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The Future Problem Solving Program International: An Intervention to Promote Creative Skills in Portuguese Adolescents

ABSTRACT

The *Future Problem Solving Program International* (FPSPI) is an internationally applied educational program that involves young people. Its theoretical foundation is both the Creative Problem Solving Model and the Futurist Thinking. It aims to promote creative and critical thinking through a futurist approach to problems. This study intended to analyze the effects of the program on creative skills evaluated by the Torrance Tests of Creative Thinking (Figural Version). The participants' perceptions of the efficacy of the program were also assessed. This intervention was carried out with 131 adolescents over a period of 7 months in an extra-curricular context. The evaluation of the program takes into account periods both before and after interventions, using similar experimental and control groups. The results showed significant statistical differences for the all skills studied and very positive perceptions of the efficacy of FPSPI. Two significant gender differences in creative performance were also found. The results are described and discussed in order to promote awareness for future research concerning this program.

Keywords: creativity, Future Problem Solving Program, adolescents, gender, creative problem solving.

Creativity today is regarded as an essential requisite for personal and social success (Rietzchel & Caniels, 2013; Runco, Lubart, & Getz, 2012). The world requires that ordinary citizens and social, political, scientific, and technological leaders alike develop skills to solve problems creatively, in the face of rapid and constant changes with their unpredictability and inherent risks. These characteristics involve not only the need for adjustment but also the ability to anticipate the advent of future innovations (MacLaren, 2012; Miller & Mumford, 2014). Thus, convergent, logical and analytical thinking has to be employed when resolving current problems, without neglecting, however, divergence, critical abilities, and a *futuristic* perspective (Guerra & de Abreu, 2005; Woythal, 2002).

The importance of an educational program intentionally aimed at the development of creativity is evident, particularly in the school context (Trilling & Fadel, 2012). In this context, adolescence develops with specificities that reinforce the relevance of promoting creativity systematically. The beginning of adolescence heralds a decline in creative skills, as has been noted since Torrance's (1976) developmental studies, largely due to the fact that teenagers become more focused on the expectations of others and they also experience profound pubertal and cognitive changes. After this decline these creative skills do tend to increase, aided by the greater capacity for abstraction and the process of constructing identity (Guinard & Lubart, 2006). Thus, there is a need to bridge these gaps at the beginning of adolescence and to encourage growth over the course of this period with respect to creativity.

On the other hand, results regarding the relationship between gender and creative achievement have been inconclusive. Different studies find that each gender can attain higher levels of creativity, while others find the results to be very similar (Amabile, 2010; Kimmelman & Walton, 2012). However, since gender as a variable is strongly influenced by psycho-social dimensions throughout life (Caleo & Heilman, 2014; Subrahmanian, 2005), the influence of stereotypes from childhood tend to show the female gender as more conformist, as being less prone to taking risks, achieving lower professional success, being less entrepreneurial and having a lower self-esteem (e.g., Shinnar, Giacomini, & Janssen, 2012; Wai, 2013). Girls are then referred

to as having fewer opportunities for creative expression (Gralewski & Karwowski, 2013; Kimmelmeier & Walton, 2012). It is thus important that opportunities to promote creativity be available to both genders, particularly during school years.

Research shows that the promotion of creative skills is justified. Meta-analytical studies (Ma, 2006; Scott, Leritz, & Mumford, 2004a,b) have shown positive results for intervention programs. Thus the idea that individuals have inherent creative potential that can be developed systematically is emphasized (Runco, 2014). Hence, a diversity of strategies and training programs have been designed, aimed at developing creative problem solving (CPS) skills regarded as the incentive for ideas that are both effective and original (Runco & Jagger, 2012).

THE FUTURE PROBLEM SOLVING PROGRAM INTERNATIONAL (FPSPI)

This training program was founded in the United States of America, derived from the educational concerns of Torrance and his collaborators (Torrance, Torrance, Williams, & Horng, 1978). It is today one of the most widespread programs in creativity training (Cramond, 2009). The designation *International* is completely appropriate, taking into account that the program has been applied in countries on every continent, such as South Africa, Australia, Korea, United States, Great Britain, Portugal, Turkey, China, Japan, Malaysia, New Zealand, Singapore, and Thailand. There is an annual international competition (www.fpspi.org) in which children and youngsters from the countries involved submit a creative project developed while attending the program. The main purpose of this competition is the training of creative skills based on themes related with the future.

The main referential model of the FPSPI (Torrance et al., 1978) is the CPS methodology. It was initially developed by Parnes (1967) and primarily focused on enhancing divergent thinking. Later, a number of convergent cognitive tools were developed within this methodology to balance and to complement divergence techniques (Miller, Vehar, & Firestien, 2001). Furthermore, Puccio and Murdock (1999) introduced the training of a specific cognitive skill at each step of the interventional method, such that they all contributed to the final goal of developing creative skills (Puccio & Murdock, 2001).

Creative Problem Solving combines the practice of divergent and convergent thinking in a cyclical process. According to this model, the creative process has six basic steps: identify underlying problems, define the relevant problem, generate ideas, select relevant ideas, create a solution for the problem, and devise a plan of action (Isaksen, Dorval, & Treffinger, 2011). This process is intended to develop skills in conceptualization, analysis, synthesis, production, evaluation, and communication of information, as well as collect this information through direct observation, experience or reflection (Cojorn, Koocharoenpisal, Haemaprasith, & Siripankaew, 2013). The CPS will thus enhance a wide range of cognitive and social dimensions, such as creative thinking, critical thinking or communication and interpersonal skills (Treffinger & Young, 2002; Vijayaratnam, 2012).

The application of the Future Problem Solving International program also takes place in six steps, but they do not totally coincide with those of CPS. The steps are: identify the problem area, select the actual problem, devise possible solutions for the problem, generate criteria for decision-making about the solutions, select the best solution after evaluating those proposed, and finally, design a plan to implement that solution.

The program is run in three competitive components. Each is defined by the number of participants, the challenges to solve, and the expected outcomes from the intervention (Treffinger, Jackson, & Jensen, 2009). In the first, Community Problem Solving, a group, with an unlimited number of participants, identifies a specific problem/challenge in the community (local, regional, worldwide). The expected output is a solution found through their practical intervention in the community. During the competition participants work on the process throughout the year, and submit a report, a visual presentation, an exhibition, and a public interview (Arbor, 1999). In the Global Issues Problem Solving component, the teams are required to have a maximum of six members. The problem is presented as a Future Scene, which contains information foreseeing a future scenario. The CPS skills the participants develop should then be reflected in a report, whose structure is predetermined (*Booklet*). This is the only component in which adults can be participants and not only coaches. Individually, young participants can apply the FPSPI through the Scenario Writing component. They are required to write creative texts, envisaging a future at least 25 years ahead (Shewach, 1991). Finally, the Action-Based Problem Solving component is not competitive and is used to facilitate the learning of other contents (Cramond & Fairweather, 2013; Treffinger, 2011). This method is always developed with groups (with an unlimited number of participants). The problems to be solved can be taken from

stories, academic texts, newspaper articles or any other source of information. As with the other components, the students' assignments are submitted to an evaluation committee and participants will receive a progress report about their skills, intended to diagnose gaps and develop potential.

Each component is assigned an adult coach trained in the program, who oversees the work developed. The training can take place in formal educational contexts (in classroom or in extra-curricular activities) or informally (through the family, local councils, etc.).

The FPSPI program lasts for at least one school year. The participants are trained in creative, critical and futurist skills while working on the defined problem, whose solution will be implemented by means of a plan they have devised. At the same time, they develop skills in competition and cooperation related to, for example, time management, emotions, or decision-making. Communication skills are also trained in group-work situations and in devising plans for solutions, for example, with reports, drawings, videos, or interviews (Treffinger, Selby, & Crumel, 2012).

Studies have been conducted on the effectiveness of FPSPI on different skills development. The program shows it is effective in stimulating creative, critical, and analytical thinking (Cramond & Fairweather, 2013; Kaufman, 2012), as well as in oral and written communication (Volk, 2008), motivation for learning, accurate representations about creativity (Morais, Jesus, Azevedo, Araújo, & Viseu, 2015; Rimm & Olenchak, 1991), and research skills (Alvino, 1993). Research also suggests the program helps to develop creative problem-solving skills among the adults charged with applying it (Margison, 2004). However, more rigorous studies that guarantee and reinforce the validity of this program are lacking.

METHOD

The purpose of this study consists in evaluating, among adolescents, the effect of the FPSPI program on the creative skills of Fluency, Originality, Elaboration, Abstractness of Titles, Resistance to Premature Closure and Creative Strengths, as well as on an overall rating of creativity. It also intends to analyze gender differences and to evaluate the perceptions of the participants about the efficacy of the program.

PARTICIPANTS

A total of 131 students from the Portuguese middle school participated in the study (67 in the experimental group and 64 in the control group). They were attending the grades seventh to ninth and aged between 12 and 15 years ($M = 13.08$; $DP = 0.888$). Gender distribution of participants was similar in each group: the experimental group had 36 girls and 31 boys, while the control group had 36 girls and 28 boys. They were attending two private schools, one in Porto and the other in Lisbon. In the Porto school, 39 students were in the experimental group and 40 in the control group and, in Lisbon, there were 28 in the experimental group and 24 in the control group. No significant statistical differences were found between the experimental and control groups, whether in terms of gender or average age.

PROCEDURES

To evaluate the effects of the FPSPI, an experimental and a control group were used in an experimental pre-test-post-test design. Groups were evaluated in the same time period and with the same time span between the two periods. The test was conducted by a psychologist in the classroom context.

Prior to data collection, permission was requested from the schools and a written consent from the participants' parents or their educational guardians. The aim of the evaluation was briefly presented to all involved. Confidentiality and voluntary participation were also guaranteed.

The program was applied in both schools using the Global Issues Problem Solving component over 7 months, in 45-minute sessions held weekly during extracurricular activities. Participants were organized into 11 groups. The program was carried out by the first author of this article (the co-coordinator director of FPSPI in Portugal) who was assisted by two teachers (one in each school) and the sessions were planned together.

This research was part of a postdoctoral project approved by the University of Minho and by the Portuguese Foundation for Science and Technology and is in agreement with ethical procedures of both institutions.

MEASURES

The evaluation of creativity was performed based on the Portuguese version (Azevedo, 2007) of the Torrance Tests of Creative Thinking (TTCT) (Figural Version, Form A). This tool is internationally the most widely used, studied and validated in evaluating creativity (Beghetto & Breslow, 2013; Runco, Millar, Acar,

& Cramond, 2010). The test is composed of three activities. In the first activity, a stimulus picture is presented and participants are asked to make their own drawings; in the second, ten different figures are used to be completed freely by the participants; then, 30 pairs of parallel lines are presented to inspire drawings. Each of these tasks is performed in 10 minutes and participants are asked to give each drawing a title. The creative skills to be tested are Fluency (number of relevant responses), Originality (rarity of responses), Elaboration (display of details), Abstractness of Titles (involving synthesis and organization of information, the only verbal measurement in the test’s Figural version), Resistance to Premature Closure (openness in processing information from a stimulus), and Creative Strengths (a set of 13 emotional indicators characteristic of creative people: Emotional Expressiveness, Story-telling Articulation, Movement or Actions, Expressiveness of Titles, Syntheses of Incomplete Figures, Syntheses of Lines, Synthesis of Circles, Unusual Visualization, Extending or Breaking Boundaries, Humor, Richness of Imagery, Colorfulness of Imagery, and Fantasy). A general score of each participant’s creativity is then calculated, providing his/her individual Creative Index. This indicator corresponds to the value obtained from the previous parameters and represents “the creative energy showed by that person” (Torrance, 1974, p. 56).

The version employed showed solid psychometric qualities. The inter-corrector agreement has scores between .66 and .90, which are similar to those found in the author’s test (Torrance & Ball, 1990a,b). The internal consistency is acceptable (a Cronbach alpha of .70) and is in line with studies on the evaluation of creativity that have also made use of this test (Kim, Cramond, & Bandalos, 2006).

This paper also used the Perceptions of FPSPI Efficacy Scale, which was developed recently (Azevedo, Morais, & Martins, submitted). Based on research on the FPSPI, 40 indicators were identified derived from variables the program aims to develop. These indicators are illustrative of the cognitive (e.g., to find connections between different themes), emotional (e.g., intrinsic motivation) and interpersonal (e.g., empathetic interpersonal relationship) dimensions. Next, ten North American coaches, with a minimum of 5 years of experience with the program, were asked to select 20 indicators from the set of 40 that best expressed the effects of the FPSPI. Thus, those that achieved an approval rate of between 85% and 100% were used in the evaluation of the program. The indicators were then scored on a five-point Likert-type scale, as follows: 0 = No opinion; 1 = Totally disagree; 2 = Disagree; 3 = Agree; and 4 = Totally agree. A Factorial analysis was performed resulting in a 17-item scale with a one-factor structure and a Cronbach alpha reliability index of .90.

RESULTS

Comparative analyses were made of the results obtained in the experimental and control groups in a pre-and post-tests design. A 2 × 2 ANOVA was conducted, with the group (experimental or control) as the between-subjects factor and the assessment times (pre-test, post-test) as the within-subjects factor. Separate ANOVA were conducted for the six main skills. In these analyses for variance in the repeated measures (time × group), the percentiles obtained at the national level in the TTCT were used, with the exception of Creative Energy (the raw values were considered for this indicator). These results are presented in Table 1.

TABLE 1. Comparison of the Results in Creative Skills Between the Control and Experimental Groups for Pre- and Post-Tests

Skills	Group	Pre-test M (SD)	Post-test M (SD)	F(1,129)	p
Fluency	Control	60.83 (26.729)	62.00 (27.104)	85.237	.000
	Experimental	41.21 (24.861)	73.49 (16.206)		
Originality	Control	25.52 (19.842)	23.50 (20.581)	40.139	.000
	Experimental	18.66 (20.514)	36.85 (24.397)		
Abstractness in titles	Control	46.16 (32.222)	29.19 (28.838)	68.258	.000
	Experimental	50.05 (30.400)	68.09 (26.657)		
Elaboration	Control	85.75 (23.930)	85.33 (23.613)	5.465	.021
	Experimental	92.03 (16.984)	97.21 (6.986)		
Resistance to premature closure	Control	53.57 (30.666)	47.78 (28.360)	25.123	.000
	Experimental	50.55 (29.765)	57.97 (29.417)		
Creative strengths (raw values)	Control	12.17 (4.997)	9.80 (4.332)	33.532	.000
	Experimental	12.99 (3.369)	13.91 (3.004)		

The analysis of the means for each assessment time (pre-test and post-test) showed that, for Fluency, Originality and Resistance to Closure, the mean was higher in the control group than in the experimental group before the intervention, whereas in the remaining skills, it was the opposite. However, in the post-test period, the means were higher in the experimental group for all the skills. When comparing the pre- and post-test, the mean of the control group was lower in the post-test except for Fluency, which increased in the post-test period. Moreover, in the experimental group means were always higher for all skills in the post-test when compared to the control group.

According to the results obtained in the ANOVA for the repeated measures, there was a significant effect in Fluency ($F(1,129) = 98.563, p = .000$), Originality ($F(1,129) = 25.723, p = .000$), Elaboration ($F(1,129) = 3.942, p = .049$), and Creative Strengths ($F(1,129) = 6.469, p = .012$). In contrast, there were no differences in the case of Abstractness of Titles ($F(1,129) = 0.065, p = .800$) and Resistance to Premature Closure ($F(1,129) = 0.380, p = .539$). There was a significant group effect for Abstractness of Titles ($F(1,129) = 20.017, p = .000$), Elaboration ($F(1,129) = 8.560, p = .004$), and Creative Strengths ($F(1,129) = 14.940, p = .000$). The effect was not present in Fluency ($F(1,129) = 1.112, p = .294$), Originality ($F(1,129) = 0.917, p = .340$), and Resistance to Premature Closure ($F(1,129) = 0.511, p = .476$). A significant interaction effect between time and group for all the skills studied was also observed (cf. Table 1).

Results for the Creative Index (overall score obtained in the TTCT) taking account of Portuguese national percentiles were also analyzed. These results are presented in Table 2 for the control and experimental groups and both pre- and post-tests.

The mean value for the control group when compared to the experimental group in the pre-test was higher. Nevertheless, considering the post-test, the experimental group improved its performance in comparison to the control group.

A significant main effect for time was observed ($F(1,129) = 16.815, p = .000$), as well as a significant main effect for group ($F(1,129) = 14.567, p = .000$) in the case of the Creative Index. A significant interaction effect for group \times time in the case of the Creative Index was also observed (cf. Table 2 and Figure 1).

Furthermore, this study also intended to determine if the program had a distinct effect with regards to gender. An ANOVA for repeated measures was performed and the results are presented in Table 3.

The values displayed in Table 3 indicate that there was a mean decrease in Originality, Abstractness of Titles, Resistance to Premature Closure, and Creative Strengths for both genders in the control group when comparing the pre and post-test. Mean values for both genders in the experimental group increased. Results were similar for Elaboration in the experimental group, whereas the females' mean increased slightly in the control group.

ANOVA for repeated measures showed that statistically significant differences were observed only in Fluency and Originality. In the case of Fluency, analyzing the pre- and post-tests, females obtained higher means than males in both control and experimental groups at pre-test. Nevertheless, at the post-test, this only occurred in the control group, thus showing that the experimental group values were higher for males. There was a significant main effect for time ($F(1,127) = 97.453, p = .000$). There was no significant interaction effect for Fluency \times gender ($F(1,127) = .777, p = .380$) but there was a significant interaction effect for Fluency \times group ($F(1,127) = 91.427, p = .000$), as well as a significant interaction effect for time \times group \times gender, also for Fluency (cf. Table 3).

With regard to Originality, the control group presents higher mean results for males at pre-test than the female group but results in this skill decreased at post-test. In the experimental group, females obtained slightly higher results at pre-test. However, at the post-test, males obtained higher results despite both genders having scored higher results at time. There was a significant main effect for time ($F(1,127) = 27.291, p = .000$). There was no significant interaction effect for Originality \times gender ($F(1,127) = .446, p = .505$), nevertheless a significant interaction effect for Originality \times group ($F(1,127) = 47.291, p = .000$), as well as for time \times group were observed (cf. Table 3).

TABLE 2. Comparison of the Results for the Creative Index Between Control and Experimental Groups for Pre- and Post-Tests

	Group	Pre-test M (SD)	Post-test M (SD)	F(1,129)	p
Creative index	Control	60.08 (30.160)	50.50 (26.261)	96.793	.000
	Experimental	59.43 (27.283)	82.70 (16.504)		

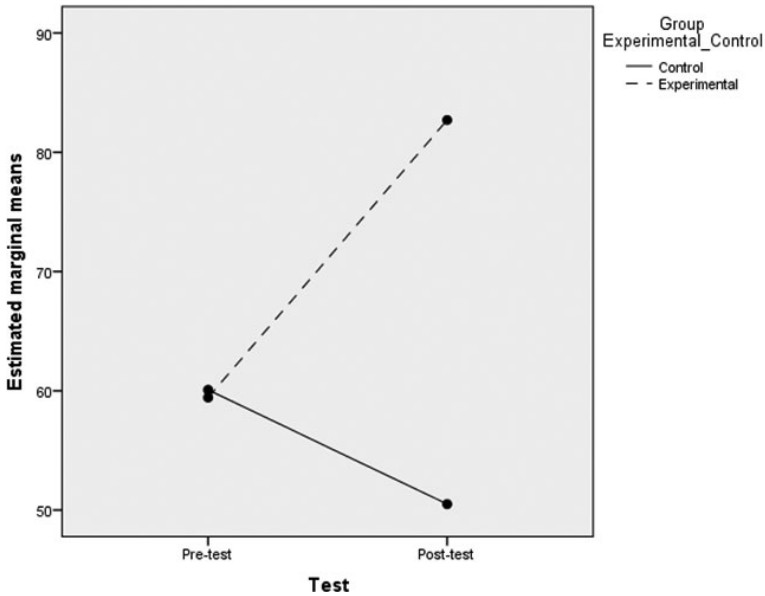


FIGURE 1. Comparison of the results for the Creative Index between control and experimental groups for pre- and post-tests.

TABLE 3. Comparison of the Results Between the Control and Experimental Groups for the Various Skills by Gender in Pre- and Post-Tests

Skills	Group	Gender	Pre-test M (SD)	Post-test M (SD)	F(1,129)	p
Fluency	Control	Male	59.93 (27.86)	55.21 (25.62)	5.069	.026
		Female	61.53 (26.19)	67.28 (27.39)		
	Experimental	Male	40.03 (26.59)	74.77 (16.09)	11.816	.001
		Female	42.22 (23.60)	72.39 (16.46)		
Originality	Control	Male	27.79 (18.12)	20.96 (17.02)	.681	.411
		Female	25.75 (21.17)	25.47 (23.02)		
	Experimental	Male	18.29 (23.23)	43.29 (26.17)	.754	.387
		Female	18.97 (18.19)	31.31 (21.61)		
Abstractness in titles	Control	Male	45.36 (33.88)	32.04 (31.32)	1.396	.240
		Female	46.82 (31.29)	26.85 (26.87)		
	Experimental	Male	40.77 (27.67)	58.61 (28.63)	.002	.969
		Female	58.26 (30.72)	76.49 (21.92)		
Elaboration	Control	Male	84.43 (27.24)	81.96 (30.24)	.002	.969
		Female	86.78 (21.35)	87.94 (16.79)		
	Experimental	Male	91.87 (13.71)	97.35 (3.85)	.002	.969
		Female	92.17 (19.57)	97.08 (8.90)		
Resistance to premature closure	Control	Male	48.14 (34.46)	44.96 (31.16)	.002	.969
		Female	57.91 (26.98)	50.03 (26.15)		
	Experimental	Male	42.06 (27.75)	48.65 (27.41)	.002	.969
		Female	57.86 (29.86)	66.00 (29.06)		
Creative strengths	Control	Male	12.68 (5.18)	10.04 (4.40)	.002	.969
		Female	11.78 (4.89)	9.61 (4.33)		
	Experimental	Male	12.74 (3.21)	11.80 (4.15)	.002	.969
		Female	13.19 (3.53)	11.99 (4.36)		

Finally, the participants' perceptions of the FPSPI efficacy were analyzed using the indicators selected by the program's international mentors that were statistically validated using a five-point scale. For each item of the scale, the minimum and maximum values, means (*M*) and standard deviations (*SD*) are presented in Table 4.

Participants, organized into 11 groups, showed very positive perceptions regarding the efficacy of the program. Only three items were scored below the maximum in the entire sample.

DISCUSSION

Creative Problem Solving is generally considered a requirement for present and future success (Runco et al., 2012). Such a need has also been recognized specifically in educational contexts (Trilling & Fadel, 2012). Thus, creative skill training programs have been designed for several decades. Among these, the training program that stands out due to its widespread international application is the FPSPI (Torrance et al., 1978).

The purpose of this study was to evaluate the effects of the FPSPI on Portuguese adolescents by considering diverse creative skills, namely Fluency, Originality, Elaboration, Abstractness of Titles, Resistance to Closure, and Creative Strengths, as well as an overall score for creativity. Statistically significant differences were verified in all these variables in both groups and in the two assessment times (before and after the intervention in the case of the experimental group). Such differences show that the experimental group had consistently better performances at the end of the intervention when compared to the control group.

These results further support the positive effects of training programs for CPS skills in general (Ma, 2006; Scott et al., 2004a,b) and of the FPSP in particular (Cramond, 2009; Kaufman, 2012; Woythal, 2014). Taking specifically the skills evaluated by the TTCT, one study in particular should be noted, still ongoing

TABLE 4. Descriptive Data Related to the Perceptions of Efficacy of the FPSPI by the Participants

	<i>N</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>
I deal better with complex issues	66	3	4	3.95	.210
I am more creative (have many, varied and unusual ideas)	66	4	4	4.00	0.000
I have more critical thinking (analyze, select and evaluate information)	66	4	4	4.00	0.000
I am more curious (observe and make questions)	66	4	4	4.00	0.000
I am better at finding and writing problems	66	4	4	4.00	0.000
I am more interested in engaging with different kinds of subjects	66	4	4	4.00	0.000
I am more involved in the tasks by the pleasure of accomplishing them	66	0	4	3.94	.492
I manage time better	66	4	4	4.00	0.000
I deal better with competition	66	3	4	3.88	.329
I am better at collecting information from multiple and varied sources	66	4	4	4.00	0.000
I am better at anticipating consequences, envisioning solutions and their executions, setting goals and following plans	66	4	4	4.00	0.000
I am more precise and thorough in thoughts and communications	66	4	4	4.00	0.000
I am more aware of complex social issues facing the world	66	4	4	4.00	0.000
I have more learning motivation	66	4	4	4.00	0.000
I have more innovative ideas (useful and unusual)	66	4	4	4.00	0.000
I am more available when facing difficult issues (complex and ambiguous)	66	4	4	4.00	0.000
I am more open to new experiences	66	4	4	4.00	0.000

and led by the Scholastic Testing Service (Kaufman, 2012; Woythal, 2014), which has found such skills were enhanced by this intervention program. Students from grades fifth to sixth obtained better Creative Indexes in the TTCT than the control group (Kaufman, 2012). Students in grades seventh and eighth showed again significant differences in performance when compared to the control group, particularly in Fluency, Originality, Abstractness in Titles, and Resistance to Premature Closure (Woythal, 2014). The results reported in this article are not only consistent with those of previous studies, but also indicate a significant improvement in Creative Strengths, that is, the positive impact of FPSPI on more emotional dimensions.

The characteristics of the program in terms of its foundations and structure can be easily associated with the positive effects that have been obtained in creativity. It systematically strives to identify what is relevant in the tasks as well as to produce and balance ideas (Isaken et al., 2011). These skills are present when performing the TTCT (Figurative version) and in the creative process in general (Kaufman, 2012; Sawyer, 2011). The program also intentionally develops fundamental requirements for the resolution of problems in general, such as time management, self-regulation, motivation through tasks and competition (Treffinger et al., 2012). These skills are also inherent to creativity assessment and to creative achievement in general (Hennessey and Amabile, 2010). FPSPI encourages discussions requiring critical thinking, imagery, metaphors and analogies, free association of ideas, forced relationships, or brainstorming techniques (Cramond, 2006). These tasks help to produce more and new ideas (Fluency, Originality, and Resistance to Premature Closure), improvements (Elaboration), and abstractness (evident in the titles asked for in the evaluation tests). Finally, it should be noted that the FPSPI also focuses on the affective dimension of learning including the use of tools like games and simulations, metaphors, imagery, or even the intentional management of emotions and the reduction of emotional blockages. These tools require both coaches and young participants to explore personal and interpersonal dimensions. Such intentional tasks can have an impact on greater emotional wealth expressed by the creative forces evaluated. Moreover, this data becomes potentially more useful given that training creative skills has more easily observed effects on the cognitive dimensions than on the emotional ones (Runco et al., 2012).

It is also interesting to analyze the mean values obtained in both groups in the pre-test and in the post-test. The fact that the experimental group started with higher values in Abstractness in Titles and in Elaboration, that is, before the intervention, does not call to question the positive effect of the program in this study. After the intervention, these dimensions (like the all the others) revealed significant growth in this specific group when analyzing the interaction between group and time. The control group obtained higher values in the pre-test for Fluency and Originality, but it was the experimental group that showed higher values in these dimensions after the intervention. While the experimental group increased their values in all the skills, the control group only maintained its values in Fluency. It should be noted that in this group the scores dropped sharply in Abstractness of Titles and Resistance to Premature Closure (more cognitive skills) as well as in Creative Strengths (the more emotional one). These results may indicate not only the positive impact of the FPSPI on the experimental group, but they also suggest students in the school years evaluated have some difficulty in maintaining creative skill levels when there is an absence of an intentional intervention. The fact that both tests were conducted at the end of the school year raises the question as to whether the increased pressure to obtain academic results, usually more or exclusively convergent (Lubart, Mouchiroud, Tordjman, & Zenasni, 2003), may have influenced the results of the control group who did not attend creative training. Anxiety and motivation to achieve a certain standard of school performance may also have hindered the development of emotional indicators, like humor or fantasy, in the creative responses. Thus, the FPSPI could have an effect not only as an enhancer of creative expressiveness, but also as a protector of possible blockages to such expressiveness. The increase in Fluency in the control group, although not statistically significant, may suggest the participants are more focused on the quantitative production of responses rather than on their quality. Thus, it may have been the less demanding skill.

The FPSPI also had a positive impact at an overall score of creativity – the Creative Index – considering the assessment times (pre-test and post-test) and the groups evaluated. This score is considered to be more useful to differentiate groups through the TTCT, whereas the evaluation by dimensions is more recommended for purposes of diagnosis and development of individual traits (Cramond, 1999; Kim, 2006). Thus, the information collected in both cases could be useful for future directions in this research. They can be used, for instance, to compare different age groups, grades, or groups with specific traits. They can even be used in the future for a more systematic development of the creative skills tested (continuation/beginning of intervention programs) or just as general orientations to be provided to educators.

The results obtained in this research, like those from other studies mentioned previously, reveal the development of creativity in adolescent participants. Taking into account the developmental course of this

construct (Guinard & Lubart, 2006; Torrance, 1976), FPSPI can be regarded as a means to overcome the decreasing trend in creativity in early adolescence and as a means to enhance creativity throughout this age group.

It also intended to analyze if the program had a differentiated gender effect but only a statistically significant interaction effect in the Fluency and in the Originality skills was found. As no significant interaction $\text{time} \times \text{group} \times \text{gender}$ was found for the majority of skills tested, it is assumed that, in general, the program does not favor any particular gender. Likewise, it is remarkable that the values of the means for boys and girls in Abstractness in Titles, Resistance to Premature Closure and Creative Strengths decreased from the pre-test to the post-test in the control group, whereas these values increased for both genders in the experimental one. Taking the school years analyzed and the idea that creativity decreases over the school year, this result may suggest that the program can help to contradict this tendency. In Fluency and Originality (skills in which significant interactions in $\text{moment} \times \text{group} \times \text{gender}$ were observed), both genders in the experimental group increased their performance from the pre-test to the post-test, having started with lower values when compared to the control group. This rise is slightly more expressive for boys. Thus, the FPSPI is not reinforcing (or is even contradicting) the predominant stereotypes that normally favor boys in creativity characteristics (Gralewski & Karwowski, 2013; Kimmelmeier & Walton, 2012).

Finally, with regard to the indicators chosen by the experienced coaches from the FPSPI, which were later validated statistically, participants expressed very positive perceptions of the program's efficacy. These indicators covered such diverse aspects such as motivation for learning, time management, creativity, and dealing with competition. On the one hand, the perceived benefit of the FPSPI may appear surprising because of its intensity and diversity (practically all of the indicators achieved top scores). On the other, such an advantage is consistent with the results of other studies. North American participants from this program have declared that their involvement in the FPSPI during adolescence was one of the most stimulating and rewarding experiences of their lives, as it aids in solving everyday problems, such as choosing a career, including challenging jobs (Cramond, 2002; Jerry, 1991). The very positive perceptions of the indicators selected are also understandable if taking into account the positive effects of the program on performance in aspects related to the indicators, such as motivation for learning (Azevedo et al., 2012; Rimm & Olenchak, 1991), desire for working in a group and research skills (Alvino, 1993; Crabbe, 1989), oral and written communication skills (Treffinger et al., 2012; Volk, 2008), and critical and analytical thinking (Cramond & Fairweather, 2013; Treffinger et al., 2012; Woythal, 2014). With respect to the gains in creativity described here and in other studies, it is important to note that the indicators for the evaluation of perceptions like "I am more curious", "I am more involved in the tasks, due to the pleasure of accomplishing them", "I am more available, when facing difficult issues", "I am more open to new experiences" or "I am better at finding and writing problems" correspond to characteristics of being creative (Cropley, 2009; Hennessey and Amabile, 2010; Morais, 2013). They are thus indicators of the program's efficacy.

This study does have some limitations. The use of a control group was the primary method to control for potential confounding variables. Given such positive perceptions from participants, there may be also a need for the study to have more than just one evaluator. If, on the one hand, this condition controlled the differential effect of various evaluators, it may also have been excessively homogeneous. However, it must be noted that participants were organized into eleven groups with their different idiosyncrasies interacting with the same evaluator.

The sample size could have been larger allowing for greater control over the students' school year. This study could also provide relevant information about a possible differential effect of the program concerning the initial and final periods of adolescence. It would, therefore, also clarify how the FPSPI could help to develop creativity in this age group in a more profitable manner.

New research should be conducted in the future given such limitations. The effect of the program could be analyzed through comparative studies with specific groups, such as gifted students, students with cognitive and/or emotional difficulties or just through the use of different intervention contexts (e.g., curricular/extracurricular). Qualitative comments from study participants could also help to clarify assumptions from the obtained Likert-scores. Finally, a follow-up study could be conducted to determine impact of the program over time. This new data could broaden knowledge on the use of this program in different countries.

The results of this study clearly show the positive effects of the FPSPI on the creative skills of Portuguese adolescents. In terms of the existing international research, FPSPI has proved once more to be a useful and valuable tool, in this case, in a country that has in recent years started its systematic application and conducted research on the issue.

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