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Research Article / Araştırma Makalesi

The Effect of Playing a Musical Instrument on Aggression and the Vulnerability to Stress in Young Adults

Enstrüman Çalmanın Genç Yetişkinlerin Saldırganlık ve Strese Yatkınlık Düzeyleri Üzerindeki Etkisi

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ABSTRACT

This study examined the effects of playing musical instruments on the vulnerability to stress and aggression levels of young adults. The sample group of the study consisted of 223 young adults between the ages of 18-30. The data of the study were obtained using the Buss-Perry Aggression Scale and Stress Control 4.2-OS (Vulnerability) scales. Since the data met the normality assumption, parametric tests were used. The results of the study showed that individuals who played musical instruments had significantly lower levels of physical aggression, anger, and vulnerability to stress than individuals who did not play musical instruments. In addition, it was found that the level of physical aggression, anger, and vulnerability to stress decreased as the duration of playing an instrument increased. The results show that participation in playing musical instruments has a beneficial effect on reducing aggressive behavior and improving stress management skills.

Keywords: Music, aggression, vulnerability to stress, instrument playing, young adults

ÖZ

Bu araştırmanın amacı enstrüman çalmanın genç yetişkinlerin strese yatkınlık ve saldırganlık düzeyleri üzerindeki etkisini incelemektir. Araştırmanın örneklem grubunu 18-30 yaş arası 223 genç yetişkin oluşturmuştur. Çalışmanın verileri Buss-Perry Saldırganlık Ölçeği, Stres Denetimi 4.2-OS (Yatkınlık) ölçekleri kullanılarak elde edilmiştir. Verilerin normallik varsayımını karşılaması nedeniyle verilerin analizinde parametrik testler kullanılmıştır. Araştırma sonuçları, enstrüman çalan bireylerin çalmayanlara göre fiziksel saldırganlık, öfke ve strese yatkınlık düzeylerinin anlamlı şekilde düşük olduğunu göstermiştir. Ayrıca enstrüman çalma süresi arttıkça fiziksel saldırganlık, öfke ve strese yatkınlık düzeyinin azaldığı tespit edilmiştir. Araştırmanın sonuçları, enstrüman çalmanın genç yetişkinlerde saldırgan davranışların azaltılmasında ve stres yönetimi yeteneklerinin geliştirilmesinde olumlu bir etki yarattığını göstermektedir.

Anahtar Kelimeler: Müzik, saldırganlık, strese yatkınlık, enstrüman çalma, genç yetişkinlik

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INTRODUCTION

In the context of contemporary global society, where rapid technological advances and competitive environments are experienced, individuals often face increasing levels of stress and anxiety as they try to cope with the increasing demands of professional and academic life. Technological developments also have a significant impact on young people, with new lifestyles created by rapidly developing technology resulting in a significant transformation in personal relationships, such as those shaped by social media, and broader societal interactions, including workplace and community dynamics. While digital platforms provide young people with access to vital knowledge in fields such as business, education, and social life, they are faced with an ever-growing dependency on constant internet connectivity. The advent of new technologies has brought about a transformation in the business, social and communication skills of young people. While these changes have the potential to enhance their lives, they also introduced a number of psychological challenges that must be addressed. It is therefore crucial to understand the psychological effects of this transformation in the modern world. Aggression, often defined as aggressive behavior, and the stress created by the anxiety of coping with difficulties are now almost considered a natural part of modern life.

It is important to note that aggression is not limited to physical behavior alone; it can also occur in a social or psychological context. In social psychology, aggression is defined as behavior that is directed towards the intention of causing harm to another individual (Baron & Richardson, 1994). Aggression is a deliberate act, that is, a conscious behavior with the intention of causing harm. For this reason, aggression cannot be equated with concepts such as anger, irritation, or frustration. Although these emotions may be precursors to aggression, they cannot be defined as aggression unless they manifest as deliberately harmful behavior.

Aggression covers a wide range of actions, from psychological violence to physical violence. For example, Batrinos (2012) states that hormonal imbalances at the biological level, particularly high levels of testosterone, are associated with increased aggression. According to Siever (2008), abnormalities in brain regions involved in impulse control and emotional regulation may also contribute to aggressive behavior. Psychological factors play an important role in the development of aggression. Negative childhood experiences, such as exposure to violence, can lead to the emergence of aggression (Moffitt & Klaus-Grawe, 2012, 2013). Aggression can also occur as a result of distorted thought patterns, such as instinct or hostility. (Menon et al., 2015). It is clear that aggression has many different causes and forms. These differences in aggression can be attributed to a number of factors, including an individual's social status, cultural norms and social environment.

The consequences of aggression are not merely individual; they extend to affect all members of society. Aggressive behavior manifests as a social issue in various contexts, such as interpersonal conflicts in neighborhoods, and workplace violence. In the context of social aggression, the probability of individuals resorting to physical violence and becoming involved in criminal activity increases. A number of studies have indicated that aggression, psychological violence, and lynching culture are becoming increasingly prevalent on social media platforms, with young adults actively using these platforms providing the opportunity to attack by hiding their identity (Boadi & Kolog, 2021). One of the main factors that precipitates aggression is stress.

Stress, as defined by Selye (1975), is the body's non-specific response to any situation. Holroyd and Lazarus (1982) posit that psychological stress necessitates the evaluation that environmental and/or internal demands exceed the individual's capacity to manage them. The World Health Organization (WHO, 2023) defines stress as a state of anxiety or mental tension caused by a challenging situation. The prevalence of various difficulties encountered in modern life has led to an increase in the stress levels of individuals, with the necessity for effective coping strategies becoming increasingly apparent. Individual differences result in variations in the impact and damage that stress has on an individual. Vulnerability to stress is an individual phenomenon. Vulnerability to stress plays a crucial role in determining the extent to which an individual is affected by negative events. A vulnerability to stress may be genetic or the result of negative experiences. While vulnerability to stress indicates the possibility of experiencing stress, the opposite is true of the ability to cope with stress, which is associated with traits such as flexible thinking and adaptability. Lardinois et al. (2011) state that one of the factors that increase vulnerability to stress is childhood trauma. Characteristics such as excessive responsibility and perfectionism also increase individuals' susceptibility to stress (Basińska et al., 2021; Hewitt Flett, 2002). In addition, it seems that socio-economic conditions should also be taken into account. For example, Baum et al. (1999) state that there is a socio-economic difference between advantaged and disadvantaged groups, with the latter being more vulnerable to stress.

A high level of vulnerability to stress may be a facilitating factor in the development of some mental health problems. The tendency to stress can create difficulties in interpersonal communication and mood regulation (Moriya Takahashi, 2013). These factors may cause individuals to experience difficulties in their family relationships, social interactions,

and professional environments. Nevertheless, there is evidence that stress is associated with a number of physical health problems (Barclay et al., 1987; Bhatia Tandon, 2005; Bremner, 1999; Collins, 2001). In the contemporary era, the factors that precipitate stress are of paramount importance, as are the strategies that enable individuals to cope with and overcome stress. In daily life, music represents a significant source of stress relief for many individuals.

Young adults are exposed to numerous factors that can influence their aggression and stress levels. One of the methods employed by young people to circumvent or mitigate these effects is music. They frequently turn to music, particularly to express themselves emotionally or to relax, while simultaneously creating a personal space for themselves. Participation in musical activities has been demonstrated to stimulate the release of endorphins, a type of neurochemical associated with activating brain pathways linked to pleasure and relaxation (Bao et al., 2001; Gangrade, 2012). Research indicates that music increases the level of perceived relaxation (Burns, et al., 1999). Allen et al. (2001) found that music also positively affects perceived stress. Knight and Rickard (2001) posit that relaxing music prevents stress-induced increases in subjective anxiety, systolic blood pressure, and heart rate in healthy men and women. Blood and Zatorre (2001) argue that music activates pleasure and reward-related circuits in the brain. Many other studies show that participation in musical activities improves psychosocial skills. An important aspect of music, which has such a wide and profound impact on both human physiology and psychology, as evidenced by its ability to reduce stress (Knight & Rickard, 2001), enhance emotional regulation (Blood & Zatorre, 2001), and stimulate cognitive development (Hallam & Rogers, 2016), is playing an instrument.

Playing a musical instrument is a multifaceted activity encompassing cognitive, emotional, and physical processes. The high level of motivation and concentration required to play or learn a musical instrument can help alleviate the anxiety and stressors of daily life. As Aristotle expressed with the concept of catharsis[1], playing an instrument has the potential to purify toxic emotions accumulated with the difficulties of life and create psychological relief.

Research shows that individuals need to improve their psychological and behavioral skills, including self-regulation, motivation, and responsibility, to overcome the barriers associated with learning musical instruments and achieve the necessary proficiency (Davidson et al., 1997; Martin, 2008; McPherson, 2005). Toyoshima et al. (2011) concluded that playing the piano is more effective than other artistic activities in reducing stress. Kim and Kim (2017) reported that following 24 weeks of instrument training for Korean primary school children, there was a reduction in verbal and physical aggression levels, although there was no statistically significant effect on general aggression levels. In their research on young people aged 11 and 16, Hallam and Rogers (2016) concluded that those who play instruments perform better academically.

One of the crucial periods during which individuals are exposed to a multitude of stressors is young adulthood, which marks the transition to establishing an independent life. It is challenging to delineate a precise age range for young adulthood. For example, Levinson (1986) refers to this age range as 17-22, while Neinstein (2016) refers to the age range as 18-25. Although the precise age range of young adulthood cannot be defined, it is generally understood to be the first transition period to adulthood following adolescence. This period represents a transition period during which society expects young people to become economically independent, start families, and assume responsible roles as productive members of society. In the context of the uncertainty that characterizes this transitional period, the personal characteristics and competencies of young adults become increasingly significant. This research aims to determine how playing musical instruments affects aggression and stress vulnerability among young adults.

The research question is as follows: What is the effect of playing an instrument on the specific dimensions of aggression (e.g., physical, verbal) and vulnerability to stress in young adults? The research presents a series of sub-problems, which include:

1. Does gender have a significant effect on young adults' aggression and vulnerability to stress?
2. Does age have a significant effect on young adults' aggression and vulnerability to stress levels?
3. Does there exist a significant correlation between aggression, stress vulnerability, and instrument-playing variables?
4. Does there exist a significant correlation between the duration of playing a musical instrument and the levels of aggression and vulnerability to stress among young adults?

METHODOLOGY

This study employs a descriptive research methodology with the objective of elucidating the interrelationship between young adults' instrument-playing status, aggression tendencies, and vulnerability to stress. The research was designed

[1] The word catharsis, principally used by Aristotle in Poetics, refers to the emotional purification that humans experience through art. See Aristotle (trans. 1984), Poetics.

in a relational screening model, with the objective of elucidating the relationship between variables in their own conditions. As Fraenkel and Wallen (2006) state, the purpose of relational survey research is to define the relationship between variables.

Sample Group

As the research required voluntary and accessible participants, convenience sampling was used to select the sample. Power analysis was conducted to determine the sample size (Cohen, 1992). An a priori power analysis, using an alpha level of 0.05 and a medium effect size, determined that at least 150 participants were required to achieve 80% statistical power. In the study, data were collected from 223 volunteer participants aged between 18 and 30 years. Descriptive information about the participants is shown in Table 1.

Table 1. Descriptive Characteristics of the Participants

	n	*%*
Gender		
Female	106	46.9
Male	117	51.8
Age		
18-20	81	35.8
21-23	80	35.4
24 and above	62	27.4
Total	223	100

Ethics

In order to collect research data, permission was obtained from the Zonguldak Bülent Ecevit University Human Research and Ethics Committee on March 26, 2024, with the reference number 432630. Prior to the commencement of the study, written consent was obtained from all participants, thereby ensuring their voluntary involvement. The participants were informed that they could withdraw from the research at any time, without the need to provide a reason. Furthermore, it was explicitly stated that the participants' identities would remain confidential and would not be disclosed in the research report. This also applied to the administration of the Buss-Perry Aggression Scale, the Vulnerability to Stress Scale, and the personal information form.

Data Collection

Data were collected by administering stress and aggression scales to the participants and by completing a personal information form. A personal information form was used to determine the gender, age, and instrument-playing status of the participants.

The first version of the aggression scale developed by Buss and Perry (1992) consists of four dimensions and 29 questions (Buss & Warren, 2000). The scale was later developed and increased to 34 items and had a structure with five sub-dimensions. These sub-dimensions are: physical aggression, verbal aggression, anger, hostility and indirect aggression. The scale is a five-point Likert scale and the items are answered as '4 = always', '3 = often', '2 = sometimes', '1 = rarely', '0 = never'. The Cronbach alpha value of the Turkish version of the scale was found to be 0.85, and the split-half reliability coefficients for the subtests were found to be between 0.53 and 0.82 (Can, 2002). The data obtained indicate that the scale is valid and reliable.

The second scale used in the study is the Stress Audit 4.2-OS (Vulnerability) Scale developed by Miller, Smith and Mehler (1988). The scale has three main parts. "stress-related factors", "stress symptoms" and "vulnerability to stress". The Vulnerability subscale represents the tendency to experience stress as measured by the Stress Control 4.2-OS. The validity and reliability study of the Turkish scale was conducted by Şahin and Durak (1994) and the Cronbach alpha reliability coefficient was found to be 0.74 and the test-retest reliability coefficient was found to be 0.71. The data obtained show that the scale is a valid and reliable instrument. The scale consists of 20 items in a five-point Likert format, with answers ranging from 'almost always' to 'never'.

Cronbach's alpha coefficients were calculated in order to assess the reliability of the measurement tools in the light of the data obtained in this research. The Cronbach's alpha value of the aggression scale was found to be 0.82. The Cronbach's alpha value of the Vulnerability to Stress Scale was calculated to be 0.79. These values indicate that the instruments are valid and reliable for this research.

Table 2 lists the items from the Buss–Perry Aggression Questionnaire that were used in the study along with the findings about the scale's internal consistency.

Table 2. Internal consistency of the Buss–Perry Aggression Questionnaire

Factor Items of the BPAQ		Cronbach's alpha (n = 223)	
		Item-total correlation if item deleted	Reliability for subscales
Anger (AN)	Some of my friends think I'm a hothead	.76	
	I am an even-tempered person	.77	
	I flare up quickly but get over it quickly	.79	
	I have trouble controlling my temper	.75	
	When frustrated, I let my irritation show	.73	.84
	I sometimes feel like a powder keg ready to explode	.80	
	Sometimes I fly off the handle for no good reason	.78	
Physical aggression (PA)	If I have to resort to violence to protect my rights, I will	.72	
	I have become so mad that I have broken things	.71	
	Once in a while I can't control the urge to strike another person	.73	
	I have threatened people I know	.69	
	Given enough provocation, I may hit another person	.70	.78
	I can think of no good reason for ever hitting a person	.74	
	If somebody hits me, I hit back	.75	
	There are people who pushed me so far that we came to blows	.76	
	I get into fights a little more than the average person	.74	
Hostility (HS)	When people are especially nice, I wonder what they want	.73	
	I wonder why sometimes I feel so bitter about things	.79	
	I am suspicious of overly friendly strangers	.76	
	I am sometimes eaten up with jealousy	.80	
	At times I feel I have gotten a raw deal out of life	.78	83
	I sometimes feel that people are laughing at me behind my back	.77	
	Other people always seem to get the breaks	.72	
	I know that "friends" talk about me behind my back	.79	
Verbal aggression (VA)	I tell my friends openly when I disagree with them	.75	
	I can't help getting into arguments when people disagree with me	.71	
	When people annoy me, I may tell them what I think of them	.80	.82
	I often find myself disagreeing with people	.71	
	My friends say that I'm somewhat argumentative	.77	
Indirect aggression (IA)	I react to those who really disturb me by remaining silent and not paying attention	.72	
	I know that my friends talk about me behind my back	.71	
	Some of my friends think that I act without thinking	.70	.79
	Sometimes I get too jealous to think about anything	.73	
	I like to joke	.75	

Table 2 shows the internal consistency values (Cronbach's alpha) of the Buss–Perry Aggression Questionnaire (BPAQ) sub-dimensions (Anger, Physical Aggression, Hostility, Verbal Aggression, Indirect Aggression). The data obtained show that the general reliability level of the scale sub-dimensions is sufficient. In order to see whether an item in the scale disrupts the total structure, the "Total correlation if ıtem deleted" was examined, and it was seen that the scale items had a consistent structure with the overall scale.

The items in the Vulnerability to Stress Questionnaire used in the study and the results regarding the internal consistency of the scale are presented in Table 3.

Table 3. Internal consistency of the Vulnerability to Stress Questionnaire

Factor Items of the Vulnerability to Stress Questionnaire	Cronbach's alpha (n = 223)	
	Item-total correlation if item deleted	Reliability
I eat at least one hot, balanced meal a day.	.68	
I get seven to eight hours of sleep at least four nights a week.	.70	
I give and receive affection regularly.	.74	
I have at least one relative whom I can easily reach from wherever I am and whom I can trust and rely on.	.66	
I exercise to the point of perspiration at least twice a week	.72	
I limit myself to less than half a pack of cigarettes a day	.65	
I take fewer than five alcoholic drinks a week	.71	
I am the appropriate weight for my height	.69	
I have an income adequate to meet basic expenses	.73	
I get strength from my religious belief	.71	
I regularly attend club or social activities	.75	.79
I have a network of friends and acquaintances	.71	
I have one or more friends to confide in about personal matter	.69	
I am in good health (including eye- sight, hearing, teeth	.65	
I am able to speak openly about my feelings when angry or worried	.69	
I have regular conversations with the people I live with about domestic problems - for example, chores and money.	.66	
I do something for fim at least once a week	.70	
I am able to organize my time effectively	.73	
I drink fewer than three cups of coffee (or other caffeine-rich drinks) a day.	.69	
I take some quiet time for myself during the day.	.70	

The internal consistency values (Cronbach's alpha) of the single-dimension Vulnerability to Stress Questionnaire are given in Table 3. The data obtained show that the general reliability level of the scale is sufficient. In addition, it was observed that the scale items had a consistent structure with the overall scale.

Data Analysis

The research data collected from young adults aged 18-30. The scales were administered both electronically and through face-to-face interviews. The data obtained were analyzed using the SPSS programme. The data were pre-processed to increase validity and reliability. Initially, any instances of missing data within the data set were identified. It was observed that the proportion of missing data in the data set was less than 5%. These missing values were completed using the mean filling method. In order to ascertain any anomalous values (outliers), the z-scores for each variable were calculated, and it was found that these z-scores fell within the range ±3. The kurtosis and skewness values of the data were examined in order to ascertain the normality of the data distribution. It was observed that the skewness and kurtosis values of the data exhibited a range between -1.5 and +1.5. The fact that the skewness and kurtosis values are between -1.5 and +1.5 indicates that the data meet the normality assumption (George & Mallery, 2010; Hahs-Vaughn & Lomax, 2013; Tabachnick, et al., 2007). In light of the assumption of normality in the data

obtained within the scope of the research, parametric tests were employed in the analysis of the data. The findings were evaluated at a 95% confidence interval and a 5% significance level, in accordance with the analysis.

RESULTS

The purpose of this study is to examine the relationship between the duration of instrument playing and aggression and vulnerability to stress. Aggression was examined in the subscales of physical aggression, verbal aggression, anger, hostility, and indirect aggression. In addition, the research data examined in terms of demographic variables, and the correlation between the variables discussed in the research was analyzed.

The results of the analysis of aggression and vulnerability to stress in relation to gender variables are presented in Table 4.

Table 4. Results of the Analysis of Aggression and Vulnerability to Stress in Relation to the Gender Variable

Measure	Male		Female		*t*	*p*	*Cohen's d*
	M	*SD*	*M*	*SD*			
Vulnerability to Stress	3.169	.745	3.138	.556	.348	.728	0.047
Aggression							
Physical Aggression	2.175	1.101	2.220	1.041	-.311	.756	0.042
Verbal Aggression	2.056	1.124	1.194	1.116	.481	.631	0.769
Anger	1.815	.826	2.210	.962	-2.273	.001	0.440
Hostility	2.030	1.142	2.055	1.136	-.166	.868	0.021
Indirect Aggression	2.083	1.203	2.488	1.094	-2.632	.009	0.352

A review of the data in Table 4 reveals no statistically significant difference between men and women in terms of vulnerability to stress (t=.348, *p*=.728, Cohen's d=.047). No significant difference was identified between males and females with regard to physical aggression (t=-.311, *p*=.756, Cohen's d=.042). Similarly, no significant gender difference was observed in verbal aggression (t=.481, *p*=.631, Cohen's d=.769) or hostility (t=-.166, *p*=.868, Cohen's d=.021). Nevertheless, a significant gender difference was observed in terms of anger, with females reporting higher levels of anger than males (t=-2.273, *p*=.001, Cohen's d=.440). Furthermore, female participants demonstrated significantly elevated levels of indirect aggression relative to their male participants (t=-2.632, *p*=.009, Cohen's d =.352).

The results of the analysis of aggression and vulnerability to stress in the context of age-related variables are presented in Table 5.

Table 5. Results of the Analysis of Aggression and Vulnerability to Stress in Relation to the Age Variable

Measure	18-20		21-23		24 and above		*F*	η^2
	M	SD	M	SD	M	SD		
Vulnerability to Stress	3.214	.627	3.107	.661	3.131	.673	.591	.005
Aggression								
Physical Aggression	2.208	1.095	2.186	1.058	2.203	1.067	.010	.000
Verbal Aggression	1.881	1.156	2.124	1.102	2.062	1.087	1.021	.009
Anger	2.005	.912	2.106	.922	1.942	.931	.587	.005
Hostility	2.144	1.175	1.924	1.117	2.066	1.114	.774	.007
Indirect Aggression	2.139	1.222	2.364	1.094	2.414	1.165	1.195	.011

*p<.05, **p<.01

As demonstrated in Table 5, the findings revealed no statistically significant discrepancies in vulnerability to stress across diverse age groups (F=.591, η^2 = .005). Similarly, no significant age-related differences were identified for

physical aggression (F=.010, η^2=.000) or verbal aggression (F=1.021, η^2=.009). No significant age-related differences were found for anger (F=.587, η^2=.005), hostility (F=.774, η^2=.007), or indirect aggression (F=1.195, η^2=.011).

The descriptive statistics and correlations of the research variables are presented in Table 6.

Table 6. Correlations between the Variables of the Research

Variables	*n*	*M*	*SD*	1	2	3
Vulnerability to Stress	223	3.1531	.651	-		
Aggression	223	2.894	.941	.247**		
Musical Instrument Playing	223	1.493	1.229	-.505**	-212**	-

*p<.05, **p<.01

Table 6 shows a moderate negative correlation between playing an instrument and vulnerability to stress, which is statistically significant (p<.01, r=-.505). In light of these results, it can be expected that playing a musical instrument reduces vulnerability to stress. There is a negative and weak correlation between playing an instrument and aggression (p<.01, r=-.212). Therefore, it can be said that playing an instrument significantly reduces aggression, but the relationship is not strong. There is a positive and weak correlation between aggression and vulnerability to stress (p<.01, r=.247). This positive relationship between vulnerability to stress and aggression shows that if there is an increase in one of the variables, an increase in the other can also be expected.

Table 7 presents the means, standard deviations, and one-way analyses of variance in the context of instrument playing in aggression and vulnerability to stress.

Table 7. Means, Standard Deviations and One-Way Analyzes of Variance in the Context of Instrument Playing in Aggression and Vulnerability to Stress

Measure	Not Playing		0-1 hour		1-2 hours		2-3 hours		3 and above		*F*	η^2
	M	SD	M	SD	M	SD	M	SD	M	SD		
Vulnerability to Stress	3.744	.332	3.428	.309	2.461	.251	2.453	.247	3.762	.457	194,744*	.781
Aggression												
Physical Aggression	3.028	0.523	2.258	1.050	1.770	1.158	1.675	0.820	1.469	0.806	20.211*	.271
Verbal Aggression	2.228	1.095	1.954	1.152	1.905	1.138	2.129	1.097	1.647	0.997	1.239	.022
Anger	2.969	.572	1.948	.778	1.568	.7536	1.670	.706	1.096	.513	42.566*	.439
Hostility	2.012	1.158	2.064	1.172	2.097	1.172	1.910	1.110	2.170	.937	.207	.004
Indirect Aggression	2.339	1.103	2.088	1.255	2.266	1.177	2.494	1.084	2.612	1.104	1.043	.019

*p<.001

Table 7 reveals significant differences in vulnerability to stress across instrument playing time (F=194.744, η^2=.781). A post-hoc analysis was conducted to ascertain which groups were responsible for the observed difference. The post-hoc analysis revealed a significant difference between the group that did not play an instrument and the groups that played for 0-1 hours, 1-2 hours, 2-3 hours, and 3 hours and above (p<.05). Upon examination of the group averages, it becomes evident that as the duration of instrument playing increases, there is a corresponding decrease in the vulnerability to stress.

Furthermore, there were notable differences in physical aggression depending on the duration of instrument playing (F=20.211, η^2=.271). The post-hoc analysis revealed a significant difference between the group that did not play an instrument and the groups that played for 0-1 hours, 1-2 hours, 2-3 hours, and 3 hours and above (p<.05). A review of the data revealed a decline in the inclination towards physical aggression among individuals as the duration of instrument playing increased.

Table 7 shows that there is a significant difference in the anger sub-dimension of aggression (F=42.566, η^2=.439). As a result of the post-hoc analysis conducted to determine the source of this difference, it was understood that the source of the difference was the group that did not play instruments. There is a significant difference between the group that does not play instruments and the group that does (p<.05). Looking at the group averages, it can be seen that the average of the group that does not play instruments is the highest and the averages decrease as the duration of playing instruments increases.

The results in Table 7 show that playing an instrument has no significant effect on verbal aggression, hostility, and indirect aggression.

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

The research found that gender was not a significant variable in vulnerability to stress. Being a man or a woman does not make a difference in terms of vulnerability to stress. On the other hand, women's scores for indirect aggression and anger are significantly higher than men's. These results suggest that women are more likely to show aggression more indirectly. On the other hand, it can be said that women are more sensitive to anger-related stimuli and have less anger control than men. Gender does not affect physical aggression, verbal aggression, and hostility. These dimensions of aggression are experienced similarly by both sexes. There was no significant effect of age on aggression and vulnerability to stress. The main reason for this is that the research was conducted on a homogeneous group, as it focused on young adults.

Correlation analysis of the variables examined in the study shows that there are significant relationships between vulnerability to stress, aggression, and playing instruments. The weak positive correlation between aggression and vulnerability to stress showed that these two variables influence each other and that an increase in one would be expected to result in an increase, albeit weak, in the other. A weak relationship may mean a variety of other factors influences that aggression. However, stress coping mechanisms, as well as other factors, would be expected to reduce aggression.

The moderate negative relationship between playing an instrument and vulnerability to stress shows that as the duration of playing an instrument increases, vulnerability to stress decreases. The fact that the correlation is at a moderate level shows that playing an instrument has a significant effect on vulnerability to stress. Therefore, playing an instrument may play an important role in reducing the effects of stressors that individuals face in their daily lives and in increasing their emotional and psychological well-being. Similarly, the weak negative relationship between playing an instrument and aggression shows that aggression decreases as the duration of playing an instrument increases. However, the fact that this relationship is weak can be interpreted as aggression being influenced by other factors. It is noteworthy that both the stress sensitivity and aggression scores of people who do not play instruments are significantly higher than those who play instruments. The results show that people who do not play instruments are more sensitive to stress and have higher levels of aggression. Nevertheless, the importance of playing an instrument, which plays a significant role in reducing both vulnerability to stress and aggression levels, in creating psychologically healthy individuals and a healthy society cannot be denied.

In addition to comparing those who played an instrument and those who did not, the study also focused on the duration of playing an instrument. The findings show that playing an instrument generally has a positive effect on aggression and stress, but the duration of playing significantly increases these effects, emphasizing the importance of a sustainable interaction with music. As a result of the study, it was found that the level of sensitivity to stress and aggression decreases as the duration of playing an instrument increases. This result is consistent with other studies in the literature. For example, Hanna-Pladdy and Mackay (2011) also observed that engaging in music for longer periods of time increases cognitive flexibility and has positive effects on stress management. Herholz and Zatorre (2012) state that long-term music practice, in particular, strengthens the connections between the limbic system (responsible for emotional processes) and the prefrontal cortex (emotional control and decision-making) in the brain, positively affecting the regions in the brain associated with stress and aggression. In addition, Kreutz et al. (2004) also state that the effect of decreasing cortisol levels and making individuals who play an instrument feel calmer increases in direct proportion to the duration of playing an instrument. The results of this study regarding the duration of playing an instrument are consistent with other studies in the literature. Accordingly, there is a significant relationship between the increase in the duration of playing an instrument and the decrease in the individual's aggression and stress susceptibility levels. It is understood that long-term music practice creates these effects through a series of mechanisms, such as emotional regulation, reduction of stress hormones, and development of social skills. Therefore, not only the act of playing an instrument but also the regular and long-term nature of this practice can support the psychological well-being of individuals more effectively.

Psychological effects form the basis of human behavior. These results show that playing an instrument is very important for the psychology of the individual and for fostering community mental health. The effects of playing a musical instrument on human psychology show that it can be used for well-being. It would be useful to consider many elements such as the regulation of human psychology and behavior, emotional stability, anger management, and stress management in relation to playing an instrument. Previous studies on the effects of music on human psychology also

support this claim: the improvement in psychological factors with increasing duration of playing an instrument can be seen as a sign that music and playing an instrument can be used as a therapeutic tool.

It is thought that it would be beneficial to include activities related to music in general, and instrument playing in particular, in programs related to stress and aggression. It seems that the therapeutic elements of music and instrument playing should be utilized. Since playing an instrument has positive psychological effects on public health, it is recommended that lifelong learning centers enhance their offerings of musical training programs to support mental and emotional development in communities.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Zonguldak Bülent Ecevit University (Date: March 26, 2024, Number: 432630).

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