

**CREATIVE THINKING AND BIG FIVE FACTORS OF PERSONALITY  
MEASURED IN ITALIAN SCHOOLCHILDREN<sup>1</sup>**

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*Summary.*—This study examined the relations of creative thinking with Big Five factors of personality and the differences by sex and age on creativity. A sample of Italian schoolchildren (56 boys and 56 girls), between 8 to 10 years of age, completed the Test of Creative Thinking and the Big Five Questionnaire for Children. Analysis of results indicated that older children obtained significantly higher scores than the younger ones on Elaboration and Production of titles. Girls obtained significantly higher scores than boys on Originality and Elaboration. The results suggested a modest and negative relation of Flexibility with Conscientiousness and of Production of titles with Emotional Instability. These findings support the need to explore the connection between creativity and personality in developmental age by means of multiple tasks for evaluating creative thinking.

Traditionally, creativity has been considered an individual characteristic associated with novel ideas which may emerge in the form of tangible products and within the frame of reference of the thinking person (Guilford, 1967a, 1967b); a process of becoming sensitive to problems, gaps in knowledge, missing elements, and disharmonies (Torrance, 1963); an act that produces ‘effective surprise for its uniqueness’ (Bruner, 1962); an individual ability to produce novel things (Perry-Smith & Shalley, 2003; Wai, Lubinski, & Benbow, 2005); an imaginative process with outcomes that are original and of value (Robinson, 2001); and generally, the most mysterious and critical human trait necessary for the advancement of humanity (Kerr & Gagliardi, 2003).

Many researchers have considered creativity synonymous with “divergent thinking”, defined as flexibility of thought, production, and application of many different ideas to solve a given problem with a variety of unusual, original, or off-the-wall ideas; in other words, divergent thinking has been believed the best predictor of creative performance not only in adulthood (Kirton, 2003) but also in childhood (Runco, 1986, 1992; Lubart & Sternberg, 1995). Lubart and Sternberg (1995), for instance, stated that creatively gifted children excelled in the intellectual processes of problem definition, selective encoding, and combination skills, which are key aspects of divergent and generative thinking. In addition, other researchers have noted that creatively gifted children, in comparison with non gifted peers, excel in a variety of cognitive and meta-cognitive strategies and processes involved in idea generation, insight tasks, and divergent thinking (Runco, Johnson, & Gaynor, 1996).

According to the Kirton’s Adaptation–Innovation Theory (2003), adaptors and innovators are systematically different from each other in creative style and problem solving. Most adaptors tend to be dogmatic and show a proliferation of ideas within a

framework of rules which preserve the norms. On the contrary, innovators produce many ideas in problem solving, sacrificing short-term efficiency for longer-term benefits and challenge current structures. Moreover, the literature suggests that innovators, more than adaptors, show high tolerance for ambiguity and high flexibility, and low conservatism, dogmatism and field dependence (Kirton, 2003), high extraversion, openness to experience, and emotional stability (Gelade, 2002) and, in addition, high willingness to take risks (Goldsmith, 1994). Among these elements, many factors of personality play a role in the development of creative thinking. As Kin and Pope reported (1999), creativity has long been associated with a large number of traits of personality, such as extraversion, openness to experience, and emotional stability. The last three aspects represent the current interest.

#### *Factors of Creative Thinking*

The framework of the present study for the analysis of creative thinking is represented by the model of Williams (1969), with reference to Guilford's analytic studies on divergent thinking (1950) and Torrance's research (1963). The most systematic assessment of creative thinking in elementary school children was conducted by Torrance and his colleagues (1965), who administered the Tests of Creative Thinking to thousands of children. Although Torrance used many of Guilford's suggestions in the construction of his tests, he created many tasks which can be scored for several factors involving both verbal and nonverbal aspects. These factors were defined as "ideational productivity" (or fluency), the ability to produce a variety of ideas or hypotheses concerning possible solutions to problems; "flexibility", adapting oneself to a changes in instructions, to be free from the 'inertia of thought', and to use a variety of approaches; "originality", generating uncommon responses, remote, unusual, or unconventional associations, and, in other terms, cleverness; "elaboration" (or

redefinition), the capacity to redefine and reorganize in new ways what one sees, to shift the function of familiar objects, and to transform something well known into a new context; “resistance to premature closure”, keeping an open mind while processing information and, finally, “abstractness of ideas”, that is, synthesizing processes of thinking.

Williams (1969) produced a factorial model which integrated with cognitive factors the affective aspects of human creativity, that is, personality factors such as willingness to take risks, imagination, curiosity, and complexity. He believed that the cognitive of the creative process could not be separated from the affective dimensions; for this reason, he created the Creative Assessment Packet, including two different tests to examine the cognitive and affective factors of creativity, respectively, the Test of Creative Thinking and the Test of Creative Feeling. In this model, five typical factors were identified as representative of cognitive aspects of creativity: fluency, flexibility, originality, elaboration, and production of titles or ideas. Fluency refers to the generation of a large number of ideas and production of meaningful responses; flexibility refers to changing ideas passing from one category to a different one; originality represents the capacity to produce rare and infrequent ideas; elaboration is considered the capacity to develop, embellish, and enrich ideas with details, and, finally, production of titles or ideas refers to verbal development. For the analysis of these factors, Williams used the Test of Creative Thinking, applied to a selection of gifted children for specific programs to develop creative skills.

Longitudinal studies of the development of cognitive and affective components of creativity using Williams’ tests were undertaken by Camp (1994) and Claxton, Pannells, and Rhoads (2005). Particularly, Claxton, *et al.* reported an increase in cognitive elaboration that occurred between Grades 6 and 9, while a significant decrease in

cognitive originality occurred between Grades 4 and 6. In contrast to these cognitive factors, a significant increase was found on affective components between Grades 6 and 9. These last results were explained in line with Erikson's perspective on the development of self-identity (1963). These findings describe the relation of the structure of individual personality with creative abilities in childhood which were examined in the present study.

#### *Factors of Personality and Creative Thinking*

With regard to the affective components of creativity, most researchers identified several personality traits typical of creative individuals, particularly as adults. For example, as Barron and Harrington (1981) reported, individuals with high creativity showed attraction to complexity, high energy, independence of judgment, self-confidence, and ability to solve antonyms. In addition, it has been possible to distinguish in psychological literature other traits such as openness to experience (McCrae, 1987, 1993; Shiner, 1998), curiosity and complexity (Williams, 1969), extraversion, playfulness and sense of humor (King, McKee Walker, & Broyles, 1996), need for achievement, imagination, autonomy (Feist, 1999), tension towards novelty and risk-taking (Dacey & Lennon, 1998; Csikszentmihalyi, 1999; Lee, 2005).

Many traits evoked the complex structure of personality in the Five Factors model by McCrae and Costa (1999), proposed and supported in Italian culture by Barbaranelli, Caprara, Rabasca, and Pastorelli (2003) for children and adults. This model of personality, originating from two traditions of research, the lexicographic (Allport & Odbert, 1936; Cattell, 1945) and the factorial perspectives (Eysenck & Eysenck, 1975), reflected agreement on five factors: Energy (or Extraversion), Agreeableness, Conscientiousness, Emotional Instability (or Neuroticism), and Openness to experience. Briefly, according to Caprara and Perugini's factorial analysis (1991), Energy represents

a tendency to activity, sociability, assertiveness, self-confidence, and tolerance of new and unfamiliar experiences. Individuals who obtained high scores on this factor showed dynamism, extraversion, curiosity, feelings of dominance, and talkativeness.

Agreeableness reflects a tendency to altruism, cooperation, nurturance, friendliness, and avoidance of conflict. Individuals who obtained high scores on this factor were likely to cooperate with others, to be open to the needs of others, and to be sympathetic and generous. Conscientiousness describes a tendency to orderliness and precision; so individuals who obtained high scores on this factor showed high capacity to inhibit aggressive behaviors, preferred situations under their control, and expressed tenacity about finishing uncompleted projects. Emotional Instability represents the tendency to experience events with anxiousness. Individuals who obtained high scores on such a measure described themselves as emotional, impulsive, impatient with others, and intolerant toward ambiguous situations. Finally, Openness to experience refers to the tendency toward intellectual curiosity, aesthetic sensitivity, and appreciation of other cultures. Individuals with high scores on this factor are curious to discover new things and to be in contact with different customs, while those with low scores express a narrow-mindedness and are disinterested in variety, new experiences, or new ways of doing things.

Each factor of personality has been associated with specific characteristics of creativity. Many studies have supported the view that highly creative individuals are open to new experiences (Dollinger, Urban, & James, 2004; Shimonaka & Nakazato, 2007; Prabhu, Sutton, & Sauser, 2008), self-confident, eager to cooperate, less conforming, autonomous, and have high self-esteem (Jaquish & Ripple, 1980; McCrae, 1987; Graziano & Ward, 1992; Lee, 2005). There has been little research carried out

regarding the relation of creativity with factors of personality during childhood, so this represented the rationale for testing 8- to 10-year-old children in the present study.

### *Hypotheses*

The current purpose was to explore the relations of the factors of creative thinking with the scores on five factors of personality in a sample of elementary schoolchildren. It was predicted that there would be significant differences on all factors of creative thinking by sex and age group, that is, girls would score higher on creativity than boys, and older children would score higher on creative performance than younger ones (Hypothesis 1). Also, it was predicted that there would be significant correlations between various dimensions of creativity with scores on factors of personality (Hypothesis 2).

## Method

### *Participants*

One hundred and twelve children from 8 to 10 years of age ( $M=8.8$ ,  $SD=.9$ ) were recruited from state primary and junior high schools in middle-class neighborhoods in Catania, Sicily, Italy. The total sample was balanced by sex, 56 boys and 56 girls, and divided into two age groups, 25 boys and 31 girls in Group I ( $M=8.1$  yr.,  $SD=.03$ ; range 7 yr. 7 mo. to 9 yr. 4 mo.) and 31 boys and 25 girls in Group II ( $M=9.5$  yr.  $SD=.04$ , range 9 yr. 5 mo. to 10 yr. 5 mo.).

Participants were randomly chosen from all classes in each of three elementary schools. In addition, parental consent was obtained prior to each child's participation.

### *Materials*

The measures used for creativity and personality were an Italian version of the Test of Creative Thinking (Williams, 1994) and the Big Five Questionnaire for Children (Barbaranelli, *et al.*, 2003).

*Creative thinking.*—The Test of Creative Thinking is made up of two protocols, each with 12 frames containing incomplete graphic stimuli shown to children, who were invited to draw a picture. Five scores were identified as indicators of creative thinking, Fluency, Flexibility, Originality, Elaboration, and Production of titles. The fluency score is the total number of relevant and meaningful pictures produced by participants (range of 1 to 12 points). The flexibility score is the number of total changes of ideas or pictures from one category to a different one (range of 1 to 11 points). The originality score is the total number of pictures drawn inside or outside each incomplete stimulus placed in the frames (range of 1 to 36 points); one point is assigned to each picture drawn outside the stimuli, two points to each picture drawn inside the stimuli, and three points to each picture drawn both inside and outside the incomplete stimuli. The elaboration score is the number of asymmetric pictures drawn by participants (range of 1 to 36 points): zero points are assigned to the symmetrical pictures, one point to the asymmetric pictures drawn outside the incomplete stimuli, two points to the asymmetric pictures inside the incomplete stimuli, and three points to the asymmetric pictures drawn both inside and outside the stimuli. Also, the production of titles score is the sum of points assigned to each title generated by children. One point is assigned for simple titles, two points for titles with qualifying and descriptive adjectives, three points for imaginative titles indicating something beyond the picture drawn by participants (range of 1 to 36 points).

*Personality factors.*—The Big Five Questionnaire for Children is a self-report questionnaire of 65 items in child-friendly language. For each item, participants rated

the occurrence of the behavior mentioned in the item on a scale using anchors of 1: Hardly ever and 3: Almost always. This questionnaire has been used to measure the five factors of personality, namely, Energy, Agreeableness, Conscientiousness, Emotional Instability, and Openness to experience. The first set of items assessed Energy (e.g., “I like to talk with others”). A second set dealt with Agreeableness (e.g., “I let other people use my things”). A third set assessed Conscientiousness (e.g., “I apply myself to the things I do”). A fourth set concerned Emotional Instability (e.g., “I easily get angry”). Also, a last set of items assessed Openness to experience (e.g., “I like to know and to learn new things”). Raw scores for each factor of personality were obtained by calculating the responses of participants to all the items and then transforming scores into *T* scores by means of tables reported by the authors in the Scoring and Interpreting Manual (Barbaranelli, *et al.* 2003). Internal consistency reliability was satisfactory for each factor: Energy ( $\alpha=.77$ ), Agreeableness ( $\alpha=.70$ ), Conscientiousness ( $\alpha=.70$ ), Emotional Instability ( $\alpha=.72$ ) and Openness to experience ( $\alpha=.74$ ).

### *Procedure*

These tests were administered to the participants individually during school time and in a room specifically set aside for the study. The instructions in the Manual were used and the order of presentation to the participants was as follows. First, for the Big Five Questionnaire for Children, participants self-evaluated each of 56 items by ratings them on the 3-point scale. On the Test of Creative Thinking, they finished the incomplete graphic stimuli (e.g., line, angle, S-form, square, semicircle, etc.) starting from each of the 12 frames within 20 minutes.

### *Analyses*

Analysis was based on the SPSS Version 15.0 (Statistical Package for Social Science, 2005) using two-way analyses of variance, followed by *post hoc* two-tailed *t*

tests and Pearson correlations. The statistical analyses compared scores by sex and age groups as independent variables using scores on the factors of creative thinking and personality as dependent variables.

## Results

### *Factors of Creative Thinking*

Descriptive statistics for the measure of creativity are shown in Table 1. As noted, the assessments were oriented toward within-sample comparisons in relation to the norms in the manual for the Test of Creative Thinking (Williams, 1994). However, it was interesting to note that this sample obtained higher mean scores than normative means on the factors of Fluency, Flexibility, and Originality. On the other hand, this sample obtained lower mean scores on the factor of Elaboration and Production of titles than normative means. These results indicated that children in this sample generated a large number of ideas, changing mental sets and producing infrequent ideas.

A 2 (sex of participants) x 2 (age groups) x 6 (factors of creative thinking: Fluency, Flexibility, Originality, Elaboration, Production of titles, and Total score) analysis of variance was carried out on the mean scores on the Test of Creative Thinking (Table 2). There was no interaction of sex and age group for the total sample, but there were significant main effects for sex ( $F_{5,104}=2.54, p=.03$ ) and age group ( $F_{5,104}=2.22, p=.04$ ). *Post hoc t* tests were carried out by sex of participant on each of the total mean scores on factors of creative thinking. As shown in Table 2, statistically significant differences by sex were found on Originality and Elaboration: girls showed greater capacity to think in unusual ways and generate infrequent ideas and showed greater ability to add new elements, develop, embellish, and elaborate ideas. There were

no differences between boys and girls on measured Fluency, Flexibility, or Production of titles.

*Post hoc* Student *t* tests indicated statistically significant differences between younger and older children (Age Groups I and II) for total mean scores on the Creative Thinking factors (see Table 2); older children scored higher (more creative). With regard to each factor, for elaboration and production of titles, older children expressed greater ability to add new elements and embellish ideas and greater ability to produce a large number of different ideas using more creative words to express themselves than younger children. There were no differences for age groups in fluency, flexibility, and originality.

Pearson product-moment correlations among the five factors of creative thinking were computed (see Table 3) and almost all within-creativity correlations were statistically significant (except for Flexibility) although quite low in magnitude. Scores on Production of titles were positively correlated with scores on Fluency ( $p=.008$ ), Originality ( $p<.001$ ) and Elaboration ( $p<.001$ ). Scores on Originality were positively correlated with scores on Fluency ( $p=.01$ ) and Elaboration ( $p<.001$ ). These data suggested that children who utilized more creative words to express them also produced more varied ideas and generated unusual and statistically rare thinking, veering away from the obvious. Further, children who added new elements to their own ideas visualized things differently from others.

#### *Relations of Creative Thinking and Personality Factors*

Pearson product-moment correlations were carried out between the factors of creative thinking and personality in the total sample (Table 4). A modest and negative relation between Flexibility and Conscientiousness was found ( $p=.04$ ), in the sense that the smaller the capacity to switch from one category to another, the greater the search

for precision and respect of norms and meticulous handling of new situations. Also, a modest and negative relation of Production of titles and Emotional instability was noted ( $p=.03$ ), that is, the greater the proliferation of ideas, the lower was the Emotional instability score. This last result was relevant only for older children ( $r= -.33, p=.01$ ).

A significant main effect of age group was also noted for the relation between Flexibility and Energy,  $r= -.28, p=.04$ , flexibility and agreeableness,  $r= -.31, p=.02$ ; for older children, the greater the ability to change ideational categories, the lower the tendency to both assertiveness and friendliness. Differences for sex emerged for the correlation between flexibility and agreeableness,  $r= -.28, p=.04$ , in the sense that, for girls, the greater the ability to change ideational categories, the lower the search for friendliness.

## Discussion

The present study found several similarities with the literature in relation to the influences of sex and age on creative thinking, indicating that girls and older children scored as having greater capacity to think in unusual ways and generate rare ideas, and greater ability to add new elements and elaborate ideas than boys and younger children (Smith & Carlsson, 1990; Flaherty, 1992; Dudek, Stobel, & Runco, 1993; Stephens, Karnes, & Whorton, 2001; Charles & Runco, 2001; Lee, 2005; Prieto, Parra, Ferràndo, Ferràndiz, Bermejo, & Sàncchez, 2006; De Caroli, Licciardello, & Sagone, 2007).

The advantage of this study was the exploration of the relations of creative thinking with five factors of personality in children by age, since the literature on this issue provided very few suggestions. The findings partially supported expected relations, because only the factor of Flexibility in creative thinking was modestly and negatively correlated to Conscientiousness, Emotional instability, Energy and Agreeableness. It means that children (in particular, the older children and girls) who

scored as having high capacity to switch mental sets were less interested in the handling of new situations, less emotionally unbalanced and insecure (i.e., kept their positive and negative feelings under control), and less able to opening up to the needs of other individuals and avoiding conflict. On the basis of previous studies, these results received a reasonable support in adult sample by Batey and Furnham (2006), Chamorro-Premuzic and Reichenbacher (2008).

A further interesting element that is worthy of mention because it is different from the literature is the absence of the connection between openness to experience and creative thinking. Two possible explanations of this last result could be linked to the specific age of participants and to the creativity measure used in the present study. It could be useful to replicate the study with a larger, more representative sample of Italian adolescents to assess whether these findings hold true in Italy, and subsequently with children and adolescents from other sociocultural environments, to verify if the results are similar in other countries. In addition, it could be important to utilize a set of multiple tasks for measuring creative thinking; in fact, this study has the obvious limitation to inference and generalization associated with the use of only one measure of creativity instead of a battery of creative tasks (e.g., for Italian school context, Antonietti & Cerioli, 1991), which could affect statistical correlations among factors of creativity and personality.

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Table 1. Descriptive Statistics for Factors of Test of Creative Thinking ( $N=112$ )

Factor	<i>M</i>	<i>SD</i>
Fluency	11.9	0.4
Flexibility	8.3	1.4
Originality	24.2	5.0
Elaboration	9.4	5.9
Titles	17.7	4.8
Total score	71.5	12.9

Table 2. Analysis of Variance for Six Creative Thinking Factors With *Post Hoc* Tests By Sex and Age Group ( $N=112$ )

Creative Thinking Factor	Sex	Age Group	<i>M</i>	<i>SD</i>	<i>N</i>	<i>Post hoc t</i>	
						<i>Sex</i>	<i>Age Group</i>
Fluency	M	I	11.8	0.4	25	-.49	.49
		II	11.9	0.4	31		
	F	I	11.9	0.2	31		
		II	11.8	0.5	25		
Flexibility	M	I	8.2	1.4	25	-1.20	.39
		II	8.1	1.5	31		
	F	I	8.5	1.3	31		
		II	8.5	1.4	25		
Originality	M	I	21.9	4.9	25	-3.30†	-.81
		II	23.2	4.9	31		
	F	I	25.2	5.2	31		
		II	26.2	3.9	25		
Elaboration	M	I	7.0	5.5	25	-1.98	-2.52†
		II	9.3	5.9	31		
	F	I	8.8	4.5	31		
		II	12.5	6.2	25		
Titles	M	I	15.1	4.1	25	-.99	-2.13*
		II	19	5.5	31		
	F	I	18.1	4.5	31		
		II	18.2	3.9	25		
Total score	M	I	64.1	12.4	25	-2.71†	-2.20*
		II	71.6	13.2	31		
	F	I	72.6	11.5	31		
		II	77.2	11.6	25		

*Note.*— The interaction of sex and age group was not significant ( $F_{5,104}=1.56, p=.18$ ), but main effects for sex ( $F_{5,104}=2.54, p=.03$ ) and age group ( $F_{(5,104)}=2.22, p=.04$ ) were significant. Group I participants were 7yr. 7 mo. to 9 yr. 5 mo. of age, Group II were 9 yr. 5 mo. to 10 yr. 5 mo. of age.

\*  $p < .05$ . †  $p < .01$ .

Table 3. Pearson Correlations Among Factors of Test of Creative Thinking ( $N=112$ )

Factor	1	2	3	4
1 Fluency				
2 Flexibility	.06			
3 Originality	.24*	.05		
4 Elaboration	.17	-.05	.64†	
5 Titles	.25†	-.05	.36†	.42†

\*  $p < .05$ . †  $p < .01$ .

Table 4. Pearson Correlations Among Factors of Test of Creative Thinking and Big Five Personality ( $N=112$ )

Creative Thinking Factor	Big Five Factor				
	Energy	Agreeableness	Conscientiousness	Emotional Instability	Openness
Fluency	-.13	.01	-.04	.05	.03
Flexibility	-.06	-.11	-.19*	.10	-.16
Originality	.12	-.12	-.14	-.06	.03
Elaboration	.04	-.05	-.08	-.07	.03
Title	-.05	-.07	.05	-.21*	.14

\*  $p < .05$ .