

Relationship between Extraversion and Tobacco Smoking Among High School Students

Abstract

Background: There is limited information about the relationship between extraversion, as a personality trait, and the modes of tobacco smoking. The aim of this study was to investigate the relationships between extraversion and cigarette and water-pipe smoking among a representative sample of Iranian high school students. **Methods:** A sample of 2,312 tenth-grade students in Tabriz (Northwest of Iran) was selected through multistage proportional cluster sampling. Participants completed a self-administered questionnaire including information on cigarette smoking, water-pipe smoking, extraversion, socioeconomic information, as well as demographic characteristics. An ordinal logistic regression model was used for data analysis. **Results:** In total, 4.2% and 3.5% of the students were regular cigarette and water-pipe smokers, respectively. The adjusted odds ratios were 1.10 (95% CI: 1.04–1.15, $P < 0.001$) and 1.10 (95% CI: 1.06–1.15, $P < 0.001$) for the relationships between extraversion and the stages of cigarette smoking and water-pipe smoking status, respectively. **Conclusions:** It seems that extraversion is in a positive relationship with a cigarette and water-pipe smoking among adolescents. Longitudinal studies are needed to examine the effect of this personality trait on the modes of tobacco smoking and the transition in the stages of cigarette and water-pipe smoking in adolescents.

Keywords: Adolescent, cigarette smoking, extraversion, personality, water-pipe smoking

Introduction

Tobacco use among adolescents is considered to be a major public health concern as it is strongly associated with smoking in adulthood and smoking-related morbidity and mortality.^[1] Adolescence is considered as a challenging period of life in terms of cigarette smoking because the majority of adults who smoke cigarettes establish this behavior before the age of 18.^[2] The earlier is the onset of cigarette smoking, the greater risk is expected for negative consequences, including cardiovascular diseases, stroke, and various types of cancer.^[3] A majority of cigarette smoking prevention programs have been focused on adolescent populations. Because this period of life provides an optimal period to affect cigarette smoking across the lifespan and society at large.^[4]

Apart from cigarette smoking, water-pipe (hookah) use is also becoming popular among adolescents,^[5] many of whom are unaware of the health risks associated with this type of tobacco

use.^[5,6] Evidence shows that water-pipe use, similar to cigarette smoking, is associated with nicotine addiction as well as many smoking-related risks such as cardiovascular and respiratory diseases and lung cancer.^[7,8]

In the Eastern Mediterranean, water-pipe use has become the leading tobacco use mode among youth and is now documented as the mode of tobacco smoking with an increasing rate of popularity among youth worldwide.^[9] The prevalence rates of cigarette experimentation and regular cigarette smoking among Iranian adolescents are reported to be 27% and 7%, respectively, while the prevalence of water-pipe experimentation in this population is 23.1%.^[10,11]

Personality traits are specific and relatively stable features, which are considered as the main indicators of human behavior. Personality traits can be important determinants of a wide range of behaviors, including smoking.^[12,13] As such, there is a question that whether specific traits increase the risk of tobacco use among adolescents. If the answer to this question is yes and

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cigarette smoking would be more common in adolescents with a distinct personality type, so the information can be useful for designing better-informed intervention and prevention programs, and for the development of specific policies, as well as the application of more tailored approaches to smoking prevention.^[14,15] Extraversion, as a personality trait, is one of the most prominent traits associated with smoking.^[16] Extrovert adolescents have certain traits such as a desire to have more friends or a higher presence in society, which might expose them to a higher risk of tobacco smoking. The relationship between extraversion and tobacco use, particularly the stages of cigarette smoking and water-pipe use, in adolescents has not yet been sufficiently studied. So, our aim in the present study was to examine the relationship of extraversion with the stages of cigarette smoking and water-pipe use in a representative sample of high school students in Tabriz, Iran.

Methods

This cross-sectional study was conducted in February 2017 on a representative sample of 10th-grade students in the city of Tabriz (northwest of Iran). This study was the first stage of a longitudinal study, and the reason for limiting the sample to the 10th-grade students was the possibility of following up on the sample in the next phases of our study. A multistage cluster sampling was employed to recruit the participants. At first, among all high schools in Tabriz 21 schools were randomly selected with considerations on the type of school and the gender of students. Then, based on the number of students in each school and their fields of study, 91 classes were selected as clusters and then all the students in the classes were invited to participate in the study. The total number of students participating in the study was 2,312.

After explaining the objectives of the research and obtaining informed consent, the students were requested to complete self-administered and anonymous questionnaires in their classroom.

The questionnaire included items on cigarette smoking, water-pipe use, extraversion scale, socioeconomic information, and demographic characteristics.

Extraversion was measured using the Eysenck Personality Questionnaire^[17] designed for the age group older than 15. In this questionnaire, the sections associated with extraversion and introversion contained 24 items, with a “Yes” (1)/“No” (0) response format. As a result, the total score was ranged from 0 to 24, in which the higher scores indicated a higher level of extraversion. In a previous psychometric study on this questionnaire in Iran, Pearson’s correlation coefficient test and Cronbach’s alpha (internal consistency) as reliability indices were reported to be 0.88 and 0.79, respectively.^[18]

Cigarette smoking was assessed using a valid algorithm for cigarette smoking in adolescents.^[19] According to recent

studies,^[20,21] the cigarette smoking status in this study was defined in the following three stages:

1. Never smoked: Students who have never smoked;
2. Cigarette experimenter: Students who have experimented cigarette smoking and have smoked less than 100 cigarettes;
3. Regular smoker: Students who have smoked 100 cigarettes and more during their life span.

Water-pipe use was assessed using a multiple-choice question with the following response format: “Never smoked,” “Just experimented,” “Sometimes,” “At least once a month,” and “At least once a week.” Then, based on their answers, the students were placed in one of the following three groups:

1. Never smoked: Students who have never smoked water-pipe (even a puff);
2. Occasional user: Students who have experimented water-pipe or smoked water-pipe occasionally (less than once a month);
3. Regular water-pipe user: Students who use water-pipe at least once a month.

Socioeconomic status (SES) scale was built using the following demographic variables: Father’s education, mother’s education, family assets, and family income. In this measure, we graded the students in the groups with very high, high, middle, low, and very low SES.

Statistical analysis

Due to the clustered nature of the sampling method, survey analysis was used in all analyses. Chi-square test, one-way analysis of variance, and ordinal logistic regression model were used for data analysis. All analyses were done using Stata-14 software.

Results

The participation rate was 97.8% (2261 out of 2312). The mean age of students was 15.48 ± 0.50 years (range: 14–17) and 1,056 (46.7%) students were male. The results of the study indicated that 1,814 (80.2%) students were never cigarette smokers, 338 (14.9%) were experimenters and 94 (4.2%) students were regular smokers. In terms of water-pipe smoking, 1,341 (59.3%), 725 (32.1%), and 79 (3.5%) students were never, experimenters, and regular water-pipe smokers, respectively.

The mean score of extraversion was 14.13 ± 2.23 . These scores were 14.16 ± 2.33 and 14.12 ± 2.14 among male and female students, respectively ($P = 0.719$). The mean score of extraversion was 13.87 ± 2.22 , 13.91 ± 2.29 , 14.24 ± 2.25 , 14.24 ± 2.22 , and 14.14 ± 2.23 among students with very low, low, middle, high, and very high SES, respectively ($P < 0.001$).

Table 1 shows the differences in tobacco smoking by demographic characteristics and the extraversion score. As shown, cigarette smoking status was significantly differed

by gender and extraversion score. Water-pipe smoking status was also significantly different by gender, SES, and extraversion score.

As extraversion is a personality trait, we considered age, gender, and SES as potential confounders for the associations between this variable and tobacco use behaviors. Because of the very small variance of age (standard deviation = 0.50, range 15–17) and lack of difference in the extraversion score by gender ($P = 0.719$), we considered SES as the only confounder (conservative approach about cigarette smoking status) for the abovementioned relationships.

Using the ordinal logistic model, the adjusted odds ratio was 1.10 (CI 95%: 1.04–1.15, $P < 0.001$) for the relationship between extraversion and the stages of cigarette smoking. In other words, for one unit increase in extraversion score, the odds of being in higher stages of cigarette smoking increased by 1.10, adjusted for SES in the model [Table 2]. Exactly the same result was obtained for the relationship between extraversion and water-pipe smoking (OR = 1.10).

Discussion

The present study was aimed to examine the relationships between extraversion, as a personality trait, and water-pipe smoking, and the stages of cigarette smoking in Iranian high school students. Our results showed a significantly positive relationship between extraversion and the stages of cigarette and water-pipe smoking, suggesting higher rates of extraversion for the students who belonged to the higher stages of cigarette and water-pipe smoking.

Previous studies in this regard have presented inconsistent results. Some of these studies have shown a significant relationship between extraversion and cigarette smoking,^[22-24] and some others, in contrast, have shown a lack of significant relationship between these variables.^[25,26] This contradiction has justified for a variety of reasons. Eysenck^[27,28] claimed two possibilities for this contradiction. First, in the extraversion measurement scale used in most of the previous studies, sociability and impulsiveness were included, incorrectly.^[17] Once the psychoticism was added to the Eysenck’s theory, as the dimensions of the main character,^[29,30] the most of extraversion impulsiveness items were added to the psychoticism scale. Consequently, later studies could not find a positive relationship between extroversion and tobacco use, as usual. As the second reason proposed by Eysenck, significant changes have been made in social attitudes associated with cigarette smoking acceptance, particularly among men, over the last century. Therefore, the probability that men are motivated through peer groups for cigarette smoking is very low. According to Eysenck, “Today, the cigarette smoking behavior is socially unacceptable and, hence, the social extroversion might be excluded. Therefore, it reduces the expected correlation.”^[27]

In consistent with our findings in the present study, Buczkowski *et al.*^[31] have recently shown association between extraversion and the initiation and continuation of smoking. Compared to introverts, the extraverts are more likely to be influenced by environmental factors affecting smoking, and thus change their attitudes toward smoking. Therefore, considerations on this cognitive dimension

Table 1: The relationship of tobacco smoking with demographic characteristics and extraversion score

Characteristics	Cigarette smoking status			P	Water-pipe smoking status			P
	NS	ES	RS		NS	ES	RS	
Gender								
Male	777 (74.1)	185 (17.7)	86 (8.2)	<0.001	560 (56.5)	364 (36.7)	67 (6.8)	<0.001
Female	1037 (86.6)	153 (12.8)	8 (0.7)		781 (67.7)	361 (31.3)	12 (1.0)	
Socioeconomic status								
Very low	324 (79.4)	70 (17.2)	14 (3.4)	0.288	274 (67.0)	124 (30.3)	11 (2.7)	0.001
Low	316 (79.6)	58 (14.6)	23 (5.8)		259 (64.8)	132 (33.0)	9 (2.3)	
Middle	330 (82.1)	62 (15.4)	10 (2.5)		243 (60.4)	151 (37.6)	8 (2.0)	
High	335 (82.5)	56 (13.8)	15 (3.7)		262 (64.1)	128 (31.3)	19 (4.6)	
Very high	323 (79.0)	64 (15.6)	22 (5.4)		223 (54.7)	162 (39.7)	23 (5.6)	
Extraversion score	14.05±2.25	14.41±2.03	14.77±2.12	<0.001	13.95±2.29	14.37±2.07	15.05±2.36	<0.001

Values are presented as number (%) or mean±standard deviation. NS: Never smoker; ES: Experimenter smoker; RS: Regular smoker

Table 2: Ordinal logistic regression analysis of the relationship between “cigarette smoking stages” and “water-pipe smoking status” and “extraversion score”

Variable	Cigarette smoking stages		Water-pipe smoking status	
	OR (95% CI)	P	OR (95% CI)	P
Univariate analysis:				
Extraversion score (higher score)	1.09 (1.04-1.15)	<0.001	1.11 (1.07-1.16)	<0.001
Multivariate analysis*:				
Extraversion score (higher score)	1.10 (1.04-1.15)	<0.001	1.10 (1.06-1.15)	<0.001

OR: Odds ratio; CI: Confidence interval. *Adjusted for socioeconomic status

of personality traits while designing smoking cessation programs for current smokers may promote the possibility of success after interventional efforts.

The limitations of this study were as follows: First, this was a cross-sectional study based on which we cannot detect the sequence of the impact of the main variables. Second, the concepts of interest in our study were measured using self-report questionnaires that may have resulted in recall bias and underestimation, particularly in tobacco use. Third, the students who participated in this study were limited to the 10th-grade students, which could restrict the generalization of results to other age groups.

Conclusions

It seems to be relationships between extraversion and both cigarette and water-pipe smoking among adolescents. Longitudinal studies are suggested to examine the effect of this personality trait and the transition in the stages of cigarette and water-pipe smoking in adolescents. Extrovert people have certain traits such as the desire to have more friends or a higher presence in society, which might expose them to a higher risk of cigarette or water-pipe use. Therefore, in the prevention programs at schools or within families, extraversion should be considered as a determinant for a cigarette and water-pipe smoking among adolescents.

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Ethics

The plan of study and questionnaire was approved by the ethics committee of Tabriz University of Medical Sciences (Ethical code: IR.TBZMED.REC.1396.990) and the research committee of the Education Organization of East Azerbaijan Province.

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Conflicts of interest

There are no conflicts of interest.

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