

# Motives and Personality: A Comparison of Monosubstance and Polysubstance Users

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## Abstract

**Background and Objectives:** Although it is well-known that personality motivates substance use disorder, few studies have systematically compared motives for substance use across drug classes, and even less have compared drug use in relation to personality factors.

**Methods:** The current study examined the relationship between personality by cluster and motives for substance use in treatment seeking individuals with current opiate, marijuana, alcohol, cocaine and polysubstance Use Disorder. Participants (N = 433) completed the Inventory of Drug-Taking Situations or and the Inventory of Drinking Situations assessing motives for substance use, and the Millon Multiaxial Inventory-III assessing personality.

**Results:** Motivational differences for drug use were found across the different substance dependent groups.

**Discussion and conclusion, and scientific significance:** The differences revealed in motives for drug use and their relation to different personality may provide a basis for more personalised management and improved longer term outcomes for individuals.

**Keywords:** Monosubstance users; Polysubstance users; Motivations to use; Personality

## Introduction

Substance use disorder (SUD) is a chronic condition, characterized by high rates of relapse months or even years after abstinence [1]. Clinically it is increasingly common for illicit drug users to develop polydrug use, making application of research to this group difficult [2,3]. This evolution is marked in treatment seeking people [4].

Historically personality has held a central role in the etiological theories of SUD, with 'Alcoholism' listed as a subtype of the sociopathic personality disturbances in DSM-I [5]. Not until Jellinek was personality and addiction considered separately [6]. More recently, personality has been considered a vulnerability factor for SUD and thought to play a major role in its maintenance, severity and relapse, albeit addiction and personality pathology are generally considered separately. [7-9].

Treatment for individuals presenting comorbid SUD and personality disorder (PD) is difficult; the presence of a comorbid PD has been associated with early drop out, poorer treatment outcomes and higher relapse [10-11]. Even in the absence of a formal PD diagnosis, personality traits reflecting PD symptomatology can lead to emotional and interpersonal problems and are often comorbid with major psychiatric conditions, particularly addictive disorders [12-14].

Numerous studies have yielded evidence for a relationship between personality and substance use [15-17]. Cluster B personality traits characterized by: emotion dysregulation, poor response inhibition, and externalizing behaviors are associated with SUD [18,19]. Externalising personality traits such as sensation-seeking, novelty seeking, reward-sensitivity and behavioural disinhibition, are strongly linked to adolescent and adult substance misuse [20,21]. The role of internalising traits is less clear. Cluster C personality traits are highly comorbid with SUD as an avoidance behaviour [22,23]. Anxiety disorders are also common amongst adult substance misusers and likely play a critical role in maintenance and treatment effectiveness [24,25].

How personality relates to substance use and SUD remains debated [26]. From a motivational perspective, it has been suggested that personality traits act as distal, non-specific variables that influence substance use through proximal specific variables, such as drinking or drug using motivations [27,28].

There is, however, a wide variety of motivations leading to substance use, and comparison of results between studies remains problematic. These problems relate to the populations studies, methodological rigor and the instruments used to

measure motivation [29]. More recently, research revealed that, as opposed to alcohol, cocaine and cannabis users, prescription opioid dependent individuals were most likely to use substances to cope with physical discomfort, to test their personal control over the substance and when they had conflicts with others. Both the prescription opioid and cocaine dependent groups were more likely than the marijuana group to use substances in response to urges and temptations. In contrast, marijuana dependent individuals were more likely to use substances when feeling pleasant emotions and when spending pleasant times with others [29]. Although these results offer interesting findings, the participants were non-treatment seeking individuals, and subjects having comorbid disorders were excluded from the study, preventing generalisation to a treatment seeking population.

Though different studies have investigated motivations to use and personality traits, none have differentiated between drug users, and studies have failed to include a polysubstance dependant (PSU) group. This failure increases the importance in understanding this group, in relation to users of single substances [1] as they differ from monosubstance users (MSU) on socio-demographic variables, developmental factors, personality features, psychiatric comorbidities [2,30] and neurocognitive factors [31].

The current study has three main objectives:

1. To investigate the relation between personality traits and motivations to use in different substance dependant populations including polysubstance dependence. Based on previous literature, we hypothesized that reasons for use may differ among polysubstance, opiates, alcohol, cannabis, and cocaine dependant individuals.
2. To see if substance users having similar personality traits would show different motivations to use depending on the type of substances they use, and
3. To examine if motivations to use substances mediates or moderates the relation between personality and SUD across substances.

As personality may predispose, precipitate or perpetuate SUD, and as it is considered to remain stable across the years, potential links with the drug of choice and the motives for consumption may help bring better understanding for treatment, by tailoring more specific interventions.

## Method

### Participants and setting

The Clinique Nouveau Départ is a rehabilitation center specialised in the treatment of SUD and comorbid psychopathologies located in Montreal, Canada. Data was collected from the medical records of 433 consecutive, newly admitted patients seeking treatment between January 2006 and January 2013. This represents the whole cohort of newly admitted patients over this time period. The medical director approved the screening of medical files for epidemiological purposes and all data acquired was made anonymous. Local

ethical approval was obtained. Patients were at least 18 years of age at the time of admission for treatment. All met criteria for an Axis I diagnosis of SUD based on Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) [32] for alcohol, cannabis, cocaine, opiates or polysubstance. The clinical interview for the diagnosis of SUD was performed by a physician specialised in addiction medicine. Subjects also provided urine drug screening, as well as measurements of hepatic biomarkers to confirm their substance use. The polysubstance users (PSU) group comprised of patients with at least two different psychoactive substance dependence diagnoses in the past twelve months. No exclusion criteria were applied to the chart review.

### Measures

Psychometric evaluations were performed within two weeks of admission, following the stabilization of acute withdrawal symptoms, and included the French versions of standardized tests: the Inventory of Drug Taking Situations (IDTS), Inventory of Drinking Situations (IDS) and the Millon Clinical Multiaxial Inventory III (MCMI-III).

The IDTS / IDS [33,34] a 50-item self-report form, assessed the types of situations in which individuals most often use their substance of choice (i.e. opioids, marijuana, cocaine, alcohol). The IDTS / IDS allows for problem scores to be generated for eight subscales:

1. Unpleasant Emotions
2. Physical Discomfort
3. Pleasant Emotions
4. Testing Personal Control
5. Urges/Temptations
6. Conflict with Others
7. Social Pressure and
8. Pleasant Times with Others.

These eight subscales are then compiled into three global categories:

1. Negative Situations (i.e., Unpleasant Emotions, Physical Discomfort, Conflict with Others)
2. Positive Situations (i.e., Pleasant Emotions, Pleasant Times with Others) and
3. Temptation Situations (i.e., Social Pressure, Urges/Temptations, Testing Personal Control).

For polysubstance users, subjects were instructed to give answers to the questionnaire regarding the group of substances they used simultaneously during the past year. Simultaneous polydrug use covers events where two or more substances are taken in the same session of drug taking, for example smoking cannabis whilst already intoxicated on alcohol. We decided to focus on simultaneous drug use instead of concurrent polydrug use, because this was of most relevance to our hypotheses. The IDTS has demonstrated high levels of validity and reliability [35].

The MCMI-III [36] is a 175 items true / false self-report inventory consisting of 24 clinical scales (14 personalities and 10 clinical disorders) and three modifiers. The division between personality and clinical disorders parallels the multi-axial model of the fourth edition of the Diagnostic and Statistical Manual of mental disorders (DSM-IV) [37]. Personality disorders are best thought as prototypes with different variations. The MCMI has been used in multiple studies with substance abusing populations [38-40] and there is substantial literature supporting its use or its predecessor (i.e. MCMI or MCMI-II) with substance abusers [41,42]. This instrument was also selected because, in line with a dimensional approach, it covers a variety of clinical personality patterns, severe personality pathology, clinical syndromes otherwise missed in the categorical evaluation or by using low-order personality traits [43,44]. Raw scores on MCMI-III scales were converted to Base Rate (BR) scores as described by the author. The BR transformation adjusts raw scale scores so that the proportion of patients who score above each scale cut-off point matches the actual prevalence among a representative national population of patients [45].

### Data analysis

The relationship between motives for using (three global categories of the IDTS / IDS) and personality traits (three clusters of personality derived from the MCMI-III) were examined using bivariate correlations. Pearson correlations were calculated between factor scores from the IDTS / IDS and personality clusters scores from the MCMI-III. The clusters classification used in this study was the one proposed by the DSM-IV (i.e. A-odd/eccentric: Schizoid, Schizotypal, Paranoid; B-dramatic/emotional/erratic: Borderline, Narcissistic, Antisocial and Histrionic; C-anxious/fearful: Avoidant, Dependent and Obsessional-Compulsive) and continued in DSM-5.

Following correlation, partial correlations were computed between personality traits scores and motivations to use controlling for age, gender and psychiatric comorbidity (including PD), well-established risk factors for SUD and potential confounders [19,26]. To assess if substance users

having similar personality traits would show different motivations to use depending on the type of substances they used, we conducted a moderated multiple regression. The categorical moderator (substance used) was dummy coded. Then control, clusters and substance used were included. Finally, the interactions with the dummy variables were entered.

Finally we conducted a series of path analyses using Mplus version 7.4 [46] to test the hypothesis that the relation between personality trait symptoms and SUD diagnosis was mediated by drinking or drug using motives. Clusters A, B and C scores were correlated to account for shared variability, as were the motives for drug and alcohol use.

## Results

**Table 1** shows the patients characteristics and the number of patients meeting DSM IV criteria for psychoactive substance dependence. **Table 2** shows the patients clinical characteristics for the personality subscales and the substance use situations scales.

**Table 1:** Patients' (n=433) Characteristics.

Age 41.03 +/- 13.76 years
Sex 123 females, 310 males
Education 13.86 +/- 2 years
Ethnicity 424 Caucasians, 9 others
<b>SUD Diagnosis:</b>
Alcohol Use Disorders 163
Cannabis Use Disorders 39
Cocaine Use Disorders 25
Opiate Use Disorders 26
Polysubstance Users 180

**Table 2:** Personality and Substance use situations.

Personality	Cannabis		Cocaine		Opiate		Alcohol		Polysubstance	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Schizoid	61.18	27	67.36	13.2	60.77	19.61	59.52	21.71	60.88	18.58
Avoidant	57.15	25.51	47.36	28.5	47.69	28	51.29	29.1	51.11	24.86
Depressive	67.21	28.6	55.68	34.27	55.81	35.93	59.47	30.11	62.29	27.73
Dependant	62.41	21.09	65.28	24.02	53.88	25.29	61.75	25.04	66.79	22.86
Histrionic	43.05	22.67	46	12.48	47.88	15.67	50.37	19.93	50.96	18.01
Narcissistic	58.92	23	58.28	17.31	60.04	15.82	56.97	18.17	60.44	19.96
Antisocial	65.23	19.41	65.12	17.87	61.23	22.19	58.42	19.55	70.42	18.29
Sadistic	57.72	19.89	55	20.32	55.5	18.87	51.72	22.31	62.18	16.22
Compulsive	43.72	13.8	46.68	13.64	51.42	18.25	51.1	14.72	42.02	16.84

Passive Aggressive	53.31	25.55	44.88	27.6	40.88	27.98	45.15	25.02	52.53	24.32
Masochistic	62.33	26.86	53.48	30.18	53.81	30.39	52.5	27.1	60.27	24.71
Schizotypal	52.59	25.33	46.88	22.07	37.65	28.34	43.69	25.12	49.62	22.97
Borderline	56.26	24.45	49.04	22.6	44.77	25.47	47.72	25.41	57.09	22.58
Paranoid	54.54	21.47	52.72	22.48	51.12	22.88	50.12	24.4	56.21	18.67
Unpleasant Emotions	57.95	25.77	43.52	29.87	49.62	25.52	58.43	25.17	56.73	26.26
Physical Discomfort	41.87	20.1	22.92	25.18	42.42	22.39	30.8	23.97	37.22	24.38
Conflicts with others	43.77	24.23	28	26.54	34.54	30.27	42.29	26.19	41.58	27.9
Pleasant Time with Others	60.56	20.32	37.84	30.4	31.77	26.43	50.87	25.85	55.12	26.59
Pleasant Emotions	57.13	22.9	44.84	24.46	31.31	21.67	46.75	26.27	49.04	23.45
Temptations	52.67	23.48	39.72	21.99	24.88	19.42	36.34	21.34	49.33	24.86
Social Pressure	49.28	27.07	29.84	33.59	20.54	29.16	40.14	27.53	41.54	27.61
Testing Personal Control	36.44	27.48	28	26.72	21.84	20.88	31.55	25.39	30.31	26.67
Cluster A	56.1	20.2	55.65	14.9	49.84	19.39	51.1	19.36	55.49	16.08
Cluster B	55.86	11.9	54.61	10.27	53.48	11.45	53.36	11.28	59.73	11.83
Cluster C	54.42	12.63	53.1	15.63	50.99	14.95	54.71	14.73	53.38	13.36
Negative Situations	47.86	19.64	31.47	25.22	42.19	22.42	43.84	22.51	45.17	23.51
Positive Situations	58.84	18.35	41.34	23.74	31.53	21.61	48.81	23.48	52.07	22.81
Temptation Situations	46.12	22.44	32.51	23.66	22.14	20.34	36	21.31	40.39	22.7

First, Pearson correlations were calculated between cluster scores from the IDTS / IDS and personality cluster scores from the MCMI-III. Expected positive correlations appeared between Cluster A and coping motives (Negative Situations), for cannabis  $r(39) = 0.429, p < 0.001$  and alcohol  $r(163) = 0.408, p < 0.001$ . This was also observed for Cluster C and alcohol  $r(163) = 0.287, p < 0.001$  but not for cannabis as to coping motives. Our results did not show any significant correlation between opiate use and coping motives. Unexpectedly, Cluster A was correlated with cocaine use for coping motives  $r(25) = 0.471, p < 0.005$ . In Cluster B PD patients, the strongest correlations were observed for alcohol and Positive situations  $r(163) = 0.302, p < 0.001$  and for polysubstance use and Positive Situations  $r(180) = 0.360, p < 0.001$ . Our results also show a correlation between cannabis use and Cluster A  $r(39) = 0.338, p < 0.005$  and Cluster C  $r(39) = 0.328, p < 0.05$  during Positive Situations (see **Table 3**).

Next, to examine how personality factors corresponded with risky motives for drinking and drug use partial correlations were computed between personality cluster scores and cluster scores from the IDTS / IDS. This approach was appropriate given our interest in how personality factors may confer risk for SUD via associations with problematic drinking and drug use motives. Age, sex, PD and psychiatric disorders were also controlled in the partial correlations to assess unique links between personality and drinking / drug use motives. After controlling for these, Cluster A was still significantly correlated with Negative situations for cannabis, cocaine, alcohol and polysubstance use. The correlations between Cluster B and Positive Situations remained unchanged as the strongest correlations for alcohol and polysubstance use. No correlations were observed between Cluster A and C and Positive Situations for cannabis use (see **Table 3**).

**Table 3:** Correlations and Partial Correlations (controlling for age, gender and psychiatric comorbidity including PD) between MCMI-III cluster scores and IDS / IDTS cluster scores.

		Negative Situations		Positive Situations		Temptation Situations	
		r	pr	r	pr	r	pr
Opiates	Cluster A	-0.193	0.042	-0.201	-0.099	0.029	0.083
	Cluster B	-0.237	-0.221	0.095	0.086	0.309	0.216
	Cluster C	-0.268	-0.082	-0.353	-0.235	-0.047	0.057
Cocaine	Cluster A	0.471*	0.464*	0.181	0.223	0.296	0.275

	Cluster B	0.11	0.052	0.197	0.243	0.276	0.256
	Cluster C	0.352	0.362	0.177	0.161	0.236	0.202
<b>Cannabis</b>	Cluster A	0.429**	0.453*	0.338*	0.3	0.291	0.295
	Cluster B	0.067	0.08	0.116	0.146	0.062	0.136
	Cluster C	0.294	0.246	0.328*	0.283	0.271	0.234
<b>Alcohol</b>	Cluster A	0.408**	0.302**	0.246**	0.146	0.279**	0.173*
	Cluster B	0.282**	0.181*	0.302**	0.266**	0.281**	0.229*
	Cluster C	0.287**	0.203	0.172*	0.097	0.234**	0.161*
<b>Polysubstance</b>	Cluster A	0.237**	0.210*	0.262**	0.222*	0.192*	0.148*
	Cluster B	0.297**	0.193*	0.360**	0.331**	0.297**	0.241**
	Cluster C	0.121	0.129	0.023	0.019	0.037	0.045

The results for the moderated multiple regressions are shown in **Table 4**. Our results show that substance users having similar personality traits show different substance use preference during Negative situations ( $\Delta R^2 = 4.5\%$ ,  $p = 0.023$ ). There is no moderation effect for Positive and Temptation situations. The

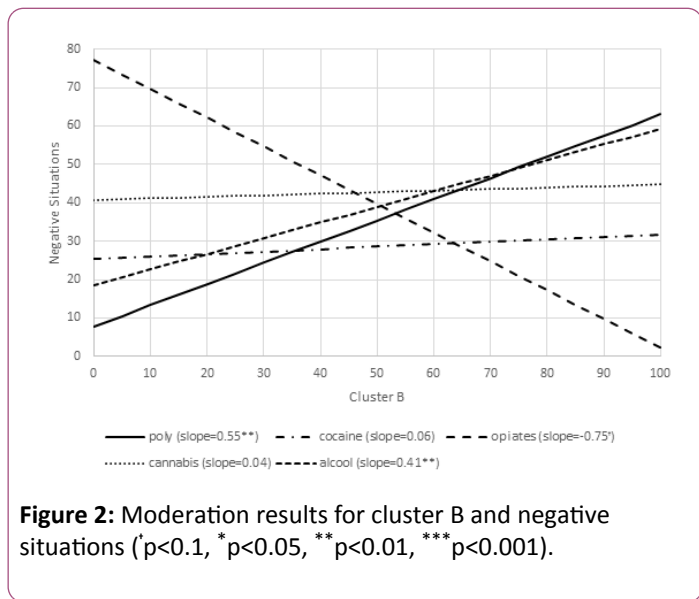
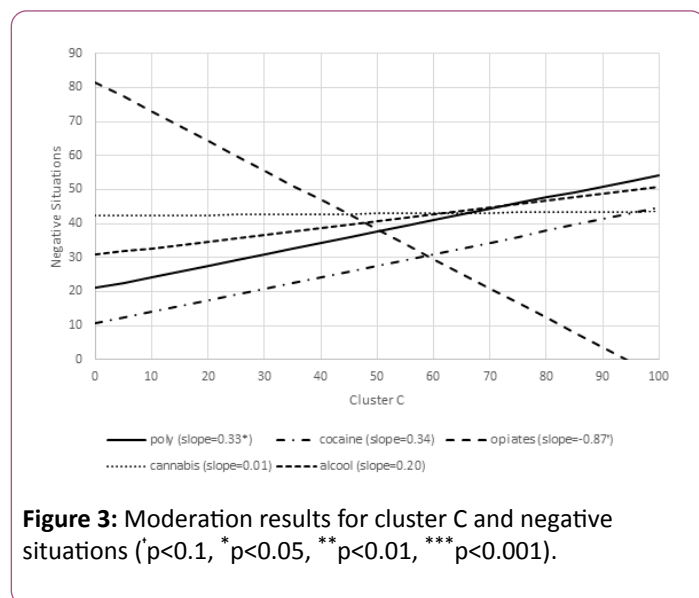
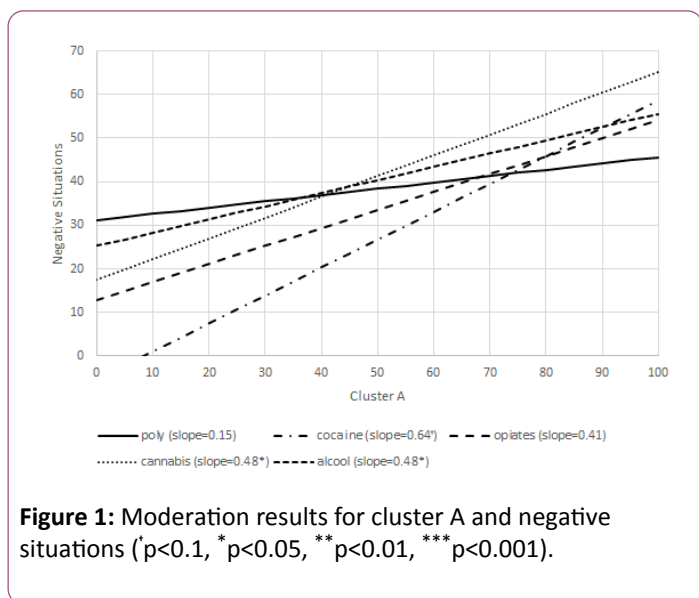
results of the slopes for the different substances used are shown in **Figures 1-3**. Cluster A has a significant and positive effect for cannabis and alcohol use. Cluster B has a significant and positive effect for alcohol use and for polysubstance use. Finally, Cluster C has a positive and significant effect for polysubstance use.

**Table 4:** Moderated multiple regression results.

	Negative Situation			Positive Situation			Temptation Situation		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
<b>Psychiatric condition</b>	-0.04	-0.05	-0.05	0.02	-0.01	-0.01	0	-0.02	-0.03
<b>Age</b>	-0.1*	-0.05	-0.05	-0.14**	-0.07	-0.06	-0.16**	-0.08	-0.07
<b>Gender</b>	0.21***	0.19***	0.18***	-0.02	-0.07	-0.08	0.04	0.01	0.01
<b>Personality disorder</b>	0.17***	0.02	0.02	0.16**	0.01	0	0.14**	-0.01	-0.02
<b>Cluster A</b>	-	0.21***	0.11	-	0.11	0.14	-	0.1	0.08
<b>Cluster B</b>	-	0.17**	0.29**	-	0.30***	0.37***	-	0.28***	0.32***
<b>Cluster C</b>	-	0.11*	0.20*	-	0.09	0.1	-	0.15*	0.13
<b>Alcohol</b>	-	0.04	0.2	-	0.06	0.13	-	0.02	-0.03
<b>Cannabis</b>	-	0.05	0.4	-	0.09	0.35	-	0.08	0.28
<b>Cocaine</b>	-	-0.09*	-0.1	-	-0.08	-0.06	-	-0.05	-0.33
<b>Opiates</b>	-	0.01	1.24***	-	-0.15**	0.71*	-	-0.14**	-0.02
<b>Cluster A x</b>									
<b>Alcohol</b>	-	-	0.19	-	-	-0.05	-	-	0.03
<b>Cannabis</b>	-	-	0.25	-	-	-0.03	-	-	0.11
<b>Cocaine</b>	-	-	0.29	-	-	-0.16	-	-	-0.05
<b>Opiates</b>	-	-	0.15	-	-	0.03	-	-	-0.1
<b>Cluster B x</b>									
<b>Alcohol</b>	-	-	-0.17	-	-	-0.09	-	-	-0.09
<b>Cannabis</b>	-	-	-0.37	-	-	-0.36	-	-	-0.34

<b>Cocaine</b>	-	-	-0.28	-	-	-0.02	-	-	0.15
<b>Opiates</b>	-	-	-0.74**	-	-	-0.42	-	-	0.01
<b>Cluster C x</b>									
<b>Alcohol</b>	-	-	-0.16	-	-	0.09	-	-	0.11
<b>Cannabis</b>	-	-	-0.22	-	-	0.13	-	-	0.05
<b>Cocaine</b>	-	-	0	-	-	0.16	-	-	0.19
<b>Opiates</b>	-	-	-0.66*	-	-	-0.5	-	-	-0.04
<b>R2</b>	9.8	19.3	23.8	5	18.6	21.3	5.3	17.2	18.3
<b>ΔR2</b>	9.8	9.5	4.5	5	13.6	2.7	5.3	11.9	1.1
<b>ΔF</b>	11.62	7.05	2	5.58	10.04	1.19	5.96	8.59	0.47
<b>p ΔF</b>	<0.001	<0.001	0.023	<0.001	<0.001	0.291	<0.001	<0.001	0.932

Only standardized coefficients are shown. \* p<0.05, \*\*p<0.01, \*\*\*p<0.001



**Figure 1:** Moderation results for cluster A and negative situations (†p<0.1, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001).

**Figure 3:** Moderation results for cluster C and negative situations (†p<0.1, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001).

The series of path analyses conducted using Mplus version 7.4 [46] to test the hypothesis that the relation between personality traits symptoms and SUD diagnosis was mediated by drinking or drug using motives showed no significant mediation.

### Discussion

In line with prior studies pertaining to the subject, we expected to observe a use of central nervous system depressants (alcohol, opiates) among introverted populations for coping motives (dealing with negative situations such as conflicts with others, unpleasant emotions and physical discomfort) [47]. Our results offer partial support for this hypothesis as we observe this relation for alcohol use but not for opiates. In fact, our opiate group was distinctly different from the other groups, and no significant correlations were found with motivation to use. One could question if people with Opiate Use Disorder represent a distinct class of addicted patients, an interesting finding that warrants further investigation [48]. This is particularly relevant bearing in mind



the significant deleterious effects of opioids experienced globally.

We also expected cannabis use among introverted subjects related to urges and temptations to use substances to join in and to deal with negative emotions. We did not find any significant relation for the use of cannabis related to urges and temptations, but the later hypothesis was supported in cluster A patients. It is possible cannabis use may be internally driven by a need to cope with depressive feelings in Cluster A patients.

One interesting finding, is the use of cocaine by patients with Cluster A personalities to deal with negative situations. This personality profile is associated with chronic feelings of boredom, dysphoria, or fatigue mirroring a depressive state. For these individuals, cocaine acts to increase energy and may counter anhedonia-psychotic spectrum psychopathology. It may be that cocaine is a possible treatment modality for patients with significant cluster A PD, and this possibility needs further investigation bearing in mind the complete absence of evidenced based treatment from this patient population [49,50].

We also observed a significant relation between Cluster A traits and the use of alcohol for temptation. A possible explanation for this is the use of alcohol for social conformity, as opposed to the psychoactive effects that are sought by impulsive use [51]. This implies differing treatment models need to be developed, based on personality cluster type, in those with AUD in order to ensure appropriate motivations are addressed.

As for Cluster B subjects, the use of alcohol was related to the incentive of enhancement (positive situations, pleasant emotions, pleasant moments with others). Although we also expected to see a use of cocaine, cannabis and alcohol as part of urges and temptations, this type of consumption was nonspecific [17]. Our results support a link between Cluster B personalities and temptations to use alcohol. As for cocaine use, we did not observe any significant finding related to Cluster B personalities. We also expected to see a relation between Cluster B personalities and the use of cannabis for expansion incentives (pleasant emotions, pleasant moments with others) [52]. Our results did not support this hypothesis either.

Studies have previously shown that distinct personality traits are related to risk for substance-specific misuse patterns, with impulsivity specifically associated with misuse of stimulants (including cocaine and prescription stimulant medications) and sensation seeking preferentially associated with alcohol and cannabis misuse [51,52]. By contrast, anxiety sensitivity and hopelessness have been shown to be associated with preferential use/misuse of depressant drugs, such as alcohol, sedatives and opioids [47]. These traits also appear to predict different motives for drinking and substance use. We hypothesised that substance users having similar personality traits would show different motivations to use depending on the type of substances they use. Our result show that personality risk factors were primarily associated with negative reinforcement motives for drinking and drug use. The use of cannabis and alcohol was moderated by negative coping in Cluster A subjects. Also, negative coping and dealing with disagreeable emotions moderated the relationship in patient

with Cluster B personalities and polysubstance/ alcohol use. Finally, negative coping moderated the relation between Cluster C personality and polysubstance use.

These findings suggested that cannabis, alcohol and polysubstance use may be employed when individuals attempt to cut off strong negative feelings. In addition, these findings suggest that these substances may be used in a mental state in which consumers feel bored, empty, lonely, depressed and have physical discomfort. These results also suggest SUD and personality link could be characterized by a more general pervasive pathology factor for personality which should be taken into consideration by clinicians to avoid mischaracterizations of the nature of certain PD and SUD comorbidities, as pointed out by Jahng and collaborators (2011) [19]. However, due to the cross-sectional design of this study, it is not possible to conclude whether these substances are indeed used for these motivations or if the association could be explained otherwise.

Contrary to expectations, these results did not support the hypothesis that motivations mediate the relationship between personality traits and SUD. Neither consumption for coping, nor enhancement, nor temptations and urges appear to play a role in the relation between personality traits and SUD. It is important to note that these results may be limited by the low variance found, limiting the power of the study to detect a 'true effect', i.e. a type II error.

Like all studies there are a variety of limitations. In this study the sample population comprised of treatment-seeking individuals in a private paying setting from Quebec. It may be that treatment seeking individuals in other countries, or in public institutions may have differing motivations and personality structures and this requires further investigation. Further assessments were only completed at the beginning of treatment, with no other re-assessment. This enable at best associative findings to be presented. Significant differences in number of participants in the groups may also limit comparability; however, the samples are likely representing different substance dependent populations within clinical populations. The information gathered in the study was retrospective, which may have biased responses, as retrospectively recalled motives to use may differ from information gathered in the moment. Moreover, polysubstance users were instructed to give answers to the questionnaire regarding the group of substances they used simultaneously during the past year. However, the IDTS / IDS is a well-studied and validated instrument employed in both clinical and research settings, and as such, was considered an appropriate instrument to assess the specific aim of this study. Further research should focus on a combination of self-report questionnaires, electronic agendas and neurocognitive tasks to investigate the impact of reactive and cognitive/effortful control processes in the different phases of an addiction. The use of the three global categories for motivations to use and three global Clusters for personalities, instead of the subscales could have impacted the specificity of our findings. Finally, the cross-sectional nature of this study limits consideration in relation to outcome. To better examine the implementation of interventions based on personality

status, longitudinal (ideally randomised controlled) methods are needed.

## Conclusion

Motivational differences for drug use were found across the different substance dependent groups and to a certain extent subjects showing the same personality style showed different motivations to use depending if they used one or multiple substances. These findings indicate that clinicians should assess personality regularly in their clinical work. It may be that some of the problems in ensuring high quality long term benefits in those with SUD's is related to the failure in the field to individualise treatment based on personality and motives, and potentially we should pay more attention to this. Further, appreciation of motives unique to sub-populations of substance dependent individuals and a personality-targeted approach which focuses on the differential motivations for engaging in substance use, may aid in the development of tailored strategies to help patients cope with high-risk situations as part of treatment and aftercare.

## Conflict of Interest

Author's have no conflicts of interest to declare.

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