

DRUG ADDICTION AND CHOICE OF DRUGS: TEMPERAMENT AND PERSONALITY AS RISK FACTORS

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ABSTRACT

Aims: We sought to evaluate the risk factors and personality traits associated with specific drug use and drug addiction in general. **Design:** We compared the temperament and character traits of people addicted to opiates or alcohol to healthy controls. **Participants:** In total, 412 consecutive patients (312 people addicted opiates; 100 to alcohol) treated at the Specialised Clinic for Chemical Dependency in Belgrade, Serbia and a community sample of 346 healthy controls participated in this study. **Measurements:** We employed the Temperament and Character Inventory (TCI) and the DSM-IV criteria for opiate addiction and alcoholism. **Findings:** Participants addicted to opiates manifested "antisocial" temperaments (i.e., high novelty seeking and low reward dependence), whereas participants addicted to alcohol had "sensitive" temperaments (i.e., high novelty seeking, high harm avoidance). We observed immature personalities and personality disorders far more frequently in people addicted to opiates than those addicted to alcohol or healthy participants. **Conclusions:** Novelty seeking appears to be a risk factor for drug addiction. High harm avoidance may direct high novelty seeking people toward alcoholism. Personality disorders increase the risk of illegal drug use. Personality factors may provide useful indicators for drug addiction preventive work with young people.

Keywords: Temperament, Character, Drug Addiction

INTRODUCTION

The personalities of people addicted to drugs are studied to determine their role as risk factors for drug addiction and, ultimately, to improve drug prevention and patient treatment. While most authors agree that personality traits differ between non-users and people who use drugs, only a few personality patterns have been able to predict

drug addiction. One of the most consistent findings is that people who are impulsive, exploratory, and disinhibited are at higher risk for drug addiction. Specifically, novelty (1) or sensation seeking (2) are significantly higher in drug users compared to non-users (3, 4, 5). Most authors agree that these traits appear to be a risk factor for drug addiction (8).

In this article, we analyse the personality features of people addicted to opiates or those addicted to alcohol. We expected our study design to facilitate the evaluation of personality risk factors for specific types of drug use and drug addiction in general. We chose opiates and alcohol because opiates are illegal, and their abuse may reflect immature personalities associated with law breaking, whereas alcohol is anxiolytic and its abuse may be associated with people who feel the need to self-medicate their stress and high anxiety.

We are aware of only one prior study in which the Temperament and Character Inventory (TCI; 1) assessed personality features of people addicted to opiates, those addicted to alcohol, and healthy participants in Liege, Belgium (6). These authors found robust differences in temperament and personality among the three groups. Our study attempted to replicate these findings using the same personality test but in a different culture (East vs. West), socio-economic setting (developing vs. developed countries), and level of social stability (society in transition in Belgrade vs. stable society in Belgium).

One unique feature of our study is the permissive environment in Belgrade, Serbia that provides easy access to street drugs (although heroin is illegal in Belgrade, as it is most everywhere in the world, unstable social circumstances interfere with the effective policing of illegal drug trafficking). Such an environment is optimal to investigate whether one's drug choice is based on one's preference or its availability (i.e., do addicts use what they like or what is available?).

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METHODS

a) Sample

We conducted this study in the Specialised Clinic for Chemical Dependency, Belgrade, Serbia. The participants were consecutive patients admitted to the clinic for residential detoxification and rehabilitation.

Table 1. People addicted to opiates, people addicted to alcohol, and healthy controls. Gender distribution and sample size				
	People addicted to opiates	People addicted to alcohol	Healthy controls	Total
Female	66	36	177	279
Male	246	64	169	479
Total	312	100	346	758

Table 1 divides all participants by their gender and addiction. We recruited the control group from the local School of Nursing at the University of Belgrade and the Belgrade Police Academy.

Table 2. Age distribution			
	People addicted to opiates	People addicted to alcohol	Healthy controls
Female	26.4 (6.22)	36.8 (11.88)	24.6 (7.85)
Male	26.3 (5.9)	40.5 (10.5)	21.9 (5.14)
Male and female	26.32 * (5.99)	39.21** (11.1)	23.33*** (6.79)

* sig different from people addicted to alcohol ($<.0001$) and controls ($<.05$)

** sig different from people addicted to opiates ($<.0001$) and controls ($<.0001$)

*** sig different from people addicted to opiates ($<.05$) and people addicted to alcohol ($<.0001$)

Table 2 shows the average age for all groups of participants. Participants addicted to alcohol were significantly older than the other two groups ($p <.0001$).

b) Diagnostics

A psychiatrist (BL, PN) diagnosed both alcohol and opiate dependency using the DSM-IV criteria.

Exclusion criteria:

Participants who were addicted to both alcohol and opiates (or to other classes of drugs) were not included in this study.

Participants with comorbid Axis I disorders were not included in the study.

c) Personality Measures

The TCI (1) is a self-report true-false test consisting of 239 items designed to measure four temperament traits (i.e., harm avoidance, novelty seeking, reward dependence, and persistence) and three character traits (i.e., self-directedness, cooperativeness, and self-transcendence). Each of these dimensions of temperament and character is subdivided into five lower-order traits (or facets). The TCI is psychometrically valid in both the US (7) and in Serbia (8).

d) Statistical analyses

The variables available for analysis were limited to age, gender, the TCI personality dimensions and substance abuse group (i.e., opiate use, alcohol use, or control). Because age and gender were distributed unevenly in the substance abuse categories and because there are known, albeit slight, age and gender effects associated with TCI scores for NS, HA, RD and CO, we opted to test the hypothesis that group membership is associated with personality by conducting three separate logistic regressions, each including two of the three groups.

In each of the pair-wise logistic regressions, we entered age and gender as covariates along with the standardised scores (mean = 0, SD = 1) for the seven personality dimensions of the TCI. Group membership was the dependent variable.

In earlier work (9), we demonstrated that TCI personality scores could efficiently diagnose the probability of a personality disorder. To examine differences in character maturity in this study, we categorised participants into three groups: 1) “probable personality disorder” (the bottom 1/6th of the character traits scores); 2) “immature personalities” (the next 1/6th of the character scores); and 3) “mature personalities” (the top 2/3rd) based on the distribution of maturity in healthy controls. We then reviewed the distribution of these types within the three groups.

We conducted all analyses using SAS version 9.1 (10).

RESULTS

As shown in Tables 3, 4, 5, and 6, pair-wise logistic regressions comparing the groups revealed a number of significant relationships between personality traits and drug addiction.

People addicted to opiates versus healthy controls

With respect to temperament traits (Tables 3 and 6), people addicted to opiates were significantly higher in novelty seeking and significantly lower in reward dependence compared to healthy controls. This temperament configuration is called “antisocial” because these people manifest impulsive behaviours with little regard or empathy for others. Furthermore, people addicted to opiates were significantly lower in self-directedness and higher in self-transcendence than healthy participants. These character scores reflect participants’ greater likelihood to be immature and have a personality disorder (low self-directedness) as well as to be susceptible to day dreaming, fantasy, and magical thinking (high self-transcendence).

People addicted to alcohol versus healthy controls

With respect to temperament traits (Tables 4 and 6), people addicted to alcohol were significantly higher in novelty seeking and harm avoidance compared to healthy controls. This temperament configuration is called “sen-



Table 3. LOGISTIC REGRESSION MODEL: Predicting group membership from personality dimensions
Opiates and Healthy controls

Parameter	DF	Estimate	Standard error	Wald's Chi -square	Pr > Chi square
Intercept	1	- 1.2713	0.4942	6.6175	.0101
Age	1	0.1497	0.0186	64.5351	.0001
Sex	1	- 1.9706	0.2485	62.8972	.0001
Novelty Seeking	1	1.2838	0.1516	71.7408	.0001
Harm Avoidance	1	0.1142	0.1360	0.7049	.4011
Reward Dependence	1	- 0.2786	0.1209	5.3146	.0211
Persistence	1	0.1064	0.1147	0.8610	.3535
Self-Directedness	1	- 0.4504	0.1637	7.5718	.0059
Cooperativeness	1	- 0.1332	0.1381	0.9306	.3344
Self-Transcendence	1	0.3093	0.1168	7.0063	.0081

Significant differences are presented in bold

Table 4. LOGISTIC REGRESSION MODEL: Predicting group membership from personality dimensions
People addicted to alcohol and healthy controls

Parameter	DF	Estimate	Standard error	Wald's Chi -square	Pr > Chi square
Intercept	1	- 5.6408	0.7287	59.9297	.0001
Age	1	0.1970	0.0201	95.8615	.0001
Sex	1	- 0.8960	0.3545	6.3890	.0115
Novelty Seeking	1	0.5432	0.2021	7.2246	.0072
Harm Avoidance	1	0.4450	0.2091	4.5266	.0334
Reward Dependence	1	0.0079	0.1905	0.0017	.9666
Persistence	1	0.2327	0.1932	1.4509	.2284
Self-Directedness	1	- 0.3152	0.2612	1.4555	.2277
Cooperativeness	1	- 0.2823	0.2418	01.3633	.2430
Self-Transcendence	1	- 0.3700	0.1908	3.7616	.0524

Significant differences are presented in bold

Table 5. LOGISTIC REGRESSION MODEL: Predicting group membership from personality dimensions
People addicted to alcohol and people addicted to opiates

Parameter	DF	Estimate	Standard error	Wald's Chi -square	Pr > Chi square
Intercept	1	- 7.0316	0.8523	68.0691	.0001
Age	1	0.1440	0.0193	55.4923	.0001
Sex	1	1.1058	0.3550	9.7036	.0118
Novelty Seeking	1	- 0.5413	0.1989	7.4092	.0065
Harm Avoidance	1	0.1537	0.1814	0.7176	.3969
Reward Dependence	1	0.1430	0.1847	0.5994	.4388
Persistence	1	0.1565	0.1641	0.9102	.3401
Self-Directedness	1	- 0.1180	0.2377	0.2463	.6197
Cooperativeness	1	0.2084	0.2144	0.9448	.3310
Self-Transcendence	1	- 0.5900	0.1645	12.8697	.0003

Significant differences are presented in bold

**Table 6.** Pair-wise comparison between groups. Odds ratio estimates, 95% Wald Confidence limits, p-values

	Normal/Alcohol Point estimate (confidence limits), p	Normal/Opiate Point estimate (confidence limits), p	Alcohol/Opiate Point estimate (confidence limits), p
Age	1.21 (1.17-1.27) *	1.16 (1.12-1.20) *	1.15 (1.11-1.20) *
Sex	0.40 (0.20-0.82) ◇	0.14 (0.09-0.23) *	3.02 (1.50-6.06) ***
NS	1.72 (1.16-2.56) ***	3.61 (2.68-4.86) *	0.58 (0.39-0.86) ***
HA	1.56 (1.04-2.35) ◇	1.12 (0.86-1.46)	1.17 (0.82-1.66)
RD	1.01 (0.69-1.46)	0.76 (0.60-0.96) **	1.15 (0.80-1.66)
PER	1.26 (0.86-1.84)	1.11 (0.89-1.39)	1.17 (0.85-1.61)
SD	0.73 (0.44-1.22)	0.64 (0.46-0.88) ***	0.89 (0.56-1.42)
CO	0.75 (0.47-1.21)	0.88 (0.67-1.15)	1.23 (0.81-1.87)
ST	0.69 (0.47-1.00)	1.37 (1.08-1.71) ***	0.55 (0.40-0.76) **

p-values

* (<.0001), ** (<.001), *** (<.01), ◇ (<.05)

sitive” because these people frequently manifest coexisting anxiety and impulsivity (i.e., they perceive novelty as simultaneously appealing and potentially harmful). With respect to character traits, people addicted to alcohol had significantly lower self-transcendence compared to healthy controls.

People addicted to alcohol versus people addicted to opiates

The two groups of addicts differed significantly in novelty seeking and self-transcendence; both traits were higher in people addicted to opiates (Tables 5 and 6). In addition to being a risk factor for drug addiction in general, high novelty seeking apparently increases the specific risk of opiate addiction compared to alcoholism. This finding is especially true when coupled with high self-transcendence, which as noted above, makes people susceptible to fantasy and day dreaming (features potentiated by opiates).

Character Scores

As shown in Table 7, the frequencies of immature and mature personalities in the opiate group were significantly higher

Table 7. Groups by character maturity (probable PD → Mature Character)

Number Percent Row Pct Col Pct	Prob PD (Bottom 1/6)	Immature (Next 1/6)	Top 2/3 (Mature)	Total
Normal	54 7.12 15.61 25.00	60 7.92 17.34 37.07	232 30.61 67.05 48.33	346 45.65
Alcohol	18 2.37 18.00 8.61	18 2.37 18.00 12.08	64 8.44 64.00 16.00	100 13.19
Opiate	137 18.07 43.91 65.55	71 9.37 22.76 47.65	104 13.72 33.33 26.00	346 45.65
Total	209 27.57	149 19.66	400 52.77	758 100

compared to a healthy sample. (The prevalence of personality disorders in the general population is estimated to be around 15%). We classified 67% of healthy controls and 64% of people addicted to alcohol as having mature personalities. Conversely, only 33.3% of people addicted to opiates had mature personalities; 66.7% were classified as having either a probable personality disorder or an immature personality. These differences were statistically significant at $p < .0001$.

DISCUSSION

Initial exposure to and the repetitive use of drugs are the initial two steps in the aetiopathogenesis of drug addiction. Personality factors seem to influence each of these steps.

Our results demonstrate that people addicted to opiates and those addicted to alcohol show higher novelty seeking than healthy controls. This finding is in accord with prior studies in different cultures (3, 6); in other words, novelty seeking may be a risk factor for drug addiction because it increases the likelihood of initial drug experimentation.

After initial experimentation, the repetitive use of drugs triggers a series of structural central nervous system adaptations that leads to compulsive drug seeking and full-blown drug addiction. Our study indicates that both personality factors and the psychological effect of the drug may perpetuate repetitive drug use.

As shown in Tables 5 and 6, people addicted to opiates showed higher novelty seeking and higher self-transcendence compared to those addicted to alcohol. These traits make people easily bored, exploratory, prone to magical thinking and daydreams, and increase the need for frequent stimulation (1). Thus, high novelty seeking coupled with high self-transcendence and frequent boredom lead people to use opiates, whose euphoric rush maximises positive moods and facilitates magical thinking. Indeed, most our participants addicted to opiates reported that they chose to use opiates to “get high and feel good”.



On the other hand, participants with alcohol dependence (Tables 4, 6) showed high novelty seeking and high harm avoidance, the latter of which reflects a susceptibility to stress and anxiety (also called “trait anxiety”). Chronic vulnerability to stress (harm avoidance) may have led to alcohol abuse to alleviate negative moods or reduce anxiety. Indeed, most of our participants who were addicted to alcohol reported that their motivation to drink is to “get relief” and “forget their worries”. Thus, high harm avoidance may direct people high in novelty seeking toward alcoholism. Of note, Cloninger et al. (11) found that harm avoidance inhibits the initiation and frequency of drinking but increases the risk of developing an addiction once frequent drinking has begun.

In addition to temperamental and personality traits, personal maturity and social attachment appears to influence one’s drug of choice. Specifically, people addicted to opiates showed lower reward dependence than people addicted to alcohol or healthy controls. Low reward dependence is common in people who are socially detached, aloof, and insensitive to social approval. These traits make choosing illegal drugs or illegal means to obtain drugs easier. Likewise, one of the most striking findings in our study was the disproportionate frequency of immature personalities and personality disorders found in people addicted to opiates compared to those addicted to alcohol and healthy controls (Table 7). We classified a significantly higher percentage of healthy participants and participants addicted to alcohol as having mature personalities compared to those addicted to opiates. Conversely, we classified a significantly higher percentage of people addicted to opiates as having a probable personality disorder or an immature personality. Taken together with low reward dependence, personality disorders may explain illegal (e.g., opiates) versus legal drug use (e.g., alcohol). People who are addicted to alcohol, however, tend to score higher for reward dependence and to have mature personalities (only 18% had probable personality disorders in our sample). This trait reduces the risk of illegal drug use and increases the likelihood of choosing legally obtained substances.

Of note, LeBon (6) found that people addicted to alcohol tended to have more immature personalities compared to people addicted to opiates, indicating that drug availability may influence drug choice more than personal maturity in non-permissive environments.

Drug choice in permissive versus non-permissive environments

Personality factors can differentiate addicts in the same addiction class from each other. Based on family and personality studies, Cloninger et al. (5) described two types of alcoholism: Type I is characterised by late onset, anxious temperaments (i.e., high harm avoidance) and minimal

criminality. Conversely, Type II is characterised by early onset, high impulsivity (i.e., high novelty seeking), and serious criminality.

Note that in our study, people addicted to opiates differed from those addicted to alcohol in the way that Cloninger’s Type I and II diverge. People addicted to opiates were younger and showed high novelty seeking and anti-social traits, whereas those addicted to alcohol were older and showed high harm avoidance and fearful traits. Type I and Type II alcoholism classification was determined in the U.S. and Sweden—non-permissive societies with strict laws against illegal drug use. The environment in Belgrade, on the other hand, is permissive and provides easy access to street drugs. Thus, in permissive environments, young, exploratory, and antisocial drug users choose opiates over alcohol, whereas older, anxious people prefer alcohol. The type I and II alcoholism classifications appear to at least partly reflect the availability and accessibility of drugs in non-permissive societies (i.e., if given a choice, young anti-social addicts will use opiates).

Figure 1 summarises the personality characteristics of people addicted to opiates and those addicted to alcohol.

CONCLUSION

Together with LeBon et al. (6), the results presented in this paper outline a consistent and predictable relationship between personality features and drug addiction. These results can help researchers design efficient prevention strategies and specific treatments for people addicted to drugs. We are delighted to report that we have proposed screening 6th, 7th, and 8th graders at high risk (those high in Novelty Seeking) for drug use in Belgrade. Moreover, we use preventive and intensive education as well as occupational interventions with high-risk youths and their families to minimise the chance of becoming addicted to drugs.

Our study is limited because it is retrospective (i.e., the personality factors are studied in people addicted to drugs; thus, we cannot assess the causality our findings). Causal hypotheses are more realistic if prospective follow-up studies are able to replicate our results.

On the positive side, our control group was younger than either addiction group, which adds weight to the finding that novelty seeking is a risk factor for drug addiction. (We expected healthy controls would show high novelty seeking because young people are typically novelty seekers).

Figure 1. Summary of personality differences between people addicted to opiates and those addicted to alcohol		
	Alcohol	Opiates
Novelty Seeking	↑↑	↑↑
Harm Avoidance	↑	∅
Personality Disorder	∅	↑↑
Self-Transcendence	↓↓	↑↑
Age	Older (I)	Younger (II)



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