

Psychological profile and nicotine dependence in smoking undergraduate students of UFMT*

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Introduction: Data on the relationship between personality profile and nicotine dependence may help health professionals to design and improve programs for the treatment and prevention of this dependence. **Objective:** To investigate the relationship between personality profile and nicotine dependence in a group of smoking undergraduate students. **Methods:** A total of 1,245 undergraduate students were randomly selected among 10,500 students enrolled at the Cuiabá campus of UFMT in 2001. A standard questionnaire was applied for social characterization and for the determination of the tobacco consumption pattern, comprising 80 students considered as smokers. These students were then submitted to the Fagerström Test (1978) for nicotine dependence and to the reduced version of the Comrey Personality Scale (CPS), that determines personality dimensions. **Results:** Analysis of the mean scores (Student's *t* test) revealed an inversely proportional borderline association between dependence and the Order x Lack of Compulsion scale ($p = 0.06$), and a negative or inversely proportional association between the CPS Extroversion x Introversion ($p = 0.002$) and Control of Validity scales ($p = 0.04$). Linear regression analysis of the Fagerström Test points confirmed the inversely proportional borderline association between dependence and the Order x Lack of Compulsion ($p = 0.06$) and CPS Extroversion x Introversion scales ($p = 0.02$). However, when the interference of daily cigarette consumption was controlled, only the Extroversion x Introversion scale remained associated with dependence ($p = 0.001$). **Conclusion:** Students who are nicotine-dependent smokers are less extroverted than non-dependent smokers. (*J Pneumol* 2003;29(1):21-7)

Key words – Personality. Nicotine dependence. Undergraduate students. Smokers.

Abbreviations used in this work
UFMT – Universidade Federal de Mato Grosso
(Federal University of Mato Grosso)
CPS – *Comrey Personality Scale*

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INTRODUCTION

Currently, awareness concerning the risks smoking represents to health is growing, and most smokers declare they would like to quit. However, only a few of those who try to quit actually succeed in abandoning this habit permanently. It is well known that nicotine withdrawal brings about a withdrawal syndrome, the most intense peak of which occurs within the first 24 hours. This syndrome is characterized by: irritability, anxiety, difficulty to focus, unrest and impatience, excessive hunger, sleep disorders, sleepiness and the craving for nicotine⁽¹⁾. The severity of nicotine dependence is illustrated by the fact that up to 50% of smokers who suffer a severe disease, such as myocardial infarction and lung cancer (pneumectomized patients), resume smoking⁽²⁾.

Until recently, the dependence resulting from the consumption of tobacco was not classified as a drug addiction, partly because the hazards to health were not widely recognized, and also because this habit was not associated with intoxication or with a socially unacceptable behavior. But times changed, and the results of many studies lead unquestionably to the conclusion that tobacco consumption leads to dependence, that nicotine is the drug present in tobacco that is responsible for dependence, and that the pharmacological and behavioral processes determining tobacco dependence are similar to those causing addiction to other drugs, such as heroin and cocaine⁽²⁾.

Under these circumstances, research works focused specifically on dependence represent a starting point for the progress in understanding what is known and what has still to be discovered about the dynamics of tobacco consumption⁽³⁾. Researchers state that social, familiar and individual risk factors can predispose an individual to dependence. Among these factors, personality features making the individual susceptible to the properties of nicotine can play a crucial role in the process. There is strong evidence that vulnerability to dependence is a function of high sensitivity to nicotine. Thus, psychological factors related to this sensitivity can play a central role in determining who starts, who continues and who quits smoking⁽⁴⁾.

To Breslau and Kilbey, the results of some research works suggest that *initiation* to smoking suffers basically the influence of social/environmental factors, whereas the *maintenance of the habit* is primarily influenced by personality factors, like for instance neuroticism. There is evidence suggesting that personality characteristics which make the subject vulnerable to psychopathology (such as neuroticism, negative affections, hopelessness and emotional "sadness") may be more strongly associated with dependence than smoking itself⁽⁵⁾.

For decades, psychologists and psychiatrists have been investigating the association between smoking and personality. But, in contrast to the researchers' extensive efforts to investigate the association between personality and *tobacco consumption*, there are still relatively few studies focusing on the relationship between personality and nicotine/tobacco dependence⁽⁶⁾.

The literature on this subject comprises a number of studies which investigate the association between dependence and several personality factors, such as neuroticism, extroversion, psychoticism, impulsiveness, the search for stimulating or exciting situations, among others⁽⁴⁻⁶⁾. Furthermore, some researchers have been investigating the association between dependence and specific psychiatric disorders, such as a history of depression, anxiety, schizophrenia, and others^(5,7).

Worth pointing out is the study of the relationship between neuroticism and nicotine dependence. Several studies have been carried out on this matter, but the nature of this relationship is still not clear. According to some authors, there is a hypothesis about neuroticism traits predisposing the individual, simultaneously, to dependence and to disorders like depression/anxiety⁽⁵⁾. Dependence could be related to the need to release negative affections or feelings. Following this line of interpretation, smokers with traits of neuroticism may be more inclined to feelings of sadness, which may lead them to smoke, in order to alleviate such negative affections or feelings⁽⁶⁾.

Due to the importance of this matter, the present study was designed so as to provide further grounds for the understanding of the relationship between smoking and personality. The objective of this work was to compare the dependent with the non-dependent smoker, as discriminated by the Fagerström nicotine dependence test⁽⁸⁾, based on their psychological profiles, measured by Comrey's Personality Scales – revised version⁽⁹⁾. This is expected to help health care professionals acting in treatment programs for nicotine dependence.

CASUISTIC AND METHODS

Approximately 1,600¹ students enrolled at the Cuiabá campus of Universidade Federal de Mato Grosso (UFMT) during the school year of 2001 were invited to volunteer for a study on psychological profile and smoking. In 2001, UFMT (Cuiabá campus) totaled about 10,500 students, enrolled in its morning, afternoon and evening

courses. The procedure for the selection of students was by raffle, as follows: considering an average of 40 students per class, a lot was cast (simple random) among the 120 existing classes to pick 42 of them to take part in the study. Of the invited students, 1,245 agreed to participate, totaling approximately 22% of non-response, already expected by the sample size projection calculation.

Initially, a questionnaire was applied that had been specifically designed for this study and had been tested by a pilot study⁽¹⁰⁾, to establish the students' sociodemographic profile and tobacco consumption pattern. Each student filled out the questionnaire, without identification, in the classroom, following an explanation of the objectives of the study. Thereafter, Fagerström's nicotine dependence test⁽⁸⁾ and the revised version of Comrey's Personality Scales – CPS⁽⁹⁾ were applied. CPS is a psychometric tool composed of a validity control (V) and a bias (R) scale (measurement), aimed at evaluating the reliability of the answers given by the subjects, and eight scales which investigate personality factors or dimensions. The results of CPS are ascertained as gross scores.

Out of the 1,245 evaluated students, 46 had their protocols invalidated by the CPS bias (T) or validity control (V) scale, and were excluded from the study. The final sample comprised 1,199 students. As "smokers" were considered those subjects who declared consumption of at least one cigarette a day, for at least one year. Eighty out of the 1,199 students fitted this criterion. Then, the 80 students considered as "smokers" were classified into "nicotine-dependent" or "non-dependent", according to their score on the Fagerström test (1978). Smokers who scored more than 6 by that tool were considered as "nicotine-dependent", and smokers with scores equal to or lower than 6 as "non-dependent".

At first, an ANOVA variance analysis was made, to assess associations between the mean gross scores of the subjects on the ten CPS scales (treated as discreet numerical variables) and the two groups of smokers ("dependent" and "non-dependent"). Then, Student's *t* test was applied, to determine the association between the mean scores on each personality scale and dependence/non-dependence. A multiple linear regression analysis was also performed, by controlling the interference of daily cigarette consumption, in order to investigate the associations between the smokers' scores on the Fagerström test (treated as discreet numerical variables) and the scores on the CPS scales (adjusting for all scales).

RESULTS

Among the 80 students who were "smokers", seven (8.75%) were classified as "dependent", according to their score in the Fagerström test, and 73 (91.25%) as "non-dependent". It was observed that 52.6% of the smokers were males and 47.4% females. Tobacco consumption varied from 1 to 40 cigarettes/day.

The ages of the smoking students ranged from 17 years and 5 months to 48 years. The mean age of "dependent" smokers was 30.57 years. Among the "non-dependent" smokers, the mean age was 26.47 years. However, the difference found between the mean ages of the two groups of subjects did not reach statistical significance ($p = 0.19$). No statistically significant association was found either between nicotine dependence and gender ($p = 0.5$), monthly income ($p = 0.7$), age at which the smoker started tobacco consumption ($p = 0.3$), and the number of attempts to quit made so far ($p = 0.9$).

Student's *t* test showed a statistically significant association between the mean daily tobacco consumption and dependence ($p < 0.0001$). This association was predictable, since, according to the Fagerström test, daily consumption constitutes one of the items or criteria which compose the concept of "dependence".

An inversely proportional association was found between nicotine dependence and the scores on the CPS Validity Control (V), Extroversion x Introversion (E), and Order x Lack of Compulsion (O) scales (Table 1). Students classified as "dependent" obtained, on the average, lower scores on the Validity (V) ($p = 0.04$) and Extroversion x Introversion (E) ($p = 0.01$) scales, as compared to the "non-dependent". In addition to that, Student's *t* test analysis of the means also detected a borderline negative association between dependence and the CPS Order x Lack of Compulsion (O) scale ($p = 0.06$), where the dependent students also obtained lower scores, on the average, as compared to the non-dependent. This borderline association may be due to the small number of dependent smokers ($n = 7$) found in this study. No association was found with the other CPS scales.

Linear regressions to investigate the association between the subjects' scores on the Fagerström test (treated as a discreet variable) and the CPS personality scales are found on Tables 2 and 3.

TABLE 1.
Distribution of means and standard deviations of scores
found in the subjects studied, submitted to the Fagerström test for nicotine dependence

CPS scales	Dependent x		Non-dependent x	
	Standard Deviation		Standard Deviation	
V Validity control	10.00	3.4	15.19	6.4*
R Bias	41.14	9.7	44.38	8.1 NS
T Trust x Distrust	38.57	6.3	37.95	5.4 NS
O Order x Lack of compulsion	47.28	8.3	51.53	5.4**
C Conformity x Unconformity	35.85	6.9	38.69	6.8 NS
A Activity x Lack of energy	46.85	9.8	52.42	8.4 NS
S Emotional stability x Instability	51.14	10.1	50.31	8.3 NS
E Extroversion x Introversion	39.14	12.9	48.75	9.4***
M Male x Female gender	36.57	6.3	39.05	9.5 NS
P Empathy x Self-centeredness	49.14	12.6	47.24	8.7 NS

X = mean; * Student's *t* test $p = 0.04$; ** Student's *t* test $p = 0.06$; *** Student's *t* test $p = 0.01$; NS = Not significant.

TABLE 2.
Linear regression analysis for scores on the Fagerström test,
according to scores on CPS scales – Final model *

CPS scales	β	Confidence interval	P
Scale O**	-0.08	(-0.17 -0.004)	0.064
Scale E***	-0.08	(-0.13 -0.03)	0.002

* Final model – by excluding the interference of daily cigarette consumption

** Scale O: Order x Lack of Compulsion

*** Scale E: Extroversion x Introversion

TABLE 3.
Linear regression analysis for scores on the Fagerström test,
according to scores on CPS scales

CPS scales	β	Confidence interval	P
Daily consumption	0.21	(0.17 0.14)	0.001
Scale E*	-0.05	(-0.08 -0.02)	0.001

Scale E: Extroversion x Introversion

In the final linear regression model (Table 2), where the interference of daily cigarette consumption was removed³, a negative or inversely proportional association was found between the subjects' scores and the scores on the Extroversion x Introversion scale (E) ($p = 0.002$), and a borderline negative or inversely proportional to the scores association on the Order x Lack of compulsion scale (O) ($p = 0.064$). In this case it also seems likely that the borderline association is due to the small number of dependent smokers found in this study ($n = 7$). This means that the increase in the smokers' scores on the Fagerström test (or in the degree of nicotine dependence, treated as a discreet numerical variable) corresponds to the decrease in the smokers' scores on those scales.

On the other hand, a significant association between daily consumption and scores on the Fagerström test was found ($p = 0.001$) (Table 3), showing that the growth of the subject's degree of dependence was directly proportional to the increase in daily tobacco consumption, confirming the result obtained by comparing the means using Student's *t* test. Thus, it is fundamental to observe that, when the interference of daily consumption is controlled, the association between dependence and the CPS Order x Lack of Compulsion (O) scale disappears (Table 3). On the other hand, by controlling the interference of this variable, the negative or inverse association found between dependence and the CPS Extroversion x Introversion (E) scale ($p = 0.001$) is enhanced (Table 3).

So, scale O is found to be associated to dependence only when the daily cigarette consumption is removed or disregarded.

DISCUSSION

Recent studies have shown an association between neuroticism and nicotine/tobacco dependence^(5-7,11). In the present work, no association was found between dependence and the CPS Emotional Stability x Instability (S) scale, which investigates this dimension: “*Individuals with high scores for this factor claim to be happy, calm, optimistic, of stable mood, and self-confident. Individuals with low scores display feelings of inferiority, are agitated, depressed, pessimistic, and with frequent mood changes*”⁽⁹⁾. In a recent study with CPS, involving 187 college students, no association between scale S and *tobacco consumption* was found either, in none of the analyses made⁽¹⁰⁾.

Regarding factor E (extroversion), the results of recent research did not show any association between this personality trait and dependence^(6,12). Furthermore, the literature on personality and smoking is usually controversial on this matter. Prospective studies showed an association between factor E (extroversion) and smoking⁽¹³⁻¹⁵⁾. Cross studies also showed that smokers tend to be more extroverted than non-smokers^(16,17). On the other hand, this subject is still controversial, and there are many publications which do not confirm the above mentioned association^(10,18,19). Recently, Arai *et al.*⁽²⁰⁾ found an association between smoking and extroversion in a study involving more than 20,000 persons from the city of Myiagi, in Japan.

This controversy may be due to the change in the social viewing of smoking that has occurred in several countries over the last two decades. Tobacco consumption has come to be considered a socially undesirable habit. Thus, it is possible that smokers have been punished in situations of social interaction. The change in the social atmosphere regarding cigarettes may consequently have reversed the tendency towards an association between the factor extroversion and smoking⁽²¹⁾.

In this study, a negative or inverted association was found between the CPS Extroversion x Introversion (E) scale and dependence. It is fundamental here to consider a specific aspect of this matter. Certain authors point out that it is not clear, so far, whether the personality profile interferes directly with the development of dependence, or whether it has an indirect effect, through heavy smoking⁽⁶⁾. In different theoretical approaches, daily cigarette consumption represents one of the criteria which compose the concept of dependence. Therefore, it seems reasonable to assume that heavy smoking may be a confusing or interfering factor in the association between nicotine dependence and personality traits.

In the present study, linear regression analysis showed that scale E remained negatively or inversely associated with dependence, even when the interference of daily cigarette consumption was controlled. When interference was controlled, this association was actually enhanced. In this sense, it can be assumed that the previously mentioned change in the social atmosphere with regard to smoking, or the social “punishment” for smoking, contributes or is related in some way to this association.

A point that also attracted our attention in this work was the negative or inverse association (even though borderline) found between the CPS Order x Lack of Compulsion (O) scale and nicotine dependence. On the average, dependent smokers obtained lower scores on O, as compared to the non-dependent. In a recent study with CPS in a group of 187 college students, an inverse or negative association was also found between *tobacco consumption* and CPS scale O, where the smokers obtained, on the average, lower scores on O, as compared to ex-smokers and non-smokers⁽¹⁰⁾.

It is interesting to notice, however, that in this work linear regression analysis showed that the association between the CPS scale O and dependence disappears by controlling the interference of daily cigarette consumption. This leads to the supposition that, actually, scale O is inversely associated *with the daily cigarette consumption*, rather than with dependence itself. It is known that individuals with low scores on CPS scale O “*tend to be careless, untidy, unsystematic in their life style, careless and, sometimes, not neat (...). Individuals with high scores said that they were concerned with neatness and order. They are cautious, meticulous and appreciate routine*”⁽⁹⁾.

It is possible here to establish a parallel, a similarity, between these results and the perspective of Bejerot *et al.*⁽²²⁾, who suggested an inverse relationship between smoking and the obsessive-compulsive disorder. According to these authors, the results of a recent study showed that, as opposed to other psychiatric populations, subjects with obsessive-compulsive disorder smoke less than the general population. Apart from this, in subjects with this disorder, the prevalence of smoking is lower than in the general population⁽²³⁾.

The obsessive-compulsive disorder can be considered as a “hyperfrontality disorder, manifested by symptoms such as exaggerated attention, detailed planning, unrest, exaggerated concern, sense of responsibility, lack of spontaneity, controlled emotions, and care and neatness rituals”⁽²²⁾. Although the present work did not investigate the presence of obsessive-compulsive disorder in the evaluated students, there is a striking similarity between this disorder and the personality traits evaluated by the CPS Order x Lack of Compulsion (O) scale.

Bejerot *et al.*⁽²²⁾ suggest that the low tobacco consumption in subjects with obsessive-compulsive disorder may be the reflex of an underlying genetic factor, possibly related to the serotonergic and colinergic systems. According to these authors, the literature on personality and smoking reveals that personality traits such as impulsive and high-risk behavior, extroversion, unconventional behavior, and anti-social tendencies are related to tobacco consumption and precede the beginning of the habit. Coincidentally, many of these personality traits are rare in patients with obsessive-compulsive disorder, which might explain the low prevalence of smoking in persons with this disorder⁽²²⁾.

This association is however not entirely clear yet. In contrast with the extensive efforts made by researchers to understand the genetic determinants of risk for drug addiction, there are still relatively few investigations targeted at the understanding of tobacco consumption^(21,24). We suggest here that further studies are needed, in order to obtain more conclusive results on this matter.

Finally, some consideration should be given to the limitations of the present study. It is important to remember that the comparison between the mean scores regarding dependence and non-dependence revealed an inversely proportional association between nicotine dependence and the smokers' scores on the CPS Validity Control (V) scale, demonstrating that the students considered as “dependent” gave more false answers on the CPS protocols (intentionally or not) than the non-dependent students, which may represent a bias factor for the results.

In addition to that, the peculiar characteristics of the population studied (college students), the reduced number of smokers (n = 80) found and analyzed here, and the small number of smokers which fitted the concept of “dependence” according to the Fagerström test score (n = 7) are factors which make a comparison with other studies difficult. Further studies are therefore necessary, involving populations with different characteristics and a larger sample size, in order to confirm the obtained results. We also suppose that prospective studies might contribute to a better understanding of this matter.

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