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## THE EFFECT OF PHYSICAL ACTIVITY PROGRAM ON TRAIT ANXIETY LEVEL ON ADULTS

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### Abstract\*

*Aim.* The aim of this research is to examine the effect of physical activity program on trait anxiety level of adults.

*Methods.* Research was designed with the testing model of pretest-posttest control group. The research group consists of 200 sedentary adults (application group n, 100; control group n, 100) who are in the age range of 18-36, residing in the city of Konya. Physical activity program was applied to adults in application group, within sports center, for a period of 2 hours, 3 days in a week throughout 12 weeks. Program was contently formed by the categories of aerobic exercise, fitness, fit dance, step, plates and street dance. Data were obtained with "Trait Anxiety Inventory" applied on adults before and after the 12-week physical activity program. For the analysis of obtained data, SPSS 16.00 statistic package software was used.

*Results.* According to findings of research, it was determined that at the level of trait anxiety of adults in application group participated in physical activity program, there is a meaningful decrease considering the previous history of program ( $t_{99}$ : 3.108,  $p < 0.05$ ). It was figured out that the meaningful decrease seen at the level of trait anxiety of adults in application group occurred with the low level influence quantity. ( $d$ : 0.26,  $d > 0.20$ ). However, It was determined that at the level of trait anxiety of adults in control group who didn't participate in physical activity program, there is no meaningful decrease considering the previous history of program ( $d$ : 0.05,  $d < 0.20$ ).

*Conclusions.* In the light of research findings, it can be said that by attending regularly physical activities has a positive effect on the level of trait anxiety of adults.

*Key Words:* Adults, physical activity, trait anxiety.

### Introduction

Anxiety is a complex mood displaying continuity and arising when one feels sad, indefinite and uncontrollable dangers in coming events, situations or conditions (Clark and Beck, 2012). Spielberg et al. (1970) split the concept of anxiety into two basic components: Trait and State Anxiety. Trait anxiety is defined as the inclination of individual to anxiety situation, and state anxiety is defined as the subjective fear that individual feels because of the situation s/he is in.

The conducted research shows that the individuals having high anxiety and stress level, live commonly the feelings of sinking into deep in thought, decreasing of performance, incapable of getting rid of negative mood, avoiding personal relationships, failure and autism, avoiding social environments, despair and hopelessness (Salovey et al., 2002; Mennin et al., 2007; McEvoy et al., 2013; Yang et al., 2014; Weems et al., 2010).

One of the instruments which are effective on decreasing anxiety level and solving the problems

arisen in parallel with this, is the regular physical activity and exercise (Asmundson et al., 2013; Petruzello et al., 1991). In some researches on physical activity programs and anxiety, it was figured out that beside the positive effects of physical activity programs directly on anxiety level (O'Connor, Raglin and Martinsen, 2000; Stathopoulou et al., 2006), they have positive effects on the symptoms of anxiety (Herring et al., 2010; Jayakody et al., 2014; Carek et al., 2011; DeBoer et al., 2012). Accordingly, it was determined that physical activities and exercises have positive effects on poor concentration (Colcombe & Kramer, 2003), tiredness (Puetz, O'Connor, & Disman, 2006), anxiety feelings (Broocks et al., 1998), muscle strain (Smith, O'Connor, Crabbe, & Dishman, 2002), pain (Hayden, van Tulder, Malmivaara, & Koes, 2005) and depression (Blumenthal et al. 1999) which are characteristics of anxious individuals. Also literature shows that there is a strong relationship between physical activity and depression; the more active the individuals are, the less depressive symptoms they have (Chodzko-Zajko

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et al., 2011; Koukouvou et al., 2004; Nelson et al., 2007; Roshanaei-Moghaddam et al., 2009). Moreover, it is stated that physical activity has a therapeutic effects towards depression (Al-Turkait et al. 2011; Jiang et al. 2004; Mata et al. 2011; Oman and Oman 2003).

However, it was determined that in spite of these extremely positive benefits of regular physical activity on physical and psychological health (Warburton et al., 2006; Antunes et al., 2006), a lot of humans are not dealing with any physical activity and lead a sedentary life (Demello, 2013). Yet, researchers put forward that mood disorders are related with sedentary life and when maintaining a physical activity, there can be positive changes on mood (Pasco et al., 2011; Dinas et al., 2011; Barcelos-Ferreira et al., 2009; Farmer et al., 1988). From this point of view, the aim of research is to examine whether physical activity program has an effect on trait anxiety level on sedentary adults. In accordance with this primary aim, the answer for following sub problems was sought.

- 1) Is there a meaningful difference between the point means of pretest and posttest trait anxiety of adults in application and control groups?
- 2) At what level are the influence quantity (Cohen's d) values between the point means of pretest and posttest trait anxiety of adults in application and control groups?

**Method**

**Research Model**

This research was designed as pretest and posttest control group quasi-experimental. This design is defined as a model having high application validity in researches on the education, in which bringing the whole variables under the control is not possible. In present design; while pretests help determine the similarity level of groups before the education program, posttests contribute to interpret the results (Cohen et al., 2007). Information related to experimental editing of research is given in Table 1.

In Table 1, the information related to experimental

deeply the situations which are considered that they

**Table 1.** Experimental Editing

Group	Pretest	Sport Activities (12 weeks)	Posttest
Application	Trait Anxiety Inventory	Physical activity program composed of 36 sessions was applied to participants.	Trait Anxiety Inventory
Control	Trait Anxiety Inventory	No physical activity program was applied to participants.	Trait Anxiety Inventory

editing of research is given. In research, while carrying out the physical activity program composed of 36 sessions with the participants in application group, no physical activity was applied to the participants in control group. Pretest and posttest points of application and control groups were obtained with "Trait Anxiety Inventory".

**Research Group**

Convenience sampling method out of purposeful sampling methods was used to determine the research group. This method enables to study

have rich information, and provides researcher to save on energy, time and material resources by reaching the sampling easy and fast (Patton, 2014). In the light of this information, the research group consists of 200 sedentary adults who are in the age range of 18-36, residing in the city of Konya. Research group determined on a volunteer basis were split randomly into application group (n: 100) and control group (n: 100). Demographic information related to research group is given in Table 2.



**Table 2.** Demographic Information related to Research Group

Variables	Research Group	
	Application Group (n:100)	Control Group (n:100)
Sex		
Female	53	53
Male	47	47
Marital Status		
Married	33	37
Single	67	63
Age		
18-22	16	35
23-27	33	33
28-32	24	16
33 and above	27	16
Education Status		
Primary Education	6	33
High School	32	31
University	62	36
Income Status		
Low	38	21
Middle	45	44
High	17	35

In Table 2, as it is seen, research was conducted with the participation of 200 sedentary adults (application group n: 100, control group n: 100). 53% of adults in application group is female, 47% is male. Adults in this group are in the age range of 18-36; 33 of them are married, 67 of them are single. Also whereas in terms of education status, 6 of them are primary school graduates, 32 of them are high school graduates and 62 of them are university graduates; 38 of them have low, 45 of them have middle and 17 of them have high income status. 53% of adults in application group is female, 47% is male. Adults in this group are in the age range of 18-36; 37 of them are married, 63 of them are single. Also whereas in terms of education status, 33 of them are primary school graduates, 31 of them are high school graduates and 36 of them are university graduates; 21 of them have low, 44 of them have middle and 35 of them have high income status.

#### Data Collection Tools

In present research, in which whether physical activity program has an effect on trait anxiety level on sedentary adults is examined, as a data collection tool “Personal Information Form” and “Trait Anxiety Inventory” were used.

*Personal Information Form:* This form was prepared to collect personal informations about individuals consisting of research group. Form

contains the statements related to age, sex, marital status, education status and income status.

*Trait Anxiety Inventory:* In research, to determine the level of trait anxiety of participants “Trait Anxiety Inventory” developed by Spielberger et al. (1970) was used. Inventory was adapted into Turkish by Öner and Le Compte (1983). When considering that inventory consists of 20 items; minimum 20 points, maximum 80 points can be gotten. To score the inventory, the total of each of the direct and reversed statements are taken. The total points of reversed statements are subtracted from the total point obtained for direct statements. Predetermined 35 points are added to this number. The latest obtained value is the anxiety point of the individual. The fact that the point is high shows that anxiety level is high, and that the point is low shows that anxiety level is low. It was found in coherence validity that in normal individuals’ comparison with diagnosed psychiatric patients, trait and state anxiety levels of patients were much higher than normal. Considering the inventory reliability, Cronbach Alpha internal consistency coefficient of trait anxiety inventory was found between 83 and 87. It was determined that reliability of test- retest method changed between 71 and 86. In subsequent studies, Teixeira et al. (2013) found the Cronbach Alpha internal consistency coefficient as 81 and Pamuk et al. (2014) found it as 89. In present study, Cronbach



Alpha internal consistency coefficient was found as 86.

**Physical Activity Program**

Physical activity program including warm-up exercise, fitness, fit dance, step, plates, street dance and stretching-cooling trainings was applied to adults

in application group for a period of 2 hours, 3 days in a week throughout 12 weeks. Program was prepared in the direction of opinions and suggestions of 3 academicians who are specialist in the field of physical education and sport. Detailed information is given in Table 3.

**Table 3.** Physical Activity Program (6 weeks \* 2)

Weeks	Day	Hour	The Type of Exercise	The Content of Exercise
1. Week	Tuesday	2	Fitness	Workout with its own weight
	Thursday	2	Plates	Warm-up and mat workout
	Saturday	2	Fitness+Step	Workout with its own weight + step
2. Week	Tuesday	2	Plates	Warm-up and mat trainings
	Thursday	2	Fitness+Step	Fitness work-out with small weights
	Saturday	2	Street Dance	Quick step work-out
3. Week	Tuesday	2	Fitness	Fitness work on hydraulic machines
	Thursday	2	Fit Dance	Zumba dance
	Saturday	2	Fitness	Fitness work on hydraulic machines
4. Week	Tuesday	2	Street Dance	Quick step work-out
	Thursday	2	Fitness	Fitness work on hydraulic machines
	Saturday	2	Fit Dance	Zumba + aerobic
5. Week	Tuesday	2	Fitness	Work out on machines
	Thursday	2	Aerobic Exercise	Treadmill - bicycle – elliptic
	Saturday	2	Fitness	Work out on machines
6. Week	Tuesday	2	Plates	Work out with pilates balls and mat
	Thursday	2	Fitness	Work out on machines
	Saturday	2	Fit Dance	Zumba + aerobic

In Table3, information related to content of physical activity program carried out with application group was presented. Program was created in the direction of expert opinions by gathering activities having different qualifications. Among these activities; aerobic exercise, fitness, fit dance, fitness, step, plates and street dance are included.

**Process**

In the first stage of research information about the aim, content and application process of research was given to participants. In second stage, participants were split randomly into application group (n: 100) and control group (n: 100). In third stage, pretests were applied to participants. In fourth stage, physical activity program composed of 36 sessions was applied to participants in application group throughout 12 weeks, three days in a week. In this stage, participants in control groups didn't participate in any activity. Finally in fifth stage, after 12 week physical activity program, posttest was applied to participants. Data were obtained through Trait Anxiety Inventory applied to participants before and after the 12 week period.

**Data Analysis**

Whether or not the data show normal distribution was tested with Kolmogorov Smirnov analysis. In this analysis, the fact that calculated p value was bigger than 0,05 can be interpreted as points didn't show meaningful (excessive) deviation from normal distribution in this meaningfulness level and were in accordance with it (Büyüköztürk, 2014). In this context, it was determined that pretest and posttest points of measurement tool showed normal distributions as a result of conducted analyses (Trait Anxiety<sub>pretest</sub> : p=0,200> 0,05; Trait Anxiety<sub>posttest</sub> : p= 0,057> 0,05). Thus, Paired Samples t test was used to determine the intra groups difference.

Also, Cohen "d" statistic was used to calculate the influence quantity in this research. Cohen "d" statistic shows how many standard deviations the compared means become distant from each other (Card, 2012). Regardless of the sign, influence quantity is interpreted respectively as (d=0,20-0,50 small), (d=0,50-0,80 middle) and (d=0,80<d large), (Cohen et al., 2007; Cohen, 1988). In research, to determine the influence quantity, the mean and



standard deviation values pretest-posttest data were calculated and compared with each other.

**Findings**

The primary aim of the research is to examine whether physical activity program has an effect on trait anxiety level of adults. For the purpose of making the findings of research more understandable,

obtained findings were presented according to sub problems created in line with primary aim. In this context, primarily descriptive statistics related to findings obtained as a result of research and respectively findings related to sub problems were indicated.

**Table 4.** Descriptive Statistics related to trait anxiety level points of adults in application and control groups

		Application Group (n:100)		Control Group (n:100)	
		Before Program	After Program	Before Program	After Program
Trait	M	44.37	42.26	45.02	45.64
	SD	8.86	6.69	12.03	11.34
Anxiety	Min.	20	28	22	24
	Max	65	63	68	71

When examined the Table 4, it was determined that the mean, standard deviation, minimum and maximum values of points of participants in application group, obtained from Trait Anxiety Inventory before program are respectively; m 44.37, SD 8.86, min. 20 and max 65. It was figured out that the mean, standard deviation, minimum and maximum values of points of participants in application group, obtained from Trait Anxiety Inventory after program are respectively; m 42.26, SD 6.69, min. 28 and max 63. It was determined that the mean, standard deviation, minimum and maximum values of pretest points of participants in control group, obtained from Trait Anxiety Inventory are respectively; m 45.02, SD 12.03, min. 22 and

max 68. It was figured out that the mean, standard deviation, minimum and maximum values of posttest points of participants in control group, obtained from Trait Anxiety Inventory are respectively; m 45.64, SD 11.34, min. 24 and max 71.

Findings related to first sub problems of research;

Is there a meaningful difference between the means of pretest-posttest trait anxiety point of participants in application and control groups?

**Table 5.** Comparison of pretest-posttest points of participants in application and control groups

Group	Pretest		Posttest		t	P
	M	SD	M	SD		
Application Group n(100)	44.37	8.86	42.26	6.69	3.108	.002*
Control Group n(100)	45.02	12.03	45.64	11.34	1.352	.179

\*p<.01

When examined the Table 5, it was determined that there was a meaningful difference between means of pretest-posttest points, obtained from Trait Anxiety Inventory, of participants in application group ( $t_{99}; 3.99; p= 0.002 < 0.05$ ). However; in control group, in which no activity program was applied, it was determined that there was no meaningful difference between means of pretest-posttest points

obtained from Trait Anxiety Inventory ( $t_{99}; 1.352; p= 0.179 > 0.05$ ).

Findings related to second sub problems of research; At what level are the influence quantity (Cohen's d) values between the point means of pretest and posttest trait anxiety of adults in application and control groups?





**Table 6.** Mean, standard deviation and influence quantity values related to pretest-posttest points of participants in application and control groups

Group	Pretest		Posttest		Cohen's d
	M	SD	M	SD	
Application Group n(100)	44.37	8.86	42.26	6.69	.26*
Control Group n(100)	45.02	12.03	45.64	11.34	.05

\*d>.20

When examined the Table 6, the influence quantity between the means of pretest-posttest points, obtained from Trait Anxiety Inventory, of participants in application group was determined as

### Discussion

In present research, whether physical activity program has an effect on trait anxiety level on adults was examined. The findings obtained as a result of research, revealed that trait anxiety levels of adults participated in physical activity program showed positively decrease as compared with previous history of program. It was determined that this positively observed decrease came true with a small influence quantity.

In related literature, research results show consistency with the results of previous studies revealing the positive effects of physical activity and exercise programs on anxiety (Stathopoulou et al., 2006; Wipfli, Rethorst, & Landers, 2008; Ströhle, 2009; Anderson ve Shivakumar, 2013; Paluska ve Schwenk, 2000; Broman-Fulks and Storey, 2008; Smits et al., 2008; Jonsdottir et al., 2010; Ströhle et al., 2007; Jazaieri et al., 2012; Wedekind et al., 2010; Carmeli, 2013; Araújo et al. 2007).

In research, a meaningful difference at the level of trait anxiety of adults in control groups who didn't participate in any physical activity program wasn't found as compared with previous history of program. Also, it was seen that there wasn't any influence quantity between the means of pretest-posttest points, obtained from Trait Anxiety Inventory, of adults in control groups.

Akandere and Tekin (2008), in the study in which they examined the effect of physical activities on the trait anxiety level of university students, figured out that there was a positive changes at the level of trait anxiety of university students participating in physical activity program as compared with previous history of program. However, they revealed that there wasn't any changes at the level of trait anxiety of university students in control group who didn't participate in physical activity program

(d: 0.26, d>.20). The influence quantity between the means of pretest-posttest points, obtained from Trait Anxiety Inventory, of participants in control group was determined as (d: 0.05, d<.20).

In literature, when studied on the nonclinical populations, it is put emphasis on the necessity of handling the depression and anxiety at the same time (Stewart and Chambless, 2009). Because, depression and anxiety are diagnosed with each other and anxious individuals can develop depressive situations as the time progresses (Teixeira et al., 2013). Participating in physical activity is quite effective on the decrease of individuals' anxiety levels beside depression levels (Netz et al., 2005).

Physical activity, which is the part of a healthy life style, by increasing the life satisfaction (Wendel-Vos et al., 2004; Bize et al., 2007; Chen et al., 2005; Brown et al., 2003; Shibata et al., 2007; Daskapan et al., 2005; Tessier et al., 2007; Silva et al., 2010; Lobo et al., 2008; Jurakic et al., 2010; Eime et al., 2010; Zullig et al., 2005), encourages the psychosocial interaction, develops self-confidence; thereby decreases the risk of recurrence of depression and anxiety (Stella et al., 2002).

Latest conducted researches are inclined to see the physical activities in therapeutic responses because of their positive effects on both anxiety and depression (Teixeira et al., 2013). In this context, physical activity is advised for the specific mental health beside general mental health. Particularly, it is stated that physical activity can be used for the treatment of anxiety as a complementary application (Araújo et al., 2007).

### Conclusion

As a result, both information in related literature and findings obtained as a result of research indicate that there is a decrease at the levels of trait anxiety of sedentary adults participating in physical activity program as compared with previous history of program they participated in. In this context, the impression that physical activity program can have a positive effect on trait anxiety level of sedentary adults was gained. When considered the negative



effects of a sedentary life on individuals' psychological health along with physical health, it is

thought that findings obtained as a result of research are pretty important.

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