



Alcohol, drugs, and smoking among future psychologists: Differential contributions of Big Five personality traits, Sources of Meaning, and Self-efficacy

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Abstract

Background Alcohol and drug use among university students is high, often exceeding cut-off levels for risky consumption. Negative consequences abound. In the case of psychology students, development of a healthy approach to substance use is of particular importance, since it might affect prospective clients and patients. To what degree are consumption levels influenced by students' dispositional personality traits and, beyond these, more malleable characteristic adaptations?

Methods The present study investigated consumption levels of 130 first year psychology students in the year before entering university. Dispositional personality traits (Big Five: NEO-FFI) and characteristic adaptations (Sources of Meaning: SoMe, and substance-related self-efficacy) were examined as predictors of alcohol, tobacco, and illicit substance use.

Results Sixty-seven percent of participants scored above the cut-off for hazardous alcohol consumption, 38% were smokers and 33% had consumed illicit drugs in the previous year. Reduced alcohol consumption was predicted by conscientiousness, spirituality and substance-related self-efficacy. Non-smoking was accounted for by conscientiousness and substance-related self-efficacy. Openness predicted higher, conscientiousness and religiosity lower intake of illicit drug use (R^2 s from 25%-37%).

Conclusion With conscientiousness, a relatively stable, decontextualized dispositional trait proved to be the most influential factor on reduced substance use, but more dynamic characteristic adaptations – in particular, a commitment to spirituality or religiosity and a high degree of substance-related self-efficacy – had additional specific impacts.

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Introduction

Recent studies have unequivocally shown that alcohol and drug use among university students is high, even exceeding cut-off levels for risky consumption (1). First longitudinal investigations have found a decline of alcohol consumption over the course of study, though levels remain high for a substantial number of students (2). Excessive alcohol and drug intake has both short- and long-term consequences on mental and physical health. It affects academic achievements and has a negative impact on finances (2). Implications thus abound for the individual as well as society (3). They are of even more concern when it comes to future clinical health care practitioners, since here, patients and clients will potentially be affected. A majority of today's psychology students is going to work in the field of clinical health care. For them, and primarily those working with patients, a

stable mental and emotional well-being is a necessary foundation for their craft. In their case, substance use disorder is not only a private and social problem, but one that potentially jeopardizes adequate patient care. Nevertheless, alcohol and substance abuse are among the most frequent mental health problems of psychologists (4), as they are for the 'caring disciplines', in general. Research into alcohol and substance use of psychology students is therefore of particular importance. On the one hand, it offers a basis for adequate educational programs that may help raise the future psychologists' awareness of their personal risks of becoming alcohol or substance addicts. On the other hand, a broad empirical basis will add information to the discourse of potential benefits of a personal substance use – or misuse – history for later therapeutic work.

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What is known about students' motives to drink, smoke and use illicit drugs at high levels? Motives generally associated with excessive consumption are socializing, having fun, and self-expression (5-7). To what degree are these linked to the users' personality? Are levels of intake associated with dispositional personality traits? Can more dynamic characteristic adaptations shape addictive behavior over and above these rather stable features? Pathways towards student addictive behavior are far from being well understood. The present study aims to contribute to the clarification of this conundrum by investigating the predictive power of different levels of personality in relation to alcohol, tobacco, and illicit drug use.

Theoretical background

Levels of personality and alcohol and drug consumption

In their integrative model of personality, McAdams & Pals distinguish between levels of personality on the basis of their stability and contextualization (8). Three levels are identified: dispositional traits, characteristic adaptations, and life narratives. Dispositional traits, such as the Big Five personality factors (neuroticism, extraversion, openness, agreeableness, and conscientiousness), are known to be relatively stable and de-contextualized (8). Heritability values of about 50% have been established. Characteristic adaptations refer to the intentional structure of personality-in-context. McAdams and Pals describe them as "motivational, social-cognitive, and developmental adaptations, contextualized in time, place, and/or social role" (8). They are associated with dispositional traits, but not determined by these.

Both traits and characteristic adaptations guide experience and behavior in social contexts (8), and affect drinking and drug use patterns (5). On the level of dispositional traits, individuals differ with regard to psychophysical response to rewarding and threatening stimuli (9); response patterns are associated with the capability to manage consumption (10). Characteristic behavioral activation and inhibition link up with traits implicated in social life, such as the Big Five (11). Of these, two have been associated with higher consumption levels: extraversion, and neuroticism; lower levels of consumption are predicted by agreeableness and conscientiousness (1;5;10).

As regards characteristic adaptations, both motivational and social-cognitive aspects have been investigated with respect to substance use. In motivational

research, the focus has mainly been on specific drinking or drug intake motives, while generalized motives, such as purpose in life through various sources of meaning, have been largely ignored. Sources of meaning underlie human cognition, behavior and emotion in various areas of life (12). Sources of meaning implying selftranscendence, such as religiosity and spirituality, have repeatedly been linked to lower intake levels of alcohol and drug use (13). Other studies established positive relationships between high levels of consumption and a prioritization of socializing and fun (6).

Social-cognitive variables are often seen as central to the explanation of human behavior. Explicit mind-sets regarding outcome expectancy and capacity to manage consumption have been shown to predict alcohol consumption (14), with self-efficacy appearing as particularly important predictor (5;15;16).

Research employing integrative models of personality to predict alcohol and drug consumption is very rare, indeed. By using an integrative personality model, the present study aims to identify specific contributions of different levels of personality to the prediction of consumption among first term psychology students. Consumption of alcohol, tobacco and illicit drugs within the previous twelve months – thus before adaptation to the student milieu can have occurred – is assessed. Based on previous research findings, the following variables are included: the Big Five (neuroticism, extraversion, openness, agreeableness, and conscientiousness) as dispositional traits; religiosity, spirituality, community, and fun as sources of meaning, and substance-related self-efficacy as social-cognitive characteristic. Parsimonious models are developed for each of three substance groups known to be relevant among university student populations, i.e. alcohol, tobacco, and illegal drugs. Reliable and valid scales are used throughout.

Method Procedure

In order to maximize confidence in data anonymity, two sets of questionnaires were employed, one as paper-and-pencil version, one online. All substance use related measures were completed in paper-and-pencil format, thus avoiding data transfer via IP-addresses. Personality variables were subsequently assessed through an online questionnaire. Participants were assured that their responses were strictly confidential; neither names, nor birth dates or e-mail addresses were recorded. Participants who completed both the



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paper-and-pencil and the online questionnaire received course credit.

Participants

In the second week of their first term, 190 psychology students in an introductory lecture class were invited to complete the paper-and-pencil questionnaire set. Participation was voluntary; the return rate was 100%. Participants were invited to subsequently fill in the online questionnaire at a time convenient to them. Altogether, 130 participants (81% women) completed both questionnaire sets. The ensuring recruitment rate of 68.4% is considerably higher than in other studies among this population (17). In the final, complete sample, participants ranged in age from 18 to 40 (Mean = 21, Standard Deviation = 3).

Measures

Alcohol consumption

Hazardous alcohol consumption was assessed by use of the AUDIT-C, a questionnaire comprising the first 3 items of the Alcohol Use Disorders Identification Test (AUDIT) (18). This brief screening instrument measures frequency and quantity of alcohol use, as well as heavy episodic drinking on a 5-point Likert scale from 0 to 4, resulting in a sum score ranging from 0 to 12 with higher scores indicating more harmful alcohol consumption. A recent review reports sufficient reliability (Cronbach's α between .56 and .91); various studies declare sensitivities and specificities in the .80's and .90's for different cut-off points and indices of problematic drinking (19). In the present study, the cut-off point for hazardous consumption is set to ≥ 5 for men and ≥ 4 for women.

Tobacco smoking

With a single-item question, participants were asked whether they smoke tobacco. In smokers, severity of nicotine dependence was measured by the 6-item Fagerström Test for Nicotine Dependence (FTND) (20). Sum scores range from 0 to 10, and scores ≥ 6 indicate heavy smoking (21). A systematic literature review (22) found retest reliabilities between .65 and .91, α from 0.55 to 0.74, as well as moderate associations of the FTND sum score with various measures of nicotine dependence.

Illicit drug use

A 9-point single-item assessed frequency of illicit drug use in the last 12 months (0: never; 1: once; 2: two to five times; 3: six to nine times; 4: ten to 19 times; 5: 20 to 59 times; 6: 60 to 99 times; 7: 100 to 199 times;

8: more than 200 times), and ten categories referred to the types of drugs that were consumed (cannabis, cocaine, crack, amphetamines/stimulants/speed, ecstasy, heroin, methadone, other opiates, mushrooms, LSD) (23). Addiction severity in cannabis users was measured by the Severity of Dependence Scale (SDS) (23;24). Applied for cannabis, this 5-item questionnaire has shown average internal consistencies in the .80's and satisfactory indices of validity; sum scores range from 0 to 15, and a cut-off ≥ 2 has proven useful (24).

Dispositional traits

The Big Five personality traits (*neuroticism, extraversion, openness, agreeableness, conscientiousness*) were measured by the 60-item NEO-Five Factor Inventory (NEO-FFI) (25).

Characteristic adaptations/sources of meaning

Sources of meaning were assessed by use of the *Sources of Meaning and Meaning in Life Questionnaire* (SoMe) (12;26). This 151-item inventory allows for a highly differentiated measurement of 26 sources of meaning, among them *religiosity* (religion and faith; 3 items; $\alpha = .86$), *spirituality* (connection with a higher reality; 5 items; $\alpha = .75$), *community* (close contacts, sense of friendship and family; 5 items; $\alpha = .81$), and *fun* (pleasure and enjoyment; 6 items; $\alpha = .69$). Sources of meaning scales quantify the degree of realization for each of the 26 orientations. All items are statements rated on a scale from 0 (strongly disagree) to 5 (strongly agree). The SoMe construct, discriminant, factorial, and incremental validity have been demonstrated in numerous studies (12;26;27).

Characteristic adaptations/substance-related self-efficacy

Self-efficacy was operationalized by a 10-point single item asking how confident a person is that she or he can manage potential problems with regard to alcohol, tobacco or drug use from 1 (not at all confident) to 10 (very confident).

Data analysis

Data were entered into a computerized database and statistical analyses were performed with IBM SPSS Statistics, Version 21. Based on Mahalanobis distance, two multivariate outliers were detected and deleted. Descriptive results are provided as frequencies and percentages, means (M) and standard deviations (SD), as well as medians (Md) and ranges. After calculation of Pearson product-moment correlation



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coefficients, data were analyzed with hierarchic multiple regression analyses. Independent variables were included on the basis of their bivariate correlation with the dependent variable. A two-tailed p-value <0.05 was considered statistically significant. Because the number of smokers who completed the FTND was relatively low, only the binary variable (smoking/non-smoking) was used in the following analyses as well as logistic regression. Frequency of drug use in the last 12 months was moderately positively skewed and thus square-root transformed; substance-related self-efficacy was strongly negatively skewed and thus inverted for further analyses.

In multiple regression, beta weights indicate the predictive importance of independent variables, while the other predictors are held constant. R-squared indicates the proportionate amount of variation in the dependent variable explained by the predictors. F-values determine the statistical significance of the different models.

In logistic regression, regression coefficients indicate the relationship between an independent variable and the dependent variable (on the logit scale), while the other predictors are held constant. The Wald test determines statistical significance of these regression coefficients. Nagelkerkes R-squared indicates the proportionate amount of variation in the dependent variable explained by the predictors. Chi-squared values determine the statistical significance of the different models.

Results

M and SD for consumption measures are displayed in Table 1. Mean Audit-C scores indicate a high frequency of hazardous drinking, with 67% (82/122) scoring above the cut-off (88% [21/24] of the men, and 62% [61/98] of the women). Thirty-eight percent (48/127) of the participants were smokers, though only 4% (2/48) of them counted as heavy smokers. Thirty-three percent (42/127) had consumed illicit drugs in the previous year; 41 out of these had used cannabis; three had additionally used amphetamines/stimulants/speed, one additionally cocaine, and one only amphetamines/stimulants/speed. Twenty percent of the participants using cannabis (8/41) scored above the SDS cut-off for cannabis dependence. Gender was significantly associated with drinking and drug use; men drank more and used more drugs. No relationships with age were established (Table 2). Hence, gender, but not age was included in subsequent multiple regressions.

Variables from all levels of personality were associated with alcohol consumption (Table 2). Among the dispositional traits, extraversion was related positively, neuroticism and conscientiousness negatively. Spirituality was negatively associated with drinking, but community and fun were related positively. Substance-related self-efficacy established a high negative correlation with alcohol consumption. The correlation pattern was dissimilar for smoking. Of the Big Five, only conscientiousness was negatively related to smoking, as was substance related self-efficacy. Drug use showed a different correlation pattern, again. It was positively associated with openness, negatively with conscientiousness, religiosity, and spirituality.

Table 1 Descriptive statistics for all variables; Mean(Median), Standard Deviation SD, Range, N

	M(Md)	SD	Range	N
AUDIT-C ¹	4.72(5)	2.22	0-12	122
FTND ²	1.61(1)	1.81	0-10	48
Drug use last 12 months	0.93(0)	1.67	0-8	127
SDS ³	0.82(0)	1.50	0-15	41
Neuroticism	1.91	0.67	0-4	128
Extraversion	2.16	0.49	0-4	128
Openness	2.68	0.56	0-4	128
Agreeableness	2.75	0.53	0-4	128
Conscientiousness	2.52	0.53	0-4	128
Religiosity	1.28	1.30	0-5	128
Spirituality	2.46	1.11	0-5	128
Community	3.89	0.82	0-5	128
Fun	3.62	0.81	0-5	128
Substance-related self-efficacy	8.60(9)	1.93	0-10	125
Age	21	3	18-40	128
Sex	Women: 81%; Men: 19%			128
Smoking yes/no	Yes: 38%; No: 62%			127

¹AUDIT-C: Alcohol Use Disorders Identification Test, subscore for risky alcohol consumption;

²FTND: Fagerström Test for Nicotine Dependence;

³SDS: Severity of Dependence Scale

In a subsequent step, personality variables significantly related to consumption were included in hierarchic multiple regression analyses to predict substance use parsimoniously.

Predicting alcohol consumption
Male gender predicted alcohol consumption in the first step, but lost its predictor weight when dispositional traits were entered in the second step. Of these, conscientious-



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Table 2 Correlates of alcohol, tobacco and drug consumption

	Audit C	Smoking no/ yes	Drug use (transf.)
AUDIT-C ¹		.21*	.38***
FTND ²	-.02		.02
Drug use last 12 months		.27**	
SDS ³	-.24	.25	.53***
Neuroticism	-.22*	.09	-.07
Extraversion	.27**	-.13	.08
Openness	.16	.05	.35***
Agreeableness	.10	-.04	.03
Conscientiousness	-.29**	-.23**	-.30***
Religiosity	-.10	-.08	-.19*
Spirituality	-.28**	.00	-.18*
Community	.20*	.04	-.01
Fun	.37***	.12	.14
Substance-related self-efficacy (transf.)	-.39***	-.41***	-.16
Sex ⁴	.32***	.06	.28**
Age	.00	.08	.00

* = p < .05. ** = p < .01. *** = p < .001

¹AUDIT-C: Alcohol Use Disorders Identification Test, subscore for risky alcohol consumption;

²FTND: Fagerström Test for Nicotine Dependence;

³SDS: Severity of Dependence Scale;

⁴Sex: Women = 1; men = 2

ness was the only significant (negative) predictor of alcohol consumption.

Incremental explanation of variance was achieved through further inclusion of sources of meaning in a third step, and substance-related self-efficacy in a fourth step. The final parsimonious model to predict alcohol consumption identified three major predictors of reduced intake: On the level of dispositional traits, conscientiousness appeared as a barrier to excessive drinking. Spirituality had an additional influence on alcohol consumption independent of conscientiousness, with more spiritual individuals drinking less. Over and above both conscientiousness and spirituality, the cognitive expectancy to be able to manage substance intake contributed to lower consumption levels. Altogether, 37% of variance in alcohol consumption was explained by personality variables (Table 3).

Table 3 Hierarchical regression of Audit-C scores on different levels of personality

Step	Variable(s) entered	β	β	β	β
1	Sex ¹	.34***	.18	.15	.15
2	Neuroticism		-.16	-.15	-.14
	Extraversion		.18	.04	.06
	Conscientiousness		-.32***	-.31***	-.28**
3	Spirituality			-.26***	-.25**
	Community			.12	.08
	Fun			.15	.14
4	Substance-related self-efficacy (transf.)				-.17*
R ²		.11	.24	.35	.37
ΔR ²			.13	.10	.03
Model F		14.91***	9.26***	8.48***	8.24***

¹women = 1; men = 2; * = p < .05. ** = p < .01. *** = p < .001

AUDIT-C: Alcohol Use Disorders Identification Test, subscore for risky alcohol consumption.

Predicting smoking

Twenty-five percent of variance in smoking/non-smoking was accounted for through personality variables. In a first step, conscientiousness was established as a negative predictor, explaining 7% of variance. When substance-related self-efficacy was entered, an additional 18% of variance was explained (Table 4).

Table 4 Logistic regression of tobacco smoking (no/yes) on different levels of personality

Step	Variable(s) entered	Coeff.	Wald	Coeff.	Wald
1	Conscientiousness	-0.95**	6.47	-0.66*	2.77
2	Substance-related self-efficacy (transf.)			-2.59***	15.68
	Nagelkerke's R ²		.07		.25
	Δ Nagelkerke's R ²				.18
	Model X ²		6.93**		24.73***

* = p < .05. ** = p < .01. *** = p < .001



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Predicting illicit drug intake

Male students used slightly more drugs than females. Dispositional traits explained further variance, with openness predicting higher, and conscientiousness lower intake levels. Inclusion of sources of meaning in a third step resulted in an additional increase of R^2 , with religiosity as the single significant negative predictor. The final parsimonious model explained 29% of variance in amount of drug use through specific contributions of openness as positive predictor and conscientiousness and religiosity as negative predictors (Table 5).

Table 5 Hierarchical regression of drug use on different levels of personality

Step	Variable(s) entered	β	β	β
1	Sex ¹	.28**	.20*	.15
2	Openness		.29***	.34***
	Conscientiousness		-.25**	-.24**
3	Religiosity			-.17*
	Spirituality			-.13
R^2		.08	.23	.29
ΔR^2			.16	.06
Model F		10.43**	12.43***	9.84***

¹women = 1; men = 2; * = $p < .05$. ** = $p < .01$. *** = $p < .001$

Discussion

The present study offered an empirical implementation of an integrative model of personality to predict alcohol, tobacco, and drug consumption levels among future psychologists. As predictors, relatively stable and decontextualized personality dispositions were complemented with sources of meaning and substance-related self-efficacy, representing more malleable characteristic adaptations. Patterns of correlation with personality variables differed for the three substances. Three respective hierarchic multiple regressions established partly similar, partly different predictors, which explained 25% of variance in smoking, 29% of variance in illicit drug use, and as much as 37% of variance in alcohol usage.

Among dispositional traits, conscientiousness proved to be the most influential characteristic. Future psychologists who were thorough, dependable and disciplined drank less. They also used fewer drugs and were less likely to be smokers (whereas the latter effect was partly overwritten by substance-related self-efficacy).

These findings tie in with a meta-analysis by Kotov and colleagues (28), which established conscientiousness as the strongest personality predictor of substance abuse disorder. Also Loukas and co-authors (29) showed that of all Big Five personality traits, conscientiousness had the strongest association with a limitation of drinking behavior out of concern for performance at school, work, or in the family. Our data thus support and extend observations regarding the important role of conscientiousness in the prediction of health behaviors and mortality (28).

Openness was established as a positive predictor of drug use, which predominantly meant use of marijuana. The link between marijuana use and a high estimation of new experiences, change, and awareness seems to indicate that the users understood marijuana to be a means to experiment with consciousness-modulation or to expand their horizon. While a positive correlation between openness and marijuana use has also been found elsewhere (30), openness is not a typical personality marker of those suffering from substance use disorder (28). The students' use, in the present study, might therefore constitute a temporary phase of exploration.

As evidenced by hierarchic regression analyses, sources of meaning have specific impacts on alcohol and drug intake over and above dispositional traits. Considering the final parsimonious models, two sources of meaning were of particular importance: Spirituality was associated with reduced alcohol consumption, and religiosity with reduced drug consumption. Spirituality was operationalized as a subjective belief in a supernatural reality. Psychology students who choose a spiritual way of life might be especially motivated to act mindfully, thus eschewing mood modulation through excessive use of alcohol. Religiosity was operationalized as high importance of religion and a sustaining belief in God. Due to their appreciation of a tradition of norms and creeds, religious psychology students might be especially cautious not to violate regulations – and therefore refrain from the use of illegal substances. The results highlight the necessity to distinguish between concepts of spirituality and religiosity, especially in cultures of decreasing religious attachment (31).

For both alcohol and tobacco, substance-related self-efficacy had incremental predictive power after including dispositional traits and sources of meaning, thus emphasizing the potential of the mind to guide behavior, even in contradiction to personal dispositions. The fact



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that substance-related self-efficacy was not established as significant predictor for drug use might be due to the hypothetical experimental character of drug consumption in the present sample, with drug use linked to openness and, therefore, probably seen as a beneficial undertaking.

Remarkably, all significant personality predictors for alcohol and tobacco use were negative, indicating resources for prudent usage. We could tentatively hypothesize that reasons *for* hazardous drinking and heavy smoking among adolescents are largely environment-related (such as peer-group pressure, or life-events), while reasons *against* excessive drinking and smoking appear to be person-related (such as conscientiousness, religiosity, spirituality, and substance-related self-efficacy).

Limitations and suggestions for further research

With the simultaneous investigation of gender, dispositional traits, sources of meaning and self-efficacy, results from the present study are grounded as well as empirically embedded in an integrative model of personality. Given the complexity of such models, the selection of variables to be included is always partial. Future studies could consider further personality characteristics such as sensation seeking (5). Additionally, with bigger samples at hand, contextual influences should also be taken into account, both as direct predictors as well as potential moderators. Participants in the present investigation had just begun their course of study. Therefore, they had not been widely exposed to the student milieu, yet. Measures of drinking, smoking and illicit drug consumption all referred to the 12 months before university entry. When assessing consumption levels among advanced students, adaptation processes of different degrees will have to be taken into account. Longitudinal studies, starting with university entry, will be especially informative with regard to clarifying the issue of changing consumption patterns in relation to different levels of personality.

Conclusion

Results indicate that some of the participating future psychologists, by disposition (conscientiousness), had fewer problems avoiding harmful substance use than others. Commitment to sources of meaning associated with selftranscendence constituted a further resource to draw on for self-regulation, as did the confidence to handle substance intake. When reconsidering the role of personality with regard to addictive consumption patterns in the light of these findings, personality traits and characteristic adaptations figure as significant resources

for proactive, empowered management of substance intake. Therefore, future educational programs should highlight the importance of clarifying personal competence and commitments. Both can be decisive when it comes to dealing with potentially harmful stimuli, such as alcohol, tobacco, and drugs.

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