Education and Science

Vol 46 (2021) No 205 191-205

The Effects of Personality Traits of Teachers on the Development of Student Creativity

Feyzullah Şahin [1]

Abstract

By using certain techniques, teachers can set an example to their students that fosters development of their creative thinking abilities in addition to other attitudes and behaviors. The general objective of this study, conducted at the primary school level, was to analyze the effects of personality traits of teachers on the development of creative–thinking abilities among students. The Adjective–Based Personality Scale, an in–class observation form, and a creativity task were employed as data collection instruments. At the end of the study, it was found that the teachers with high levels of the *openness to experience* personality trait exhibited significantly higher levels of behavior supportive of in–class creativity and that the creativity scores of the students in their classes were significantly high. No significant differentiation was found in comparisons related to the personality traits of *agreeableness* and *neuroticism*.

Keywords

Creativity–fostering behavior
Creative–thinking
Classroom teacher
Personality traits
Openness to experience

Article Info

Received: 10.31.2019
Accepted: 06.03.2020
Online Published: 08.17.2020

DOI: 10.15390/EB.2020.9154

Introduction

An increased understanding of the importance of creativity has resulted in further study of its nature and an emphasis on examining the possibility of its responsiveness to educational interventions. In particular, four studies that deal with the issue come to the forefront. The first was conducted by Torrance (1972), who reviewed the results of 142 studies and found that the vast majority of the training he analyzed enhanced the participants' creativity. The other three studies are meta-analytic studies concluded by Rose and Lin (1984), Scott, Leritz, and Mumford (2004) and Ma (2006). In these studies, it was found that creativity trainings created a medium effect size in the first study and a large effect size in the others.

The nature–nurture position on creativity is predominantly based on interactionist (Esquivel, 1995). This humanistic–developmental perspective appears to stem from the philosophical basis for creativity. It is assumed that the roots of creativity training began with the studies of Osborn in 1953 (Meinel, Wagner, Baccarella, & Voigt, 2019). In a review study conducted 20 years earlier, 172 different techniques are mentioned (Smith, 1998). Regardless of the technique preferred, creativity training can be executed as either distinct course segments or as exercises embedded in the core curriculum (Scott et al., 2004). Teachers, as the primary individuals applying these techniques through in–class activities, are the principal actors in the development of creative–thinking abilities.

[1] Düzce University, Faculty of Education, Department of Special Education, Turkey, feyzullahsahin@duzce.edu.tr

Creativity–Fostering Practices in the Classroom

It can be said that teachers support the creativity of students in the general class environment via effects that create a synergy in two ways. In the first, student creativity is stimulated by the inquiry–discovery or problem finding–problem solving approach applied as a direct or indirect teaching method or strategy (e.g., Davis & Rimm, 2004). The second one occurs when the teacher acts as an emotional and behavioral model during social and emotional interaction (Cropley, 1997, 2006; Little, Kearney, & Britner, 2010; Soh, 2017). The teacher's actions and reactions send a signal to the students regarding the acceptability of their creative efforts, outcomes, and personal values or dispositions (Heck, 1978; Soh, 2000). As for the students, they organize their learning through the suggestions, advice, and directions coming from their teacher (Bisland, 2001). This situation is especially more apparent in the lower–age groups (Runco, 2007).

Findings of some studies have pointed out that the most important factor in developing creativity among students is the teacher (Amabile, Hennessey, & Grossman, 1986; Fryer & Collins, 1991; Kim & Schallert, 2011; Torrance, Tan, & Allman, 1970). Within this framework, a significant problem that needs to be resolved is that of determining which attitudes support creativity in the classroom environment. Setting boundaries may be difficult due to the rich and extensive status of the related literature (e.g., Amabile, 1989; Beghetto & Kaufman, 2014; Cropley, 1997, 2006; Lubart, 1994; Piirto, 2011). As for Torrance (1965, as cited in Esquivel, 1995), one of the leading researchers found in the field, points out the importance of rewarding creative behavior in the classroom and has called attention to the importance of respecting extraordinary responses and ideas. Teachers may occasionally assign exercises and tie in the evaluation with causes and consequences, thus making students realize that their ideas are respected. One of the most comprehensive studies was conducted by Cropley (1997), who included in his review the following behaviors of teachers that foster creativity in classroom: encouraging students to learn independently, using a cooperative, socially integrative style of teaching, motivating students to master factual knowledge, withholding judgement of student ideas, encouraging flexible thinking in students, promoting student self–evaluation, taking student suggestions and questions seriously, offering students opportunities, and helping students learn to cope with frustration and failure. This study pointed out that, within the large field of their instructional behaviors, teachers have the responsibly to employ those that can foster creativity in the classroom.

One of the variants within the process of developing creative–thinking abilities among students is their participation level in activities (Ma, 2006). This issue has been analyzed in a limited number of studies. For example, in one study in which self–rated data were collected, Aljughaiman and Mowrer-Reynolds (2005) determined that 75% of the primary general education teachers stated they employed in favor of integrating strategies in a regular curriculum to improve creativity. In a study in which 48 class teachers were observed for 437 hours, Schacter, Thum, and Zifkin (2006) found that attitudes that foster creative–thinking abilities were employed by teachers at the very limited frequency level of once in 8 hours. Descriptive data show that teachers provided very few opportunities for students to exercise their creativity. It is one of the most important finding that creative teaching frequency and quality scores were highly correlated with teacher productivity, suggesting a strong relationship between teachers who provide opportunities for creativity in their classrooms.

Personality Traits

The personality traits of teachers are among the factors that determine creativity–fostering behavior in the classroom. According to the Five Factor Models (FFM), McCrae and Costa (1997) investigated the relationship between personality factors and creative personality traits. The FFM categorizes the five fundamental traits of human personality as openness to experience, agreeableness, neuroticism, conscientiousness, and extraversion. One meta–analysis, which included 83 studies on scientific and artistic creativity, found a positive correlation between extraversion and openness to experience and neuroticism, while a negative correlation was found between agreeableness and conscientiousness (Feist, 1998).

In their longitudinal study covering 45 years carried out on 163 males, Soldz and Vaillant (1999) determined a positive correlation with openness to experience (r = 0.40), while a negative relationship was found with agreeableness (r = – 0.27). A few studies have investigated the relationship between a teacher's creative personality and creativity–fostering behavior. The first of these was conducted on primary school teachers by Chan and Yuen (2014), who found significant positive correlations between the total Creativity Fostering Teacher Index (CFTI) sub–dimension scores and the Creative Personality Scale scores (r = 0.19 and – 0.35, p <0.01). Lee and Kemple (2014) determined significant positive relationships between the CFTI and the personality trait of openness to experience and the Creative Behavior Inventory scale scores (r = 0.38 and 0.31, p <0.01).

Creative–thinking abilities are those that can be learned and developed (Sak & Oz, 2010). Teachers play a primary role in displaying the aforementioned attitudes and behavior. The overt or introvert attitudes displayed by teachers may consistently vary according to their personality structures. The relationship between the personality structures of teachers and their behaviors for fostering creativity in the classroom have been analyzed in a small number of studies (Chan & Yuen, 2014). Based on this point, it was decided to conduct this study.

Purpose of the Study

The objective of the present study was to determine the effects of the personality traits of teachers on the development of creative–thinking abilities among students. The study aimed to answer the following research questions:

1. What does the level of teachers' behaviors those creativity–fostering practices in the classroom?
2. Is there a significant difference between creativity of the students according to the personality traits of the teachers?

Methods

Research pattern

In this study, descriptive scanning model was used. In this type of research, the researcher does not have any intervention on the variable intended to be measured. The aim is to define the variable examined in detail and to determine the current situation as it is (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2016). In this study, this model was preferred because it was aimed to determine the effect of the behaviors exhibited by teachers on the development of student creative thinking skills and the researcher did not have any intervention.

Participants

In the present study, criterion–based selection was used to identify participants. This strategy of purposeful sampling allowed for the selection of cases, each of which met a predetermined set of criteria necessary to investigate the research question (LeCompte, Preissle, & Tesch, 1993, as cited in Yıldırım & Şimşek, 2011). The teachers who were supposed to exhibit the most frequent and intense behaviors to be observed were chosen among the group of teachers in the study. The purpose of this was to determine the highest and the lowest levels in terms of personality traits. Due to limited research opportunities, the current study was restricted to the traits of openness to experience, agreeableness, and neuroticism. Within this context, a two–stage application was employed in choosing the relevant teachers.

At the first stage, data were collected from a total of 100 classroom teachers, based on their personalities, who work in a public school and who will attend the classes of the second year in the following year in the center of Düzce city. The second grade was selected as the level at which the teachers/ school/ student interaction has been established and the skills of reading and writing have been newly learned. Among these 100 teachers, 5 (5%) had been teaching for 4 years or less, 17 (17%) for 5–8 years, 13 (13%) for 9–12 years, 23 (23%) for 13–18 years, 42 (42%) for 19 years or more. Also, they are 54 for male (54%) and 46 for (46%) and under graduate for 89 (%89), grade for 11 (%11). The arithmetic averages of all the teachers relating to their scores of openness to experience, agreeableness, and neuroticism were 6.25 ± 1.19 (min–max: 1–8), $\overline{X}$=5.14 ± 1.08 (min–max: 1–9), and $\overline{X}$=3.22 ± 1.05 (min–max: 1–7), respectively.

At the second stage, among this group of teachers, a total of 6 were determined as having either highest or lowest scores in terms of all three personality traits. Those teachers had taught the same students the previous year as well and all of them held a Bachelor's degree (male: 3, female: 3). As for their occupational experience, 2 of them had been working for 9–12 years, 2 for 13–18 years and 2 for 19 years or more. The highest and lowest scores of these teachers in terms of *openness to experience* were 4.1 and 7.00, respectively (with other arithmetic averages of their scores as 3.22 and 5.22 for agreeableness and 3.00 and 3.86 for neuroticism). The highest and lowest scores for agreeableness were 4.44 and 7.00 (with 3.38 and 5.25 for openness to experience and 3.14 and 2.43 for neuroticism). Their highest and lowest scores for neuroticism were 1.57 and 6.14 (with 4.88 and 6.22 for openness to experience and 2.24 and 4.56 for agreeableness).

The students in the classrooms of the teachers determined at the second stage were also included in the data collection pool. The observation was conducted in six classrooms with a total of 141 students (male: 73, female: 68). The population of the classrooms was between 21 and 26 ($\bar{X}$=23.50). Within the context of the study, the purposive sampling method was employed to determine the students from whom the data would be collected. Among those not included in the study were students diagnosed within the context of or identified as candidates for special education due to mental disability, learning disability, attention deficit, gifted status, etc., those participating in extra–curricular creativity–fostering activities in art and music, those registered in the current class at the beginning of the academic year and those having various levels of knowledge or skills possibly affecting creative–thinking abilities according to the opinion of their teachers. The analysis was continued using the pre and post test data obtained from 100 students (male: 48, female: 52) who met the aforementioned criteria. This research was conducted in Düzce, Turkey. The schools in which the study is carried out are public schools. Also, teachers followed exactly the same curriculum. The physical structure and equipment of the classrooms were similar.

Data Collection Tools

Adjective–Based Personality Scale (ABPT)

The ABPT was developed by Bacanlı, İlhan, and Aslan (2009) based on the theory of FFM and consists of 40 items consisting of on incompatible pairs of adjectives. Items were scored using a 7–point Likert scale ranging between "1" (strongly disagree) and "7" (strongly agree). As a result of the principal component analysis, the structure included the five factors of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. These five factors explained 52.63% of the total variance of the scale. In the ABPT reliability study, the reliability coefficient obtained through repeating the test for each sub–dimension was between 0.68 and 0.86. In this study cronbach alfa coefficient, openness to experience was calculated as 0.83, agreeableness 0.87, and neuroticism 0.79. The scores to be obtained from sub–dimensions are as follows; 8–56 for openness to experience, 9–63 for agreeableness, and neuroticism 7–49. The scores arithmetic obtained from the sub–dimensions were 8.56 for openness to experience, 9.63 for agreeableness, and 7.49 for neuroticism. High scores meant that the related characteristics were seen at a more concentrated level.

Creativity Task

To determine the figurative creativity levels of the students, among the Figurative Form B activities in the Torrance Creative Thinking Test (TTCT), the activity with circles was employed. In this activity, the students were expected to perform the task of drawing to complete incomplete circles (Torrance, 1990). Participants are asked to draw as many circles as possible. In compliance with the TTCT practical guide, 10 minutes were given to complete the activity.

In this study, the responses of the students were scored via the sub–dimensions of fluency, flexibility, and creativity index. The fluency was scored as the number of correct answers given to each item. In measuring the creativity index scores, the formula developed by Snyder, Mitchell, Bossomaier, and Pallier (2004, p. 416) was used: $CI = log2\{(1 + u1)\ (1 + u2)\ \ldots\ (1 + uc)\}$

Because the student responses on the creativity task were scored by a researcher, an analysis was carried out to examine its inter–scoring reliability. Sixty cases (30 pre–test and 30 post–test) (30%) were randomly selected from the 200 papers and these were scored by a researcher. The analysis showed that the inter–scoring reliability coefficient was .99 for the fluency score, .92 for the flexibility score, and .84 for the creativity index score. Also, the Cronbach alfa internal reliability consistency was examined. The coefficient values were found to be .85 pretest and .84 post–test. These results indicate a high level of reliability (George & Mallery, 2010).

Observation Form

To determine the levels of the in–class creativity–fostering behavior of the teachers, a structured observation form was employed. The observation form was developed by Soh (2000) based on the perspective of Cropley (1997) and adapted into Turkish in both a long form (Dikici, 2011) and a short form consisting of a Turkish sampling (Dikici & Soh, 2015). In the short form, a total of nine items thought to represent the long form at the highest level were chosen, including one item for each sub–dimension. Later on, those items were transformed into statement of performance. Two experts were consulted and they approved its use as an observation form.

The observations were conducted between 15 October 2017 and 15 December 2017 by a teacher with 13 years of experience as a primary school teacher. Within this framework, each of the 6 teachers was observed for a period of one's hour once a week for 12 weeks. The observations were conducted at different hours of the day and on different days of the week. In total, 72 hours of class observation were carried out different courses (24 hours of Turkish, 30 hours of Mathematics, 12 hours of Social Studies and 6 hours of Science Education). The observations were conducted within the framework of the routine course content determined by the National Ministry of Education. The observer sat at a free desk at the back of the classroom and noted the observations on the form. During the observation, behaviors not clearly observed or for which there was behavior about the context were brought up for discussion during the break at the end of the class. The behavior was discussed with the teacher and the results were written on the form after reaching a conclusion. Thus, the aim was to increase the internal reliability of the observation (Yıldırım & Şimşek, 2011). A score of "1" was given for each display of the behavior during a course, not to "0". Then, frequency and percentages of the observations were calculated. The behaviors in Table 1 are as follows in terms of performance: "1-S/he gives an opportunity to investigate the topics it describes in detail "," 2- S/he gives opportunity for group work "…" 9- S/he encourages the student to overcome the problem when his student has a negative experience".

Data Analysis

The data was evaluated for loss values and normality assumptions pre–analysis. Accordingly, while no value was entered incomplete, the kurtosis and skewness coefficients were not found to meet the normal distribution assumptions. It was decided to apply non–parametric techniques in the analysis. Mann Whitney U and Wilcoxon Signed Rank Test were applied to determine differences between groups. The data of the study were analyzed with the help of Statistical Package for Social Sciences (SPSS) version 23.0.

Results

Firstly, the question "What does the level of teachers' behaviors those creativity–fostering in the classroom?" was investigated. Frequency and percentages of teachers' behaviors were prepared. The results were shown in the table 1.

Table 1. The Level of Displaying Teachers' Behaviors Fostering Creativity in Classroom

Behaviors	1		2		3		4		5		6		General	
	$\bar{X}$	Sd	$\bar{X}$	Sd	$\bar{X}$	Sd	$\bar{X}$	Sd	$\bar{X}$	Sd	$\bar{X}$	Sd	$\bar{X}$	Sd
1.Providing opportunity to research the explained issues in detail	4.42	1.00	3.17	1.19	4.08	1.311	3.17	1.34	3.58	2.07	3.67	1.37	3.68	1.44
2.Providing opportunity in group work	3.67	.89	2.83	.58	3.58	.52	3.25	.75	3.0/8	.90	3.58	.79	3.33	.79
3.Indicating the importance of basic knowledge and skills completely	4.33	1.30	3.17	.84	3.75	1.36	3.83	1.27	4.33	1.56	3.50	.67	3.82	1.24
4.Asking questions in order to encourage the students to think more	3.08	1.38	2.08	1.38	2.50	.52	1.92	.90	2.25	1.06	3.33	.99	2.47	1.19
5.Even it is irrelevant, encouraging students to ask questions	3.17	1.03	2.50	1.00	3.50	1.00	3.00	1.35	3.00	.95	3.17	1.03	3.06	1.07
6.Providing opportunity to students in sharing their strong and weak sides	3.58	1.73	2.67	1.72	4.00	1.76	2.67	1.07	3.58	1.56	3.25	1.29	3.29	1.57
7.Listening to the questions from students the carefully	4.42	.90	2.75	.96	4.25	1.42	3.17	1.12	4.58	1.24	3.58	.90	3.79	1.27
8.Consolidating the newly learned issues which students employ for different purposes	2.25	1.42	1.67	.89	2.42	.52	3.08	1.16	1.75	1.06	2.92	.79	2.35	1.12
9.Encouraging students to overcome the problem when they experience a trouble	1.33	.89	1.00	.43	1.67	.98	1.67	.98	.83	.56	2.42	.67	1.49	.92
General average	30.25	5.26	21.83	5.83	29.75	4.14	25.75	4.92	27.00	5.36	29.42	3.12	2.59 27.10	1.18 5.70

Note: 1= High openness to experience, 2= Low openness to experience, 3= High agreeableness, 4= Low agreeableness, 5= High neuroticism, 6= Low neuroticism.

To foster the creativity of the students, stimulating features (stimulants) in Table 1 were presented throughout the lesson at an average of 27.10 ± 5.70 times. The teachers having higher scores related to the personality trait of *openness to experience* obtained the highest values for creativity–fostering stimulation ($\bar{X}$=30.25 ± 5.56) while the lowest values for creativity–fostering stimulation ($\bar{X}$=21.83 ± 5.83) were presented by their colleagues with lower levels of personality traits. The teachers on average displayed each stimulant 2.59 ± 1.18 times. The most stimulation was given within the context of "*Indicating the importance of basic knowledge and skills completely*" ($\bar{X}$=3.82 ± 1.24), while the least was given within the context of "*Encouraging students to overcome the problem when they experience a trouble*" ($\bar{X}$=1.49 ± 0.92). In other words, the most stimulus is given by the dimension of motivation, while the least stimulus is given by the dimension of frustration. The question of "Is there a significant difference between creativity of the students according to the personality traits of the teachers?" is also investigated in research. In this context, firstly, it was examined whether there was a significant difference between the students groups at the beginning and end of the semester.

Table 2. Mann Whitney U Test Scores of Students at Beginning of Semester

Students creativity sub–scores	Students	n	Mean rank	Sum of ranks	*U*	*p*
Fluency	Students of classroom teachers who exhibit a high level of openness to experiences	16	20.34	325.50	114.50	.202
	Students of classroom teachers who exhibit a low level of openness to experiences	19	16.03	3604.50		
	Students of classroom teachers who exhibit a high level of agreeableness	16	17.00	272.00	104.00	.516
	Students of classroom teachers who exhibit a low level of agreeableness	15	14.93	224.00		
	Students of classroom teachers who exhibit a high level of neuroticism	16	17.75	284.00	140.00	.889
	Students of classroom teachers who exhibit a low level of neuroticism	18	17.28	311.00		
Flexibility	Students of classroom teachers who exhibit a high level of openness to experiences	16	18.59	297.50	142.50	.727
	Students of classroom teachers who exhibit a low level of openness to experiences	19	17.50	332.50		
	Students of classroom teachers who exhibit a high level of agreeableness	16	18.00	288.00	88.00	.174
	Students of classroom teachers who exhibit a low level of agreeableness	15	13.87	208.00		
	Students of classroom teachers who exhibit a high level of neuroticism	16	18.44	295.00	129.00	.592
	Students of classroom teachers who exhibit a low level of neuroticism	18	16.67	300.00		
Creativity index	Students of classroom teachers who exhibit a high level of openness to experiences	16	19.75	316.00	124.00	.349
	Students of classroom teachers who exhibit a low level of openness to experiences	19	16.53	314.00		
	Students of classroom teachers who exhibit a high level of agreeableness	16	17.63	282.00	94.00	.302
	Students of classroom teachers who exhibit a low level of agreeableness	15	14.27	214.00		
	Students of classroom teachers class who exhibit a high level of neuroticism	16	18.41	294.50	129.50	.616
	Students of classroom teachers class who exhibit a low level of neuroticism	18	16.69	300.50		

Table 3. Mann Whitney U Test Scores of Students at in the Semester

Students creativity sub–scores	Students	n	Mean rank	Sum of ranks	*U*	*p*
Fluency	Students of classroom teachers who exhibit a high level of openness to experiences	16	25.31	405.00	35.00	.000[a]
	Students of classroom teachers who exhibit a low level of openness to experiences	19	11.84	225.00		
	Students of classroom teachers who exhibit a high level of agreeableness	16	18.28	292.50	83.50	.138
	Students of classroom teachers who exhibit a low level of agreeableness	15	13.57	203.50		
	Students of classroom teachers who exhibit a high level of neuroticism	16	15.25	244.00	108.00	.204
	Students of classroom teachers who exhibit a low level of neuroticism	18	19.50	351.00		
Flexibility	Students of classroom teachers who exhibit a high level of openness to experiences	16	24.00	384.00	56.00	.001[a]
	Students of classroom teachers who exhibit a low level of openness to experiences	19	12.95	246.00		
	Students of classroom teachers who exhibit a high level of agreeableness	16	17.13	274.00	102.00	.425
	Students of classroom teachers who exhibit a low level of agreeableness	15	14.80	222.00		
	Students of classroom teachers who exhibit a high level of neuroticism	16	18.00	288.00	136.00	.766
	Students of classroom teachers who exhibit a low level of neuroticism	18	17.06	307.00		
Creativity index	Students of classroom teachers who exhibit a high level of openness to experiences	16	25.50	408.00	32.00	.000[a]
	Students of classroom teachers who exhibit a low level of openness to experiences	19	11.68	222.00		
	Students of classroom teachers who exhibit a high level of agreeableness	16	17.59	281.50	94.50	.312
	Students of classroom teachers who exhibit a low level of agreeableness	15	14.30	214.50		
	Students of classroom teachers who exhibit a high level of neuroticism	16	16.72	267.50	131.50	.664
	Students of classroom teachers who exhibit a low level of neuroticism	18	18.19	327.50		

[a]*p<0.01*

As can be seen from Table 2, there was no significant difference in the creativity sub–scores of the students according to their teachers' groups at the beginning of the semester (respectively, U= 114.50, 104.00, 140.00, 142.50, 88.00, 129.00, 124.00, 94.00 and 129.50 at p> 0.05). Therefore, it can be said that the students' potential levels of creativity were similar prior to the teachers' creativity–fostering classroom behaviors. As showed in Table 3, after the teachers' creativity–fostering classroom behaviors at end of the semester, the scores of fluency, flexibility and creativity index among the students in the classrooms of the teachers with higher scores for openness to experience were at a moderate level and differed significantly (respectively, U= 35.00, 56.00, 32.00, z= –3.917, –3.344, and – 3.981 at p= 0.01, d= 0.66, 0.56 and 0.67), with the mean ranks of the students in this group being higher than those of their peers (respectively, 25.31, 24.00 and 25.50). No significant difference was observed in the scores of the students from other groups (respectively, U= 83.50, 108.00, 102.00, 136.00, 94.50 and 131.50 at p> 0.05).

Table 4. Wilcoxon Signed Rank Test Chart of the Creativity Scores of the Students

Creativity sub–score	Students	Pre–test Post–test[a]	n	Mean rank	Sum of ranks	*z*	*p*
Fluency	Students of classroom teachers who exhibit a high level of openness to experiences	Negative rank	2	2.50	5.00		
		Positive rank	14	9.36	131.00	–3.285	.001[b]
		Equal	0				
	Students of classroom teachers who exhibit a low level of openness to experiences	Negative rank	5	10.70	53.50		
		Positive rank	14	9.75	136.50	–1.722	.085
		Equal	0				
	Students of classroom teachers who exhibit a high level of agreeableness	Negative rank	1	5.92	35.50		
		Positive rank	13	6.10	30.50	–.903	.366
		Equal	2				
	Students of classroom teachers who exhibit a low level of agreeableness	Negative rank	3	6.67	20.00		
		Positive rank	11	7.73	85.00	–.782	.403
		Equal	1				
	Students of classroom teachers who exhibit a high level of neuroticism	Negative rank	6	8.08	48.50		
		Positive rank	7	6.07	42.50	–.214	.830
		Equal	3				
	Students of classroom teachers who exhibit a low level of neuroticism	Negative rank	4	6.38	25.50		
		Positive rank	12	9.21	110.50	–1.251	.172
		Equal	2				
Flexibility	Students of classroom teachers who exhibit a high level of openness to experiences	Negative rank	1	5.00	5.00		
		Positive rank	11	6.64	73.00	–2.804	.005[b]
		Equal	4				
	Students of classroom teachers who exhibit a low level of openness to experiences	Negative rank	8	5.00	40.00		
		Positive rank	2	7.50	15.00	–1.387	.166
		Equal	9				
	Students of classroom teachers who exhibit a high level of agreeableness	Negative rank	6	5.92	35.50		
		Positive rank	5	6.10	30.50	–.237	.813
		Equal	5				
	Students of classroom teachers who exhibit a low level of agreeableness	Negative rank	1	2.50	2.50		
		Positive rank	3	2.50	7.50	–1.000	.317
		Equal	11				
	Students of classroom teachers who exhibit a high level of neuroticism	Negative rank	4	3.50	14.00		
		Positive rank	2	3.50	7.00	–.816	.414
		Equal	10				
	Students of classroom teachers who exhibit a low level of neuroticism	Negative rank	5	6.00	30.00		
		Positive rank	5	5.00	25.00	–.277	.782
		Equal	8				
Creativity index	Students of classroom teachers who exhibit a high level of openness to experiences	Negative rank	2	2.00	4.00		
		Positive rank	14	9.43	132.00	–3.311	.001[b]
		Equal	0				
	Students of classroom teachers who exhibit a low level of openness to experiences	Negative rank	8	10.13	81.00		
		Positive rank	9	8.00	72.00	–.213	.831
		Equal	2				
	Students of classroom teachers who exhibit a high level of agreeableness	Negative rank	8	6.06	48.50		
		Positive rank	8	10.94	87.50	–1.009	.313
		Equal	0				
	Students of classroom teachers who exhibit a low level of agreeableness	Negative rank	3	6.00	18.00		
		Positive rank	11	7.91	87.00	–.588	.556
		Equal	1				
	Students of classroom teachers who exhibit a high level of neuroticism	Negative rank	9	6.56	59.00		
		Positive rank	4	8.00	32.00	–.944	.345
		Equal	3				
	Students of classroom teachers who exhibit a low level of neuroticism	Negative rank	6	11.00	66.00		
		Positive rank	11	7.91	87.00	–.500	.617
		Equal	1				

[a]*Based on negative ranks.*

[b]$p<0.05$

As presented in Table 4, the results of the Wilcoxon Signed Rank Test indicated that the creativity sub–scores were at medium and high levels and differed significantly for the students in the classroom of the teachers with high scores for openness to experience (respectively, z = –3.285, –2.804 and –3.311 at p = 0.005, d = 0.82, 0.70, 0.83). The rank sums of the difference scores were assessed and it was determined that the difference was in favor of the positive ranks, namely, the post–test teachers' creativity–fostering behaviors in classroom scores. The creativity sub–scores of the other students exhibited no statistically significant difference (respectively, z = –1.722, –0.903, –0.782, –0.214, –1.251, –1.387, –0.237, –1.000, –0.816, –0.277, –0.213, –1.009, –0.588, –0.944 and –0.500 at p> 0.05).

Discussion

Within the context of the study, firstly, the teachers with higher or lower levels of traits such as *openness to experience*, *agreeableness*, and *neuroticism* were determined according to the FFM model. Afterwards, the levels of creativity–fostering behavior employed by these teachers in their classrooms and their effects on the development of the creative–thinking abilities of the students were analyzed.

The results indicated that the teachers with high levels of *openness to creativity* displayed creativity–fostering behavior more and at higher levels than their colleagues with lower levels of that personality trait. The results of the in–class observation showed that the teachers with higher values of *openness to experience* presented an average of 30 stimulants per lesson while those with lower levels of the personality trait presented about 22 stimulants. Those findings are in parallel with the results of the study by Lee and Kemple (2014) on the creativity–fostering behavior and *openness to experience* personality trait and the study by Chan and Yuen (2014) which dealt with the relationships among creative personality traits. Because, high levels of *openness to experience* have been characterized with behaviors which included curiosity, aesthetic sensitivity, power of imagination, seeking original ideas and being unconventional. In contrast, low levels of this trait are seen to reflect conventional, non–progressive shallowness and limited intellectual interest (Chamorro-Premuzic, 2007).

In the study, concerning the issue of whether or not the *creativity* sub–scores of the students significantly differed, it was found that the pre and post–test scores of the students in the classrooms of the teachers with high levels of *openness to experience* differed significantly. This result is consistent with the conclusion that the student level was similar at the beginning of the study and differentiated at the end of the study. The result is parallel with Lee and Kemple's (2014) findings. According to the researcher, this result may have emerged because these tendencies, preferences, attitudes, ways of thinking and behaviors constitute the role model for the development of creativity among the students. In terms of the role modeling of teachers, when the results of the reports in which the relationships between *openness to experience* and divergent thinking (Feist, 1998; Furnham & Bachtiar, 2008; Furnham, Batey, Anand, & Manfield, 2008; McCrae & Costa, 1997; Soldz & Vaillant, 1999), creative achievement (Silvia, Nusbaum, Berg, Martin, & O'Connor, 2009) and creative verbal ability (King, McKee Walker, & Broyles, 1996) are considered, it can be concluded that they indirectly cohered the findings of this research.

On the other hand, when compared to their colleagues, the teachers regarded as being qualified more frequently displayed in–class creativity–fostering behaviors such as being eager for new experiences (Hansen & Feldhusen, 1994; Torrance et al., 1970; Whitlock & DuCette, 1989), encouraging higher thinking among their students (Hansen & Feldhusen, 1994; Nelson & Prindle, 1992; Wendel & Heiser, 1989), encouraging students to work independently (Farrell, Kress, & Croft, 1988; Hansen & Feldhusen, 1994; Karnes, Stephens, & Whorton, 2000; Nelson & Prindle, 1992; Rogers, 1989, 2007; Whitlock & Ducette, 1989), having democratic attitudes (Chan, 2001; Farrell et al., 1988) and having a strong sense of humor (Wendel & Heiser, 1989). Those results can be interpreted to partially support the findings of our study.

When the scores of the students in the class of teachers who showed high or low level of personality trait of agreeableness and neuroticism were compared, the results were not significant. Teachers with high levels of *agreeableness* were classified as friendly, warm and flexible in terms of

communication, while those having lower scores tended to display revengeful, competitive and disputative behavior (Costa & McCrae, 1995). In one group study, teachers regarded as being more qualified who displayed behavior such as being flexible (Hansen & Feldhusen, 1994; Torrance et al., 1970; Whitlock & DuCette, 1989) and establishing a better quality of communication within the learning environment (Chan, 2001; Hansen & Feldhusen, 1994; Whitlock & Ducette, 1989) were expected to support the establishment of a creativity–fostering classroom environment. Those two behavioral characteristics can be considered as an attitude displayed by individuals with high levels of *agreeableness*. On the other hand, descriptive statistics are consistent with the literature results. The teachers with higher *agreeableness* scores presented approximately 30 stimulants per lesson hour, while those with lower scores presented 26 stimulants. Moreover, at the end of the semester, the mean rank score of the students in the classroom of the teacher who had higher aggreeableness score did not differ significantly from their peers, but it was higher. In other words, the *creativity* scores of the students increased relative to the number of stimulants. The reason for this contradictory result, which does not extend beyond the expectations of the researcher, can be analyzed in further detail.

The behavior of the individuals with higher *neuroticism* levels is characterized by the power to struggle against feelings of anxiety, restlessness, remorse, and stress. However, those with lower levels of this trait are defined as individuals who are open to criticism, calm and have the capacity to cope with negative feelings and events (Costa & McCrae, 1995). From this point of view, although no data has been collected on this subject it is possible that teachers with higher levels of *neuroticism* may establish and interact with their students in a more competitively structured atmosphere and with high levels of anxiety as compared to their colleagues. Interacting with students in a structured and stressful atmosphere (Beghetto & Plucker, 2006; Graham, Sawyers, & DeBord, 1989; Jeffrey, 2006; Schacte et al., 2006) and at high levels of competitiveness (Piirto, 2011; Sungur, 1997) has been stated to repress the development of creativity. When descriptive statistics are considered, it may be seen that these results are partially supported. Namely, that the teachers with higher *neuroticism* scores presented approximately 27 stimulants per lesson hour, while those with lower scores presented approximately 29 stimulants. Moreover, after the teachers' creativity– fostering behaviors in the classroom, the mean ranks of the students in the classrooms of teachers having higher *neuroticism* scores were relatively higher than those of their peers.

Conclusion and Suggestions

Amabile (1996) and Csikszentmihalyi (1996) pointed out that the environment has a strong effect on the development and encouragement of creativity. According to Rhodes (1961, as cited in Soh, 2000), much more research effort has been accorded to the product, person, and process and much less to pressure. This, perhaps, is because of the all–encompassing nature, and hence elusiveness, of the concept of the environmental pressure needed to support the development of creativity. A teacher can directly reinforce creativity through interaction with students and by rewarding their creative efforts and outcomes as well as by recognizing their creative traits. The teacher can also indirectly influence student creativity by generating a supportive social environment through words and deeds (Yang, Hong, Lee, & Lin, 2019).

In the related literature, the doyens of the field of creativity have frequently complained that teachers fail to focus on the development of creativity in their students (e.g., Cropley, 1997; Piirto, 2011; Runco, 2007; Sak, 2004). They seem right in their views. Because, 33% of teachers were found not to regard developing student creativity as one of their major tasks, while 25% of them employed a single method (Aljughaiman & Mowrer-Reynolds, 2005), and 53% limited creativity via various applications (brainstorming, etc.) in order to develop "divergent thinking" (Fryer & Colling, 1991). When compared to those this research findings, the status of the teachers who presented approximately 27.10 ± 5.70 stimulants per lesson hour in the present study could be regarded as providing better opportunity.

This research was subject to some constraints. The first, and perhaps the most important, involved the data collection methods, which only dealt with the frequency of the aforementioned

stimulants. In addition to the frequency of stimulation, other factors such as severity, intensity, functional value and motivation are also effective in the changing of behavior. For example, it is possible that creative characteristics and abilities alone are not sufficient to improve student creative–thinking abilities. Torrance's (1987) review of studies on teacher variables suggested that the teachers' creative motivation was stronger than the teachers' creative abilities in influencing student creativity. In the current study, except for the frequency of a behavior, no data were collected on other variants. Conducting a study which includes other options which may be effective on behavior may lead to results with higher levels of generalizable.

Another limit of the study may emerge within the context of the Hawthorne effect. In accordance with the ethical guidelines, the teachers consented to be observed in their classes. Accordingly, the stimulants presented to the students by the teachers may have been relatively high. However, to minimize this effect, the observations were conducted throughout a 12–week period, on various days of the week and during different lessons, and by conducting observations within the context of nine different behavioral characteristics.

Other limitations of the study of the teachers' creativity– fostering behaviors in the classroom included only three different personality traits and the study period lasted only three months. Conducting the study using five different teacher personality traits and conducting long–term observations would be useful in obtaining more detailed and de facto information related to the issue. The present findings should be evaluated within the content of these limitations.

In numerous theoretical studies it has been emphasized that teachers should possess creative–thinking abilities and some creativity–fostering personality traits. The results of this study reflect the importance of this theoretical perspective in practice. The teachers with more creativity–fostering personality traits employed those sorts of applications relatively more frequently and those occasions developmented the creativity levels of their students. Consequently, the personality trait of *openness to experience* should be highly considered in the selection of teachers to be employed in programs which prioritize the development of this criterion among students. Moreover, in teacher–training programs and during the preparation of in–service training, focusing on the development of these behavioral characteristics within the context of the personality traits will contribute to cultivating future generations of students with high levels of creativity.

References

Aljughaiman, A., & Mowrer-Reynolds, E. (2005). Teachers' conceptions of creativity and creative students. *Journal of Creative Behavior, 39*(1), 17-24.

Amabile, T. M. (1989). *Growing up creative: Nurturing a lifetime of creativity.* New York, NY: Crown Press.

Amabile, T. M. (1996). *Creativity in context*. Boulder, CO: Westview Press.

Amabile, T. M., Hennessey, B. A., & Grossman, B. S. (1986). Social influences on creativity: The effects of contracted-for reward. *Journal of Personality and Social Psychology, 50*(1), 14-23. doi:10.1037/0022-3514.50.1.14

Bacanlı, H., İlhan, T., & Aslan, S. (2009). Beş faktör kuramına dayalı bir kişilik ölçeğinin geliştirilmesi: Sıfatlara dayalı kişilik testi (SDKT). *Türk Eğitim Bilimleri Dergisi, 7*(2), 261-279.

Beghetto, R. A., & Kaufman, J. C. (2014). Classroom contexts for creativity. *High Ability Studies, 25*(1), 53-69. doi:10.1080/13598139.2014.905247

Beghetto, R. A., & Plucker, J. A. (2006). The relationship among schooling, learning, and creativity: "All roads lead to creativity" or "You can't get there from here?". In J. C. Kaufman & J. Baer (Eds.), *Creativity and reason in cognitive development* (pp. 316-332). New York, NY: Cambridge University Press.

Bisland, A. (2001). Mentoring: An educational alternative for gifted students. *Gifted Child Today*, *24*(4), 22-26.

Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2016). *Bilimsel araştırma yöntemleri* (20th ed). Ankara: Pegem Publishing.

Chamorro-Premuzic, T. (2007). *Personality and individual differences*. Oxford, UK: Wiley Blackwell.

Chan, D. W. (2001). Characteristics and competencies of teachers of gifted learners: The Hong Kong teacher perspective. *Roeper Review*, *23*(4), 197-202.

Chan, S., & Yuen, M. (2014). Creativity beliefs, creativity personality and creativity-fostering practices of gifted education teachers and regular class teachers in Hong Kong. *Thinking Skills and Creativity, 14,* 109-118. doi:10.1016/j.tcs.2014.10.003

Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention.* New York, NY: Harper Collins.

Costa, P. T., & McCrae, R. R. (1995). Domains and facets: Hierarchical personality assessment using the revised neopersonality inventory. *Journal of Personality Assessment, 64*(1), 21-50.

Cropley, A. J. (1997). *More ways than one: Fostering creativity in the classroom* (4th ed.). Greenwich, CT: Ablex Publishing.

Cropley, A. J. (2006). Creativity: A social approach. *Roeper Review, 28*(3), 125-130.

Davis, G. A., & Rimm, S. B. (2004). *Education of the gifted and talented* (5th ed.). USA: Allyn & Bacon.

Dikici, A. (2011). The adaptation of creativity fostering primary teachers index scale into Turkish. *Educational Sciences: Theory & Practice, 13*(1), 318-323.

Dikici, A., & Soh, K. (2015). Indexing creativity fostering teacher behaviour: Replication and modification. *Higher Education of Social Science*, *9*(3), 1-10. doi:10.3968/7486

Esquivel, G. B. (1995). Teacher behaviors that foster creativity. *Educational Psychology Review, 7*(2), 185-202.

Farrell, B., Kress, M., & Croft, J. (1988). Characteristics of teachers in a full day gifted programs. *Roeper Review*, *10*(3), 136-139.

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review, 2*(4), 290-309.

Fryer, M., & Colling, J. (1991). British teachers' views of creativity. *Journal of Creative Behavior, 25*(1), 75-81.

Furnham, A., & Bachtiar, V. (2008). Personality and intelligence as predictors of creativity. *Personality and Individual Differences*, *45*(7), 613-617.

Furnham, A., Batey, M., Anand, K., & Manfield, J. (2008). Personality, hypomania, intelligence and creativity. *Personality and Individual Differences, 44*(5), 1060-1069.

George, D., & Mallery, M. (2010). *SPSS for Windows step by step: A simple guide and reference, 17.0 update* (10th ed.). Boston: Pearson.

Graham, B. C., Sawyers, J. K., & DeBord, K. B. (1989). Teachers' creativity, playfulness, and style of interaction with children. *Creativity Research Journal*, *2*(1-2), 41-50.

Hansen, J. B., & Feldhusen, J. F. (1994). Comparison of trained and untrained teachers of gifted students. *Gifted Child Quarterly, 38*(3),115-121.

Heck, S. (1978). The creative classroom envirnoment: A stage-set design. *Journal of Creative Behaviour, 12*(2), 120-133. doi:10.1002/j.2162-6057.1978.tb00167.x

Jeffrey, B. (2006). Creative teaching and learning: Towards a common discourse and practice. *Cambridge Journal of Education, 36*(3), 399-414.

Karnes, F., Stephens, K. R., & Whorton, J. E. (2000). Certification and competencies for teachers in gifted education programs. *Roeper Review*, *22*(3), 201-202.

Kim, M., & Schallert, D. L. (2011). Building caring relationships between a teacher and students in a teacher preparation program word-by-word, moment-by-moment. *Teaching and Teacher Education, 27*(7), 1059-1067. doi:10.1016/ j.tate.2011.05.002

King, L. A., McKee Walker, L., & Broyles, S. J. (1996). Creativity and the five-factor model. *Journal of Research in Personality, 30,* 189-203.

Lee, I. R., & Kemple, K. (2014). Preservice teachers' personality traits and engagement in creative activities as predictors of their support for children's creativity. *Creativity Research Journal, 26*(1), 82-94. doi:10.1080/10400419.2014.873668

Little, C. A., Kearney, K. L., & Britner, P. A. (2010). Students' self-concept and perceptions of mentoring relationships in a summer mentorship program for talented adolescents. *Roeper Review*, *32*(3), 189-199.

Lubart, T. I. (1994). Creativity. In R. J. Sternberg (Ed.), *Thinking and problem solving* (pp. 290-332). San Diego, CA: Academic.

Ma, H. H. (2006). A synthetic analysis of the effectiveness of single components and packages in creativity training programs. *Creativity Research Journal, 18*(4), 435-446. doi:10.1207/s15326934crj1804_3

McCrae, R. R., & Costa, P. T. (1997). Conceptions and correlates of openness to experience. In R. Hogan, J. A. Johnson, & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 826-848). New York, NY: Academic Press.

Meinel, M., Wagner, T. F., Baccarella, C. V., & Voigt, K. (2019). Exploring the effects of creativity training on creative performance and creative self-efficacy: Evidence from a longitudinal study. *Journal of Creative Behavior, 53*(4), 546-558. doi.10.1002/jocb.234

Nelson, K. C., & Prindle, N. (1992). Gifted teacher competencies: Ratings by rural principals and teachers compared. *Journal for the Education of the Gifted*, *15*(4), 357-369.

Piirto, J. (2011). *Creativity for 21st century skills.* Rotterdam: Sense Publisher.

Rogers, K. B. (1989). Training teachers of the gifted: What do they need to know?. *Roeper Review, 11*(3), 145-150.

Rogers, K. B. (2007). Lessons learned about educating the gifted and talented: A synthesis of the research on educational practice. *Gifted Child Quarterly*, *51*(4), 382-396.

Rose, L. H., & Lin, H. T. (1984). A meta-analysis of long-term creativity training. *The Journal of Creative Behavior, 18*(1), 11-22. doi:10.1002/j.2162-6057.1984.tb00985.x

Runco, M. A. (2007). *Creativity, theories and themes: Research, development, and practice.* Cambridge: Elsevier Academic Press.

Sak, U. (2004). About creativity, giftedness, and teaching the creatively gifted in the classroom. *Rooper Review, 26*(4), 216-222. doi:10.1080/02783190409554272

Sak, U., & Oz, O. (2010). The effectiveness of the Creative Reversal Act (CREACT) on students' creative thinking. *Thinking Skills and Creativity*, *5*(1), 33-39.

Schacter, J., Thum, Y. M., & Zifkin, D. (2006). How much does creativity teaching enhance elementary school students' achievement?. *Journal of Creative Behavior, 40*(1), 47-72.

Scott, G., Leritz, L. E., & Mumford, M. D. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal*, *16*(4), 361-388. doi:10.1207/s15326934crj1604_1

Silvia, P. J., Nusbaum, E. C., Berg, C., Martin, C., & O'Connor, A. (2009). Openness to experience, plasticity, and creativity: Exploring lower-order, high-order, and interactive effects. *Journal of Research in Personality, 43*(6), 1087-1090.

Smith, G. F. (1998). Idea-generation techniques: A formulary of active ingredients. *Journal of Creative Behavior*, *32*(2), 107-133.

Soh, K. (2000). Indexing creativity fostering teacher behavior: A preliminary validation study. *Journal of Creative Behavior, 34*(2), 118-134.

Soh, K. (2017). Fostering student creativity through teacher behaviors. *Thinking Skills and Creativity, 23*, 58-66. doi:10.1016/j.tsc.2016.11.002

Soldz, S., & Vaillant, G. E. (1999). The big five personality traits and the life course: A 45- year longitudinal study. *Journal of Research in Personality, 33*(2), 208-232.

Sungur, N. (1997). *Yaratıcı düşünce*. İstanbul: Evrim Publishing.

Snyder, A., Mitchell, J., Bossomaier, T., & Pallier, G. (2004). The creativity quotient: An objective scoring of ideational fluency. *Creativity Research Journal, 16*(4), 415-420.

Torrance, E. P. (1972). Can we teach children to think creatively?. *Journal of Creative Behavior, 6*(2), 114-143.

Torrance, E. P. (1987). Recent trends in teaching children and adults to think creatively. In S. G. Isaksen (Ed.), *Frontiers of creativity research* (pp. 204-215). Buffalo, NY: Bearly.

Torrance, E. P. (1990). *The torrance tests of creative thinking: Norms-technical manual figural (streamlined) forms A & B*. Bensenville, IL: Scholastic Testing Service.

Torrance, E. P., Tan, C. A., & Allman, T. (1970). Verbal originality and teacher behavior: A predictive validity study. *Journal of Teacher Education, 21*(3), 335-341.

Wendel, R., & Heiser, S. (1989). Effective instructional characteristics of teachers of junior high school gifted students. *Roeper Review*, *11*(3), 151-153.

Whitlock, M. S., & DuCette, J. P. (1989). Outstanding and average teachers of the gifted: A comparative study. *Gifted Child Quarterly*, *33*(1), 15-21.

Yang, K., Hong, Z., Lee, L., & Lin, H. (2019). Exploring the significant predictors of convergent and divergent scientific creativities. *Thinking Skills and Creativity, 31*, 252-261. doi:10.1016/j.tsc.2019.01.002

Yıldırım, A., & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (5th ed.). Ankara: Seçkin Publishing.