

Is There any Positive Effect of Classical Music on Cognitive Content of Drawings of Six Year-Old Children in Turkey?

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Abstract

The purpose of this study was to investigate the effect of classical music on children's cognitive content of drawings. The sample was consisted of eighty four 6-year-old children from private kindergartens from higher socio-economic status in Ankara in Turkey (In Turkey 6-year-old is a kindergarten group). The sample was divided into three groups. Group 1 was applied to free drawing with listening classical music program , Group 2 was applied to free drawing program and Group 3 was control group. Silver Drawing Test was used as pretest and posttest. The results showed that there is a positive effect of classical music on cognitive content of the drawings of six year-old children from Turkey.

Introduction

There exist a variety of studies analyzing the effects of classical music on children. Especially after Rauscher, Shaw and Ky (1993, 1995) 's studies which results were reported as listening to Mozart resulted in an improvement in spatial IQ., the amount of research on this topic has been increased greatly (Crnec, Wilson and Prior, 2006). This result was on adults but the researchers have emphasized that classical music may assist children in their spatial and other cognitive abilities (Rauscher, 1999; Shaw, 2000). Although there are studies that support this thesis, (McKnight, 1998; Van der Linde, 1999; Ivanov and Geake, 2003; Riddoch and Waugh, 2003), there exist many other studies claiming that these effects are over-exaggerated and indeed do not exist at all (Smith and Davidson, 1991; Hallam, 2000; Fioranelli, 2001; Crnec, Wilson and Prior, 2006).

Smith and Davidson (1991) investigated the effects of background music on academic achievement of seventh-grade students. The students were divided into one of four conditions (rock music, classical music, easy listening music, or no music) while studying the earth-sun relationship. The researchers found no significant differences in the academic achievement of seventh-graders among the four background conditions. Hallam (2000) sought to replicate the Mozart effect in a naturalistic school environment. Participants were 8,120 children (age range, 10–11 years) recruited from 150 schools. Participants were tested in class groups, with the class teacher running the experiment from a script. A between-participants, posttest design was used where performance on two tests of spatial reasoning was assessed after exposure to either Mozart (K. 593), popular music, or a scientific discussion. The participants were tested simultaneously, with the experimental stimuli played on BBC radio. The analysis revealed no significant differences in spatial performance between the three conditions. Fioranelli (2001) examined the effect of background classical music on mathematics problemsolving skills of third grade students in a computer lab setting. Classical music played in the background during the treatment group's computer lab sessions, while no music played during the control group's sessions. Fioranelli found no significant differences between the mathematics problem solving skills of third grade students who had listened to classical music and those who did not. Hui

(2006) investigated the 'Mozart effect in preschool children'. Forty-one boys and girls, aged three to five, attempted a series of pencil-and-paper maze tests after each of three listening conditions: Mozart's Piano Concerto in A Major (K488), age-appropriate popular music and silence. Overall, there were no statistically significant differences among the three interventions. The study of Crncec, Wilson, And Prior (2006) examined the Mozart effect in children. One hundred and thirty-six Grade 5 students (mean age 10.7 years) were exposed to three experimental listening conditions: Mozart piano sonata K. 448, popular music, and silence. Each condition was followed by a spatiotemporal task, and mood and music questionnaires. The results showed no evidence of a Mozart effect.

However, when these studies were analyzed, it is observed that classical music is only offered as a short-term stimulator. It must be evident that the longer the process takes, the better we can see whether in fact the effects exist. To be able to identify if there is a difference in a child's behavior, a certain amount of time is required (Senemoğlu, 2001; Ertürk, 1993). Here, we need more than one experience (Ertürk, 1993). Nonetheless, there are studies that show even short-term subjection to classical music has positive impacts (Van der Linde, 1999; Ivanov and Geake, 2003).

Research on the use of Baroque music has shown that when this type of music is played when children are concentrating, memory could improve by up to 26%. Baroque music stimulates both the right and the left hemispheres of the brain, and this helps to develop concentration (Van der Linde, 1999). Ivanov and Geake (2003) assessed performance on a 10-item paper-folding task using a single-session posttest design with three background listening conditions: (a) K. 448, (b) Bach (BWV 916), and (c) silence. This use of continuous background music significantly changes the nature of the task, as attention is divided between the cognitive task and the music. Nevertheless, given the use of K. 448 and a spatiotemporal dependent variable, the results warrant consideration. Participants were 76 children with a mean age of 11.1 years. Musical experience was assessed by a self-report questionnaire before testing. Ivanov and Geake (2003) reported significantly better paper-folding performance for the Mozart and Bach conditions relative to the silence condition.

The number of studies that subject children to experiments using classical music as background music is insufficient. In the few studies that exist, classical music is found to have a statistically significant effect (Malyarenko and co-authors, 1996; Foffari, 1997; McKnight, 1998; Riddoch and Waugh, 2003). In the research of the possibility that music produces reorganization of brain functions, and that such change could be detected by analysis of the electroencephalogram (EEG, "brain waves"). Malyarenko and co-authors played classical music one hour per day over six months to four year old children in a preschool setting. A control group had no exposure to music but simply the normal classroom sounds. The classical music group had an increase in a part of the alpha rhythm frequency band and, greater similarities ("coherence") between different regions of the cerebral cortex, most pronounced in the frontal lobes. Greater coherence is thought by some workers to indicate better "cooperation" among brain regions but others view it as typical of increased relaxation. A particularly noteworthy aspect of this report is that the EEG changes occurred in a passive listening situation, in which the children were not required to pay attention to the music. A three-year longitudinal study of Foffari (1997) compared children exposed to somewhat more musical influences with those exposed to little singing or music in nursery school settings. Findings indicated that the experimental group exceeded control group in frequency of vocalizations, rhythmic movements, initiations of social contact, and positive emotional reactions. McKnight (1998) explored the effects of slow tempo classical music on children's on-task performance during independent writing. The project sample consisted of 24 first grade students. The project consisted of ten individual independent writing sessions spanning two week period. The first week was the no music treatment and the second was the classical music treatment. The student's on task behavior was observed with and without use of slow tempo classical music playing and writing samples were collected. The result indicated that slow tempo classical music had a positive effect on children's on task behavior. Riddoch and Waugh (2003) examined the effect of rock and classical music on non-representational drawings of regular and special students. Pictorial and musical programme was used to teach nonrepresentational (abstract) art to students with severe

intellectual disabilities, and to regular students as a control group. The sample consisted of 12 primary age students with severe intellectual disabilities from a special school and 12 regular Year 2 (7 year old) students. There was a significant main instructional effect favouring pictorial with classical music over both pictorial only and pictorial with rock music. There was a significant main effect for the type of student favouring regular students over special students for both pictorial only and pictorial with classical music.

Drawings as Assessment Tool

Drawings explain sensations, thoughts and things to be explained more vividly compared to words. This is why young children express their thoughts by drawing rather than words or writing. At these ages, writing skills are not too developed to be able to explain feelings. When children explain themselves in oral communication or in words, they tend to be very brief and tend to skip details. In Norris and Kouider's study(1998) the writing products of 60 third-grade students, who drew before writing a story on a self-selected topic, was compared with the writing products of 59 third-grade students who wrote without drawing. The students in the group which drew before writing tended to produce more words, more sentences and more idea units, and their overall writing performance was higher than the students who wrote without drawing..

Harris(1963) asserted that children's drawing is a language in that it is a form of their cognitive expression that conveys their ideas and feelings to others. Brooks (2005)suggested that drawing operates as a unique mental tool. For this reason, in trying to answer whether classical music has a positive effect on children in general, their drawings have been evaluated.

The purpose of this study was to investigate effect of classical music on 6 year-old children's cognitive content of drawings. The specific problems of this study were the following: (1) Does classical music have positive effect on the cognitive content of drawings? (2)Are there any significant difference in cognitive content of drawings between classical music with free drawing group, free drawing group without music and control group?

Method

Participants

Eighty four 6-year-old children (50%male) from private kindergartens from higher socio-economic status in Ankara in Turkey (In Turkey 6-year-old is a kindergarten group). The sample divided into three groups. Group 1 was free drawing with classical music group, Group 2 was free drawing only group and Group 3 was control group. Each group was consisted of 28 children(50% male). The groups were selected randomly. The schools were Ari Preschool, Yeni Ufuklar Kindergarten, Sirinkent Kindergarten and İlkevim Kindergarten.

Measurement

Turkish Form of Silver Drawing Test (Cognitive Content) was used as pretest and posttest for all groups in this study. The translation of the test into Turkish and its reliability and validity studies for 6 year-old Turkish children was done by Cagla Gur(2006).

Silver Drawing Test presents a variety of images and is concerned with the cognitive content of responses to stimulus drawing tasks rather than with the physical attributes of drawings such as color, shape, or line quality. The test consists from three subtests: Predictive Drawing Subtest, Drawing From Imagination Subtest and Drawing From Observation Subtest(Silver,2002). In Predictive Drawing Subtest; respondents were asked to predict changes in the appearance of objects by adding lines to outline drawings. Drawing from Observation Subtest was based on the ability to relationships in height, width and depth.. In Drawing from Imagination Subtest; children were asked to select stimulus drawings(such as man, cat, bed etc.), imagine something happening between them and then they drew

what they had imagined and told it. In this subtest; the content of the drawings, the form of the drawings and creativity in form, content, title or story were assessed. In Silver Drawing Test; for each subtest the scores varies as 0-15, for the total test 0-45.

Procedures

After all three groups pretested, programs with Group 1 and Group 2 were begun. Programs began in November and lasted for four weeks(12 session, three times a week). Each session took 30 minutes.

Group 1 was free drawing with classical music group. This group made free drawings while listening classical music. No topic was given to children. They choose their topics freely and drew whatever they wanted. They used oil pastels, water color pens and color pencils for this purpose. For listening classical music a CD player was used. Classical music selections was made with the help of Hacer Mohan- a music teacher making her master degree on children music at Gazi University Music Department. After the music program formed, necessary corrections were made after consulting two experts in the field. Classical music program included music of Bach, Vivaldi, Handel, Pachelbel, Mozart, Beethoven, Saint-Saens, Tchaikovsky, Chopin, Brahms, Schumann, Mendelssohn, Bizet, Satie, Miguel Llobet, Vaughan Williams, Strauss, Takashi Yoshimatsu, Frederick Delius, George Gershwin and Sir William Walton. When choosing; Baroque, Classical, Romantic and Modern Period extra attention was paid to make sure samples from all four periods were included.

Group 2 was free drawing without listening classical music group. On applying the programs (both program with classical music and program without classical music) each group was divided into two subgroups and programs were applied to groups consisted of 14 children. Group 3 was control group. This group did not participate in any program. After four weeks, all three groups was post tested.

The study used a univariate analysis involving one-way ANOVA to investigate the effects of groups on cognitive content of the drawings of children. Tukey multiple comparison tests were constructed to see which groups are different from each other and which group showed the most significant development in terms of cognitive content of drawings. To test whether there was any difference in averages of the Silver drawing pre-tests and post-tests among Group 1, Group 2 ve Group 3 children, two-way repeated measures ANOVA was used.

Results

In this study; the effects of the three different methods applied to three different groups were analyzed by taking the difference between the averages of pre and post tests. The difference between the mean scores of post test and pretest of Group 1 was 4.64 (SD=3.84), the difference between the mean scores of post test and pretest of Group 2 was 1.36 (SD=4.02), and the difference between the mean scores of post test and pretest of Group 3 was -0.5357 (S=3.21)(See Table 1). Results for the Silver Drawing Test (total) indicated that there were significant differences between the groups with $F_{(2,81)}=14.348$, $p=0.00$ (See Table 2). Means of total SDT score and subtest scores difference by groups are shown in the Graphic 1. In Graphic 1, it is seen that the most effective method is the method applied to Group 1 and that was the classical music method. To see which groups are different from each other, multiple comparisons tests are constructed. Multiple comparisons of groups are reported in Table 3. The mean difference between Group 1 and Group 2 was 3.6 and it was statistically significant ($p=0.001$). The mean difference between Group 1 and Group 3 was 5.178 and it was statistically significant ($p=0.00$). The mean difference between Group 2 and Group 3 was 1.571 and it was not statistically significant ($p=0.258$).

Table 1: Mean Scores in Total SDT and SDT Subtests by Groups and Pretest and Post Test Scores

		Groups		
		Free Drawing with Classical Music(Gr.1)	Free Drawing Only (Group2)	Control (Group 3)
Predictive Drawing Subtest	Pretest	M= 3.46 (SD=2.603)	M= 4.25 (SD=2.744)	M= 3.82 (SD=2.480)
	Post Test	M= 4.71 (SD=2.258)	M= 5.07 (SD=3.005)	M= 3.54 (SD=2.117)
	Post-Pre Test	M= 1.25 (SD=2.102)	M= 0.82 (SD= 1.964)	M= -0.29 (SD=1.607)
Drawing From Observation Subtest	Pretest	M= 4.93 (SD=2.788)	M= 6.11 (SD=3.071)	M= 5.25 (SD=2.205)
	Post Test	M=6.57 (SD=1.034)	M= 6.39 (SD=2.872)	M= 5.21 (SD=2.007)
	Post-Pre Test	M= 1.64 (SD=2.934)	M=0.29 (SD=3.207)	M=-0.04 (SD=2.045)
Drawing From Imagination Subtest	Pretest	M= 4.75 (SD=1.647)	M= 5.04 (SD=1.644)	M= 4.96 (SD=1.644)
	Post Test	M=6.43 (SD=1.854)	M= 5.21 (SD=1.500)	M= 4.68 (SD=1.827)
	Post- Pre Test	M= 1.679 (SD= 1.588)	M= 0.1786 (SD=1.565)	M= -0.2857 (SD=1.997)
Silver Drawing Test (Total)	Pretest	M= 13.14 (SD=3.798)	M= 15.64 (SD=5.768)	M= 14.04 (SD=4.087)
	Post Test	M= 17.79 (SD=2.936)	M= 16.68 (SD=5.341)	M=13.50 (SD=3.667)
	Post-Pre Total	M= 4.643 (SD=3.84)	M= 1.036 (SD=4.02)	M= -0.5357 (SD=3.2143)

Note: M, mean; SD, standard deviation

Table 2: ANOVA Results of SDT Total Scores

ANOVA

differencetotal

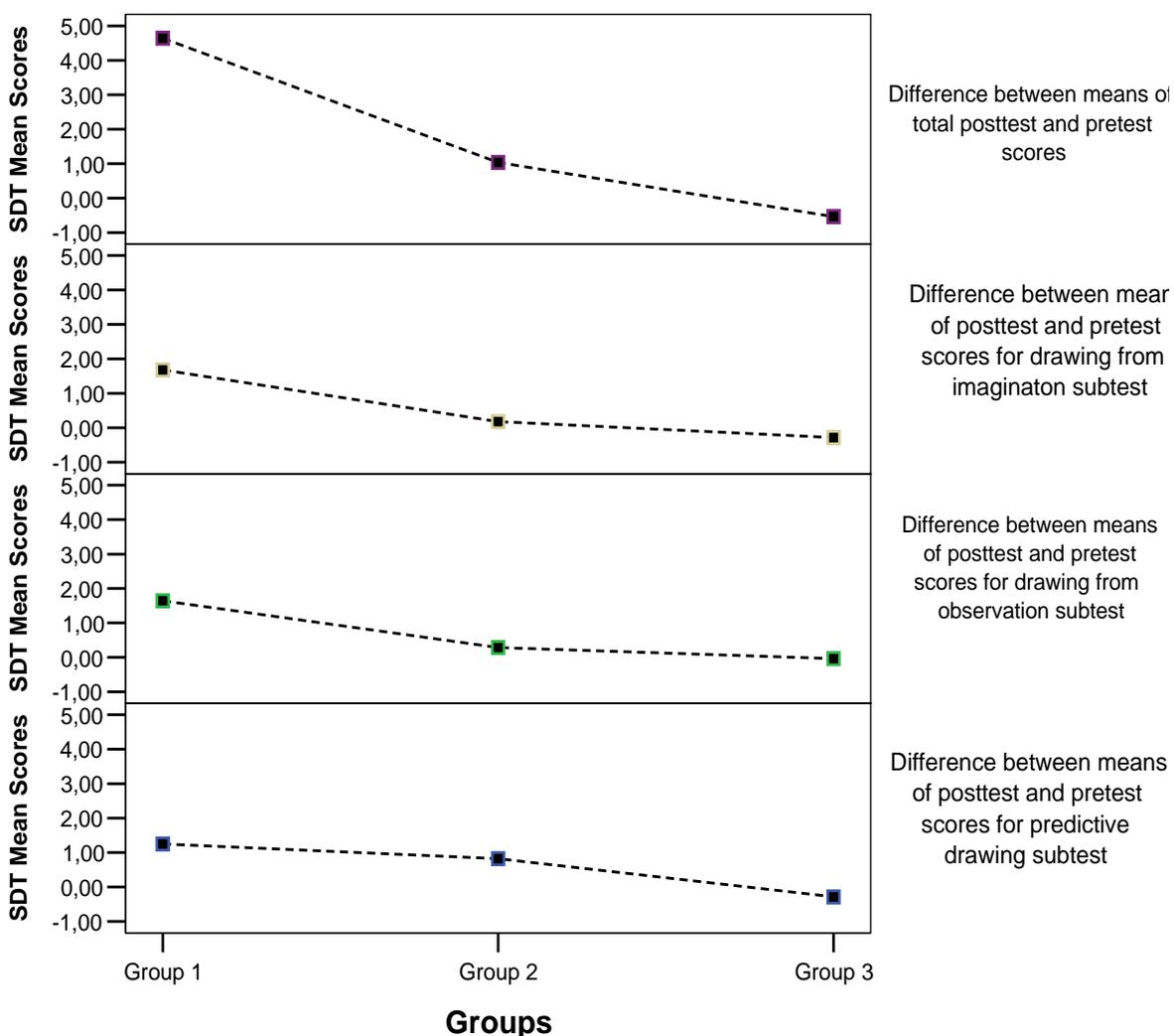
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	394,786	2	197,393	14,348	,000
Within Groups	1114,357	81	13,757		
Total	1509,143	83			

Table 3: Multiple Comparisons of Groups
Dependent Variable: Differencetotal

(1) Method (J) Method	Mean Difference (1-J)	Std. Error	Sig.
1 2	3,60714*	,99130	,001
3	5,17857*	,99130	,000
2 1	-3,60714*	,99130	,001
3	1,57143	,99130	,258
3 1	-5,17857*	,99130	,000
2	-1,57143	,99130	,258

Note: * The mean difference is significant at the .05 level

Graphic 1: Means of Total SDT Score and SDT Subtest Scores Difference by Groups



As seen in Table 1, in Predictive Drawing Subtest the mean difference between post test and pretest scores by group was the most amount in Group 1 (M=1.25, SD=2.102). This difference was found to be significant with $F_{(1,81)} = 4.86, p = 0.01$. In Drawing from Observation Subtest; the mean difference between post tests and pretests by groups was the most in Group 1 (M=1.64, SD=2.934) but however this difference was not found to be statistically significant with $F_{(1,81)} = 2.889, p = 0.061$. In

Drawing from Imagination Subtest, the mean difference between posttests and pretests by groups was the most in Group 1 ($M=1.679$, $SD=1.588$) and this was statistically significant with $F_{(1,81)} = 7.717$, $p=0.007$.

Discussion

The results of this study indicated that classical music has a positive effect on Turkish 6-year-old children's cognitive drawing skills.

The classical music had a calming effect on Group 1, so the children did their drawings quietly and willingly. The classical music addition to the free drawing sessions appeared to increase the children's desire on drawing.. Group 1 produced more drawings than Group 2 during the sessions and their drawings seemed more careful. These findings are supported by Riddoch and Waugh(2003)'s findings. Gromko and Poorman(1998) suggested that as children get involved with music, their increasingly detailed perceptions are reflected in their drawings. Music may influence learning through associated activities. When a person physically manipulates a tool accompanying with music, the brain seems to form new synapses to accommodate the new skills (Strickland,2001). During the drawing sessions with or without classical music; children made free drawings, sometimes they imagined a story or something and then drew it and sometimes they made some predictions on an event or on a situation and then drew it but they never prefer to observe anything to draw- even if the object they wanted to draw had already been existed in the class. They did not use observing method. This may lead less improvement in this task than the other tasks both in Group 1 and Group 2. The children in Group 1 made predictions, made imaginations but did not make observations accompanying with classical music so the effect of classical music on observation skills may not develop as much as the other ones. There was a slight decrease in control group's post subtest mean scores and Silver Drawing Test total post mean scores. This may be occurred as a result of new year preparations. Because the time of the study was so close to new year, art lessons in the schools were used for decorating the school for new year, to get prepared for new year shows and to get ready for new year school party. Because the control group had not participated in any drawing program, an interruption of a one-two week period of art courses might have resulted in some deterioration in drawing skills. Art related courses might be missed during exhibitions and other fairs and this might last a couple of weeks. This condition might result in a slight decrease in children's drawing test results.(Gur,2006).

As a conclusion; this study's results show that listening classical music while making free drawings improves children's cognitive drawing skills. Because drawing is a form of cognitive expression that conveys children's thoughts and when a person physically manipulates a tool (i.e. a watercolor, an oilpastel) accompanying with music, the brain seems to form new synapses to accommodate the new skills as mentioned previously, it can be thought that listening classical music while drawing may be resulted a development in cognitive skills. Because the children were more careful while listening classical music, it can be used in kindergarten, preschool or home environment as background music while children drawing, painting, sculpturing, block making, puzzle-making and playing. I recommend that further researches be conducted with children from different socio-economic backgrounds to determine the effect of background classical music. I recommend that research collaborations be constructed across fields of inquiry(e.g. music, visual arts, early childhood education and experimental and clinical psychology) and that researchers work with practitioners and parents to make more contributions for the early education of young children.

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