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EFFECTS OF NOISE POLLUTION ON ANGER AND SMOKING ADDICTION IN COLLEGE STUDENTS

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ABSTRACT

A common phenomenon observed in our daily lives, noise leads to both auditory and non-auditory health problems. In addition to workplace environments where people often develop noise-induced hearing loss, noise may frequently lead to hearing loss in our everyday lives, too. Also, it is proven that too much exposure to noise combined with other variables has a triggering effect. Furthermore, there is a meaningful relationship between smoking and anger, and increase in anger symptoms is observed in smokers during their deprivation periods. In this research, in order to measure the anger variable, The State-Trait Anger and Anger Expression Scale and in order to measure smoking Fagerström Test for Nicotine Dependence Scale were used. In order to measure the noise intensity, CESVA DC 311 model T240385 serial numbered devices were used in 8 different spots. The research took place and was evaluated in Okan University and 473 individuals participated the research. Considering this research, the correlation between noise levels and anger and smoking addiction was tested while studying the relationship of these variables on college students' group. According to the results of the study, noise was found to be significantly and positively correlated with the trait, state, outraged and hated anger. However, there is significant positive correlation between trait anger and nicotine addiction in the smoking group. Mean scores for the trait, state, outraged, and hated anger were found higher among smoking addicts when compared to non-smokers. On the other hand, the mean scores for controlled anger were higher among non-smokers.

INTRODUCTION

All over the World, the cities face the problem of noise pollution. While noise can be defined as undesired sound, all the sounds except those in workplaces can be called environmental noise. As a type of air pollution, environmental noise pollution poses threat to people's health. Noise pollution becomes more dangerous day by day due to population growth, urbanization, and various noise sources. Noise pollution will continuously increase due to the improvements in highways, railways, and airways which are the biggest sources of environmental noise pollution [1]. The relationship between anger and noise depends on some psychopathologic characteristics such as one's age, gender, and how sensitive that person is to noise. In previous research, the correlation between noise sensitivity and anger was found higher among the group aged from 17 to 20 than that of the younger group aged between 14 and 16. Although anger is expressed similarly by women and men, men's anger is often higher than that of women [2].

Negative circumstances such as noisy environments the people are exposed to may cause the person to get angry and show aggression [3-5]. Anger is a human emotion depending on psychological and physical factors and it has evolved as a part of the "Fight or Flight" mechanism along with the human being. Anger helps us to recognize when others misbehave us, and we try to correct the misbehavior through our anger. It is a normal emotion and may also be useful. It is not the emotion itself, but its effect on our feelings and behaviors that may raise problems for us and the people around us. Anger makes the person uncomfortable because it increases the epinephrine level which in turn accelerates the heartbeats, causes the person to breathe excessively, sweat, and get nervous. The individual might feel stronger, resolute, and even untouchable. Those with anger might not feel pain. On the other hand, anger might also makes the individual feel desperate and daunted [6]. Every emotion is associated with a specific core-relational-theme. Anger means that someone is confronted with a demeaning offence; anxiety means that someone is confronted with an uncertain situation or an existential threat, disgust means that someone is taking in or being too close to an indigestible object or idea [7].

It is estimated that 1,3 billion people are smoking all over the world today. 4,9 million people are dying every year due to nicotine consumption and if it continues this way, this number will probably increase up to 10 million in 2020, and 70 percent of those 10 billion is estimated to include people from developing countries. In addition to health problems arising from tobacco consumption and environmental cigarette smoke exposure, cigarette addiction is also accepted as a disease according to the International Classification of Diseases (ICD-10). Nicotine addiction requires regular treatment because it is a chronic disease and relapses.

There are significant relationships between anger and many aspects of smoking. Symptoms of anger are observed to decrease after the person smokes [8] Those smokers who show constant anger tend to smoke to be able to cope with anger [9]. When anger is considered, cigarette addicts are more vulnerable compared to non-smokers or those who do not smoke continuously [10]. Zvolensky and Hawkins [9} found that there was a relationship between anger and failure to quit smoking. Anger is accepted as a predictor variable as to the reason why the addiction relapses in the cessation process. Another study revealed that

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those cigarette addicts who have excessive anger have much more difficulty in quitting and they often tend to restart smoking one week later. The results of the research conducted by Kerrin et al. [11] also confirmed those findings. It was found that people who experienced an increase in their anger symptoms one week after quitting smoking showed a tendency to resume smoking compared to those who did not experience an increase. It was suggested that anger management interventions could help the cessation process. The literature review unveiled the limited number of research conducted on the relationship between noise, anger, and smoking addiction. Taking this into account, the study aims to examine the effect of noise, an environmental factor, on anger and cigarette addiction.

MATERIALS AND METHODS

The present study has been conducted in a correlational and comparative design. In this study two different questionnaires were used in order to obtain data from participants. The questionnaires are The State-Trait Anger, Anger Expression Scale and Fagerström Test for Nicotine Dependence. In order to measure the noise intensity, CESVA DC 311 model T240385 serial numbered devices were used in 8 different spots. The testing and data collection phases were conducted under Istanbul Okan University's permission and participants were given informed consent form to confirm their volunteering.

Participants
The present study has been conducted in a correlational and comparative design. Participants are 473 students from Istanbul Okan University. The participants were selected using convenient sampling technique. Participants of the study consisted of N=172 male Mage=22.95; SD=3.889) and N=301 Female (Mage=21.02; SD=2.818). Totally N=473 participants (Mage=21.72; SD=3.375) were attended the research [Table 1]. Participants of the study consisted of N=169 smoker Mage=22.25; SD=2.566) and N=304 nonsmoker (Mage=21.42; SD=3.721).

Measures
State-Trait Anger Scale (STAS) is a 20-item scale, with half the items proposed to measure state anger and the other half trait anger. The STAS asks individuals to respond according to how they feel right at the moment, or at a particular time. The requires individuals had to respond according to how they generally feel or react [12].

The Anger Expression (AX) is a 20-item scale, with eight items measuring Anger/In (AXI), eight items measuring Anger/Out (AXO), and four items tentatively measuring a third construct, Anger/ Control (AXCON) [13].

The Fagerström Test for Nicotine Dependence is a standard instrument for assessing the intensity of physical addiction to nicotine. The test was designed to provide an ordinal measure of nicotine dependence related to cigarette smoking. It contains six items that evaluate the quantity of cigarette consumption, the compulsion to use, and dependence. In scoring the Fagerstrom Test for Nicotine Dependence, yes/no items are scored from 0 to 1 and multiple-choice items are scored from 0 to 3. The items are summed to yield a total score of 0-10. The higher the total Fagerström score, the more intense is the patient's physical dependence on nicotine [14].

Procedures
During sample gathering from locations with high noise intensity, students who share same environment were requested to fill in the questioners and the noise analysis gathered in the end is shown in [Table 1]. The unfinished surveys were not included in research and the results were calculated with Statistical Package for the Social Sciences Version 25 (SPSS).

Table 1: Noise decibels of locations where participants filled questionnaires

Locations	Decibels	N	%
Social Sciences Faculty Building	56.80	46	9.7
Medicine III Floor Building	60.50	39	8.2
Medicine I Floor Building	62.00	49	10.4
Medicine IV Floor Building	64.80	56	11.8
Medicine II Floor Building	67.50	66	14.0
Wellness Center Building	74.70	58	12.3
Starbucks indoor Building	78.00	63	13.3
Engineering Faculty Building	80.00	96	20.3
Total		473	100.0

RESULTS AND DISCUSSION

Correlation between State-Trait Anger Scale and Nicotine Addiction Scale is shown in [Table 2]. Pearson's correlation revealed that there was significant, positive correlation between trait anger and nicotine addiction in the smoking group (r(169)=.315; p<.01). Pearson's correlation revealed that there was significant, negative correlation between controlled anger and nicotine addiction in the smoking group

(r(169)=-.186; p<.05). Pearson's correlation revealed that there was significant, positive correlation between outraged anger and nicotine addiction in the smoking group (r(169)=.213; p<.01).

Table 2: Pearson correlation between State-Trait Anger Scale and Nicotine Addiction Scale

Smoker		Trait Anger	State Anger	Controlled Anger	Outraged Anger	Hated Anger
Yes n=169	Trait Anger					
Yes n=169	State Anger	r.300** p.000				
Yes n=169	Controlled Anger	r-.309** p.000	r.459** p.000			
Yes n=169	Outraged Anger	r.708** p.000	r.432** p.000	r-.275* p.000		
Yes n=169	Hated Anger	r.452** p.000	r.735** p.000	r.092 p.235	r.506** p.000	
Yes n=169	Nicotine Addiction	**r.315** **p.000**	r-.007 p.925	**r-.186*** **p.016**	**r.213** **p.006**	r.142 p.065
No n=304	Trait Anger					
No n=304	State Anger	r.142* p.013				
No n=304	Controlled Anger	r-.491** p.000	r.338** p.000			
No n=304	Outraged Anger	r.656**	r.323**	r-.444**		

Other significant correlations are in between subscales of State-Trait Anger Scale. [Table 3] shows mean scores of State-Trait Anger Scale according to smoker-nonsmoker and results of independent samples t test. Trait anger levels of participants according to smoking were compared using independent samples t test. This revealed that the mean trait anger scores of smoker participants (M=22.83; SD=5.718) was significantly higher than nonsmoker participants (M=20.60; SD=5.373) [t=4.220; p<.05].

State anger levels of participants according to smoking were compared using independent samples t test. This revealed that the mean scores of state anger were not significantly different according to smoking. Controlled anger levels of participants according to smoking were compared using independent samples t test. This revealed that the mean scores of controlled anger were not significantly different according to smoking. Outraged anger levels of participants according to smoking were compared using independent samples t test. This revealed that the mean outraged anger scores of smoker participants (M=17.93; SD=4.477) was significantly higher than nonsmoker participants (M=15.85; SD=3.944) [t=5.057; p<.05]. Hated anger levels of participants according to smoking were compared using independent samples t test. This revealed that the mean hated anger scores of smoker participants (M=17.13; SD=4.278) was significantly higher than nonsmoker participants (M=15.95; SD=4.130) [t=2.947; p<.05].

Table 3: Means scores of State-Trait Anger Scale according to smoker-nonsmoker and results of independent samples t test

	Smoker	N	M	SD	t	p
Trait Anger	Yes No	169 304	22.83 20.60	5.718 5.373	4.220	**.000**
State Anger	Yes No	169 304	22.89 22.19	4.118 3.741	1.872	.062
Controlled Anger	Yes No	169 304	20.53 21.41	4.782 4.849	-1.918	.056
Outraged Anger	Yes No	169 304	17.93 15.85	4.477 3.944	5.057	**.000**
Hated Anger	Yes No	169 304	17.13 15.95	4.278 4.130	2.947	**.003**

State-Trait Anger Scale and Nicotine Addiction Scale mean scores shown in [Table 4], according to locations where participants filled the questionnaires and results of one-way ANOVA. As it shown in [Table 4] all locations have different noise levels. A significant difference was found among university students' main scores of trait anger according to the locations where they filled the questionnaires [F (7-465) =6.498; p=.000]. The results of the Tukey test conducted to determine the source of the difference indicated that trait anger levels of students at Engineering faculty (M=22.22) were significantly higher than those of students on the 2nd floor of Medicine Faculty (M=19.85) (p=.034). Trait anger levels of students at Coffee Shop (M=23.92) were found to be significantly higher than those of students at Social Sciences Faculty building (M=19.85) (p=.003), those of students on the 2nd floor of Medicine Faculty M=19.85) (p=.000), those of students on the 3rd floor of Medicine Faculty(M=19.51) (p=.002) and those of students on the 4th floor of Medicine Faculty (M=19.70) (p=.001). Trait anger levels of students on the top floor of wellness center (M=23.19) were found to be significantly higher than those of students at Social Sciences Faculty building (M=19.85) (p=.037), those of students on 2nd floor of Medicine Faculty (M=19.85)

(p=.004), those of students on the 3rd floor of Medicine Faculty (M=19.51) (p=.023) and those of students on the 4th floor of Medicine Faculty (M=19.70) (p=.013).

Table 4: Means scores of State-Trait Anger Scale and Nicotine Addiction Scale according to locations where participants filled the questionnaires and results of independent samples t-test

	Locations	dB	N	M	SD	F	P	Tukey
Trait Anger	Engineering Faculty	80	96	22.22	5.753	6.498	.000	Eng>Med 2nd p=.034
	Starbucks indoor	78	63	23.92	6.086			Star. in>SSFB p=.003
	Social Sciences F.	56.8	46	19.85	4.402			Star. in>Med 2nd p=.000
	Medicine Faculty 1st	62	49	21.90	5.026			Star. in>Med 3rd p=.002
	Medicine 2nd floor	67.5	66	19.48	4.598			Star. in>Med 4th p=.001
	Wellness Center	74.7	58	23.19	5.859			Wellness>SSFB p=.037
	Medicine 3rd floor	60.5	39	19.51	5.572			Wellness>Med 2nd p=.004
	Medicine 4th floor	64.8	56	19.70	5.092			Wellness>Med 3rd p=.023
								Wellness>Med 4th p=.013
State Anger	Engineering Faculty	80	96	23.30	4.089	4.247	.000	Eng>Med 2nd p=.002
	Starbucks indoor	78	63	22.79	3.575			Eng>Med 3rd p=.045
	Social Sciences F.	56.8	46	22.50	3.613			Med 1st Med 2nd p=.002
	Medicine Faculty 1st	62	49	23.80	3.867			Med 1st> Med 3rd p=.021
	Medicine 2nd floor	67.5	66	20.91	3.185			
	Wellness Center	74.7	58	22.76	4.485			
	Medicine 3rd floor	60.5	39	21.08	3.520			
	Medicine 4th floor	64.8	56	21.75	3.694			
Controlled Anger	Engineering Faculty	80	96	21.73	4.671	1.592	.136	
	Starbucks indoor	78	63	20.02	5.191			
	Social Sciences F.	56.8	46	21.67	4.854			
	Medicine Faculty 1st	62	49	20.65	4.265			
	Medicine 2nd floor	67.5	66	20.94	4.813			
	Wellness Center	74.7	58	20.09	5.266			
	Medicine 3rd floor	60.5	39	21.54	5.041			
	Medicine 4th floor	64.8	56	22.07	4.398			
Outraged Anger	Engineering Faculty	80	96	17.40	4.450	5.446	.000	Eng> Med 2nd p=.001
	Starbucks indoor	78	63	17.51	4.119			Star in > Med 2nd p=.003
	Social Sciences F.	56.8	46	15.76	3.695			Med 1st Med 2nd p=.002
	Medicine Faculty 1st	62	49	17.82	4.290			Wellness>Med 2nd p=.001
	Medicine 2nd floor	67.5	66	14.68	3.235			
	Wellness Center	74.7	58	17.78	4.896			
	Medicine 3rd floor	60.5	39	15.56	4.147			
	Medicine 4th floor	64.8	56	15.52	3.751			
Hated Anger	Engineering Faculty	80	96	17.00	4.114	7.640	.000	Eng>Med 2nd p=.002
	Starbucks indoor	78	63	16.68	3.885			Eng> Med 3rd p=.010
	Social Sciences F.	56.8	46	16.52	3.811			Star. In>Med 2nd p=.035
	Medicine Faculty 1st	62	49	18.35	4.562			Med 1st>Med 2nd p=.000
	Medicine 2nd floor	67.5	66	14.44	3.474			Med 1st>Med 3rd p=.000
	Wellness Center	74.7	58	17.91	4.236			Med 1st>Med 4th p=.002
	Medicine 3rd floor	60.5	39	14.28	3.727			Wellness>Med 2nd p=.000
	Medicine 4th floor	64.8	56	15.21	4.259			Wellness>Med 3rd p=.000
								Wellness>Med 4th p=.009
Nicotine Addiction	Engineering Faculty	80	52	3.17	2.595	.683	.686	
	Starbucks indoor	78	24	3.04	2.710			
	Social Sciences F.	56.8	13	2.62	2.181			
	Medicine Faculty 1st	62	16	3.44	2.851			
	Medicine 2nd floor	67.5	12	3.58	3.343			
	Wellness Center	74.7	39	3.28	2.752			
	Medicine 3rd floor	60.5	6	1.33	1.751			
	Medicine 4th floor	64.8	7	2.14	2.610			

A significant difference was found among university students' main scores of state anger according to the locations where they filled the questionnaires [F (7-465) = 4.247; p=.000]. The results of the Tukey test conducted to determine the source of the difference indicated that state anger levels of students at Engineering faculty (M=23.30) were significantly higher than those of students on the 2nd floor of Medicine Faculty (M=20.91) (p=.002) and those of students on the 3rd floor of Medicine Faculty (M=21.08) (p=.045). State anger levels of students on the 1st floor of Medicine Faculty (M=23.80) were found to be significantly higher than those of students on the 2nd floor of Medicine Faculty (M=20.91) (p=.002) and those of students on the 3rd floor of Medicine Faculty (M=21.08) (p=.021).

A significant difference was found among university students' main scores of outraged anger according to the locations where they filled the questionnaires [F (7-465) = 5.446; p=.000]. The results of the Tukey test conducted to determine the source of the difference indicated that outraged anger levels of students at Engineering faculty (M=17.40) were significantly higher than those of students on the 2nd floor of Medicine Faculty (M=14.68). Outraged anger levels of students at Coffee Shop (M=17.51) were found to be significantly higher than those of students on the 2nd floor of Medicine Faculty (M=14.68) (p=.003). Outraged anger levels of students on the 1st floor of Medicine Faculty (M=17.82) were found to be significantly higher than those of students on the 2nd floor of Medicine Faculty (14.68) (p=.002). Outraged anger levels of students on the top floor of wellness center (M=17.78) were found to be significantly higher than those of students on the 2nd floor of Medicine Faculty (M=14.68) (p=.001).

A significant difference was found among university students' main scores of hated anger according to the locations where they filled the questionnaires [F (7-465) = 7.640; p=.000]. The results of the Tukey test conducted to determine the source of the difference indicated that hated anger levels of students at Engineering faculty (M=17.00) were significantly higher than those of students on the 2nd floor of Medicine Faculty (M=14.44) (p=.002) and those of students on the 3rd floor of Medicine Faculty (M=14.28) (p=.010). Hated anger levels of students at Coffee Shop (M=16.68) were found to be significantly higher than those of students on the 2nd floor of Medicine Faculty (M=14.44) (p=.035). Hated anger levels of students on the 1st floor of Medicine Faculty (M=18.35) were found to be significantly higher than those of students on the 2nd floor of Medicine Faculty (M=14.44) (p=.000), those of students on the 3rd floor of Medicine Faculty (M=14.28) (p=.000) and those of students on the 4th floor of Medicine Faculty (15.21) (p=.002). Hated anger levels of students on the top floor of wellness center (M=17.91) were found to be significantly higher than those of students on the 2nd floor of Medicine Faculty (M=14.44) (p=.000), those of students on the 3rd floor of Medicine Faculty (M=14.28) (p=.000) and those of students on the 4th floor of Medicine Faculty (15.21) (p=.009).

Correlation between State-Trait Anger, Nicotine Addiction and Level of Noise shown in [Table 5]. Pearson's correlation revealed that there was significant, positive correlation between trait anger and level of noise (r(473)=.223; p<.01). Pearson's correlation revealed that there was significant, positive correlation between state anger and level of noise (r(473)=.099; p<.05). Pearson's correlation revealed that there was significant, positive correlation between outraged anger and level of noise (r(473)=.158; p<.01). Pearson's correlation revealed that there was significant, positive correlation between hated anger and level of noise (r(473)=.107; p<.05). There was no significant correlation between controlled anger and noise and also there were no significant correlation between nicotine addiction and noise.

Table 5: Pearson correlation between State-Trait Anger, Nicotine Addiction and Level of Noise

	Level of Noise
Trait Anger	**r.223**** **p.000**
State Anger	**r.099*** **p.032**
Controlled Anger	r-.043 p.345
Outraged Anger	**r.158**** **p.001**
Hated Anger	**r.107*** **p.020**
Nicotine Addiction	r.065 p.400
*p<.05; **p<.01	

Acting as a stressor, noise can result in anger. The findings of a study conducted by Iwata [15] revealed that those with a high level of noise sensitivity show more remarkable symptoms of anger. Another research carried out by Ramirez et al. [2] found that psychobiological factors, such as age, were also important variables determining the relationship between anger and noise. According to the results of this study, the relationship between noise sensitivity and anger was higher among older participants. As the literature review shows, there is a positive correlation between anger and noise, and according to the literature, the higher the noise level, the higher the anger level.

Although the literature review reveals a good number of studies regarding the relationship between smoking behavior and anger, the significance of the current study stems from the fact that there is no specific study on university students. In a study conducted in this area, a positive relationship was found between the number of cigarettes consumed daily and the level of trait anger [16]. In a study by Eiden et al. [10], smokers were found to be associated with higher levels of anger than those who did not smoke continuously or did not smoke at all. In another study, decreases in anger symptoms were observed in smokers in the period after smoking [8].

For the research done in Iran by Alimohammadi et al. [17], 250 workers in a car manufactory, noise pollution and their exposure to noise were examined. The most striking and significant correlation variable was anger. This proves us that our research touches an aspect that is in every part of life for different age and profession groups.

CONCLUSION

In this study, the effects of noise pollution on anger and cigarette addiction were examined on university students. The following results can be predicted from this study: The higher the noise level, the higher the anger level. While trait, state, outraged, and hated anger were found positively correlated with noise, no correlation was found between controlled anger and noise. There is a positive and significant relationship between nicotine addiction and anger. People with high anger levels also show addiction to nicotine. Nicotine addicts have a higher average of trait, hated, and outraged anger than non-smokers, while their controlled anger averages are lower.

In light of research's results, difference in student behavior under noise pollution was observed and its effects on anger are correlated with smoking. This research will provide basis for future research: Lack of research in this topic (especially in Turkey sample) unfortunately shows us that the interest in this topic is insufficient. Usage of different inventory in future researches (State anxiety, State stress) is one of the key factors for improving the study.

FINANCIAL DISCLOSURE
None.

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