Further Evidence of Self-Medication: Personality Factors Influencing Drug Choice in Substance Use Disorders

Lindsey Colman McKernan, Michael R. Nash, William H. Gottdiener, Scott E. Anderson, Warren E. Lambert, and Erika R. Carr

Abstract: According to Khantzian's (2003) self-medication hypothesis (SMH), substance dependence is a compensatory means to modulate affects and self-soothe in response to distressing psychological states. Khantzian asserts: (1) Drugs become addicting because they have the power to alleviate, remove, or change human psychological suffering, and (2) There is a considerable degree of specificity in a person's choice of drugs because of unique psychological and physiological effects. The SMH has received criticism for its variable empirical support, particularly in terms of the drug-specificity aspect of Khantzian's hypothesis. We posit that previous empirical examinations of the SMH have been compromised by methodological limitations. Also, more recent findings supporting the SMH have yet to be replicated. Addressing previous limitations to the research, this project tested this theory in a treatment sample of treatment-seeking individuals with substance dependence (N = 304), using more heterogeneous, personality-driven measures that are theory-congruent. Using an algorithm based on medical records, individuals were reliably classified as being addicted to a depressant, stimulant, or opiate by two independent raters. Theory-based a priori predictions were that the three groups would exhibit differences in personality characteristics and emotional-regulation strategies. Specifically, our hypotheses entailed that when compared against each other: (1) Individuals with a central nervous system (CNS) depressant as drug of choice (DOC) will exhibit defenses of repression, over-controlling anger, and emotional inhibition to avoid acknowledging their depression; (2) Individuals with an opiate as DOC will exhibit higher levels of aggression, hostility, depression, and trauma, greater deficits in ego functioning, and externalizing/

Lindsey Colman McKernan, Ph.D., Assistant Clinical Professor, Vanderbilt University School of Medicine, Osher Center of Integrative Medicine at Vanderbilt University. Michael R. Nash, Ph.D., The University of Tennessee. William H. Gottdiener, Ph.D., John Jay College of Criminal Justice. Scott E. Anderson, Ph.D., Cornerstone of Recovery, Louisville, TN. Warren E. Lambert, Ph.D., Vanderbilt University School of Medicine. Erika R. Carr, Yale University School of Medicine.

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antisocial behavior connected to their use; and (3) Individuals with a stimulant as DOC will experience anhedonia, paranoia, have a propensity to mania, and display lower levels of emotional inhibition. MANOVAs were used to test three hypotheses regarding drug group differences on the personality variables that were in keeping with the SMH. The MANOVAs for Hypothesis I (Depressant group) and Hypothesis II (Opiate group) were statistically significant. Findings partially support the SMH, particularly in its characterization of personality functioning in those addicted to depressants and opiates.

Keywords: self-medication; co-morbidity; personality; Khantzian

Khantzian's (1985, 1997, 2003) self-medication hypothesis (SMH) of substance use is an attractive and intuitively compelling theory of substance use among patients and clinicians, offering a compassionate and relatable explanation for the emotional pain that individuals with substance use disorders (SUDs) experience. The SMH postulates that suffering is at the heart of SUDs, where individuals use substances to modulate painful affect and to self-soothe unmanageable psychological states (Khantzian, 2003, 2012). For clinicians from a range of theoretical perspectives, the SMH provides an empathic platform to explore the interplay between mood states and substance use, promote understanding and acceptance, and address the affective components that are contributing to patterns of use in psychotherapy (Blume, Schmaling, & Marlatt, 2000; Khantzian, 2012; Khantzian & Albanese, 2008). In spite of its popularity, the SMH has received criticism for its variable empirical support (Darke, 2012), with authors calling for revisions, and in one case "abandonment" of the SMH entirely (Dupont & Gold, 2007; Henwood & Padgett, 2007; Lembke, 2012).

Substance Dependence and Self-Regulation

Khantzian (2012) conceptualizes substance dependence broadly as a self-regulation disorder, where individuals with SUDs suffer because they cannot or do not regulate their emotions, self-esteem, relationships, or behavior. For example, behavioral (self-care) dysregulation includes an inability to draw cause/consequence relationships in the face of risk (Khantzian, 1997, 2012). These self-regulation difficulties are associated with a significant amount of psychological turmoil. The self-medication hypothesis posits that (1) individuals use substances to alleviate psychological suffering and (2) gravitate toward particular drugs as a result of their physiological and psychological effects (drug-specificity). Khantzian postulates that substances function to

relieve suffering and to help the individual exercise control over the experience of helplessness that accompanies confusing and uncontrollable affect (Khantzian, 2012, 2013; Suh, Ruffins, Robins, Albenese, & Khantzian, 2008). In addition, the ability of substances to temporarily alter distressing states powerfully reinforces dependence on the substance and further erodes existing coping capacities (Blume, Schmaling, & Marlatt, 2000; Khantzian, 2012). Taken together with genetic and environmental influences, these self-regulation vulnerabilities increase the chance of substance dependence.

Khantzian believes there is a significant amount of specificity in what drives a person to a particular substance. The SMH posits that several factors influence what drug appeals most to a person, including the chief effect or action of the drug, the personality of the individual, the inner states of their distress, and the availability of the substance (Khantzian & Albenese, 2008). Based on these interactions, the SMH categorizes substances into three groups:

Central Nervous System (CNS) Depressants. Depressants (alcohol, barbiturates, and benzodiazepines) have amnestic properties as well as relaxant and sedative-hypnotic effects (Parrott, Morinan, Moss, & Scholey, 2004). At low concentrations, due to inhibiting norepinephrine transmission and increasing dopamine and fluidity of cell membranes, alcohol can have excitant or "disinhibitory" effects, reducing perceived anxiety, social inhibition, and fostering feelings of closeness with others (Benton, 1988; Kushner, Abrams, & Borchardt, 2000; Parrott et al., 2004; Winger, Woods, & Hoffmann, 2004). Although initially producing euphoria, as concentrations increase, alcohol has overall depressant and sedative effects (Grant & Harford, 1995). Alcohol withdrawal is also associated with re-inducing norepinephrine systems in the brain, which may serve to generate anxiety, often driving an individual to drink to relieve the anxiogenic effects (Kushner et al., 2000). Barbiturates follow the same course, although in pill form, and are used less now than historically in exchange for benzodiazepines (Winger et al., 2004). According to the SMH, individuals dependent upon depressants tend to inhibit and over-contain their experience of emotions, utilizing rigid defenses of repression and denial (Khantzian & Albanese, 2008; Suh, Ruffins, Robins, Albanese, & Khantzian, 2008). The "cutting off" and unacknowledgement of emotions leads to emptiness and isolation, predisposing individuals to depression. As such, alcohol serves to soften this defensive structure and allows individuals to temporarily relieve emotional tension (Khantzian, 1997, 1999).

Opiates/Narcotics/Analgesics. Opiates produce a high by altering the release and reuptake of neurotransmitters in the brain, generating

slowing and analgesic effects. Initially, the ingestion of narcotics (e.g., heroin) gives an individual an extremely preoccupying rush of pleasure, followed by drowsiness, reduced sensitivity to stimuli, reduced anxiety/inhibition, muscle relaxation, pain relief, and slowed respiration (Caan, 2002; Parrott et al., 2004). Anecdotal reported effects of opiates include feeling safe, comforted, and immune to life's pains, miseries, and humiliations (Caan, 2002). The SMH proposes that individuals gravitate toward opiates primarily to manage intense and often disorganizing feelings of anger due to their calming and "normalizing" effects (Khantzian, 1997). Through extensive clinical observations ("practice-based evidence"), Khantzian (1985) noted a strong association between opioid use and traumatic backgrounds. Accordingly, the SMH states that opioids act specifically to reverse regressive states by softening otherwise intolerable feelings of aggression, rage, and/or related depression often associated with the experience of trauma, loss, or painful disappointment (Khantzian, 1999; Khantzian & Albanese, 2008).

Central Nervous System Stimulants. When ingested, cocaine and amphetamines lead to increased dopamine and noradrenaline activity, due to the drug blocking dopamine transporters and reuptake of neurotransmitters into synaptic terminals (Volkow, Fowler, Wang, & Swanson 2004; Winger et al., 2004). This stimulation heightens alertness, decreases sleep and appetite, increases locomotor activity, and intensifies mood states (Parrott et al., 2004; Winger et al., 2004). The initial effects of cocaine are reported as very positive, including increased energy, feeling powerful, confident, and lively, and experiencing the world as more interesting and pleasurable (Parrott et al., 2004). The SMH identifies two types of cocaine abusers: "low energy" and "high energy" individuals (Khantzian & Albanese, 2008). Both types of users appear to be avoiding affect related to depression. "Low energy" cocaine abusers experience chronic feelings of boredom, dysphoria, or fatigue—mirroring a depressive state. For these individuals, cocaine acts as a means to increase energy and counter anhedonia. Conversely, the "high energy" class of individuals possess a magnified need for elation and excitement. "High energy" users are thought of using cocaine as a "flight from depression," by living a restless lifestyle, and maintaining feelings of hypomania. Additionally, Khantzian (1997) noted that in some individuals, stimulants can paradoxically calm and counter ADHD-related symptoms.

Previous Research and Controversy

The SMH is criticized in the literature primarily due to research not demonstrating a causal link between psychological disorders and the development/maintenance of SUDs and the lack of empirical support for the drug specificity aspect of the SMH (Lembke, 2012). In addition, researchers question the notion that substances act to relieve psychological distress, as they often do the reverse (Dupont & Gold, 2007). While empirical investigations have demonstrated higher levels of psychopathology in SUDs, Khantzian's drug specificity predictions have been less successful when empirically tested. Studies have consistently demonstrated higher rates of psychiatric co-morbidity in individuals diagnosed with a SUD, and increased rates of childhood trauma, maltreatment, and/or adversity among substance abusers (Grant et al., 2004; Sihna, 2008). When administering structured interviews to assess onset of psychiatric symptoms relative to substance use, researchers found that substance dependence followed the onset of a psychiatric disorder, such as depression preceding alcohol dependence (Abraham & Fava, 1999; Deykin, Levy, & Wells, 1987). However, these only suggest, and cannot prove causality.

Studies specifically examining self-medication have found higher levels of psychological distress in substance abusers, with individuals reporting using substances to cope with painful affect, anxiety, hyperarousal associated with PTSD, and/or depressive symptoms (Aharonovich, Nguyen, & Nunes, 2001; Craig, 1988; Henwood & Padgett, 2007; Robinson, Sareen, Cox, & Bolton, 2011; Shipherd, Stafford, & Tanner, 2005; Weiss, Griffin, & Mirin, 1992). Multiple empirical investigations of drug specificity according to the SMH could not support this aspect of the hypothesis (Aharonovich et al., 2001; Castaneda, 1994; Greene, Adyanthaya, Morse, & Davis, 1993; Hall & Queener, 2007; Weiss et al., 1992). An early investigation linking personality traits to drug use found distinct personality differences among drug users, particularly among barbiturate users, who displayed higher levels of emotional distress and reported decreased anxiety following drug use (Crain, Ertel, & Gorman, 1975). These authors concluded that barbiturate users may gravitate toward this particular drug out of a personal need to avoid cognitive activity and social interaction. Using methods that target underlying affective constructs in personality functioning, a more recent investigation found partial support for the SMH, with lower depression and repression predicting alcohol dependence, cynicism predicting opioid dependence, and higher levels of psychomotor acceleration predicting cocaine dependence (Suh et al., 2008).

Limitations of Previous Research

The above examinations of the drug-specificity aspect of the SMH have several methodological limitations that warrant consideration, including issues in assessing drug of choice, measurement, power, and generalizability. Studies (Aharonovich et al. 2001; Castaneda, 1994; Hall & Queener, 2007) based drug of choice on self-reported use. According to a 24-study meta-analysis of self-reported drug use among high-risk populations, self-reported drug use is extremely unreliable (Kappa = .42), variable, and under-reported, particularly in post-treatment follow-up visits and out-of-treatment populations (Magura & Kang, 1996). These authors suggest that along with self-reported use, drug dependency research should routinely include an appropriate biological test to increase validity of reports. This is particularly relevant in assessing drug preference when individuals are abusing multiple classes of drugs, a point of the specificity hypothesis that has drawn criticism in the past (Lembke, 2012).

With regard to measurement, previous studies utilized strictly self-report measures and/or instruments that target major psychiatric symptom categories to measure distress, narrative responses to questions, and one using a new and unreliable measure to assess for emotionality relative to substance use (Ahoronovich et al., 2001; Castaneda, 1994; Hall & Queener, 2007; Weiss et al., 1992). The clinical scales of the Minnesota Multiphasic Personality Inventory–2 (MMPI-II; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) used by Greene and colleagues (1993) are heterogeneous in nature and multidimensional, with symptom overlap. The SMH focuses on characterological functioning in SUDs, such as affect regulation and psychological defense. These concepts are subtle and difficult to capture, and could have easily been missed by heterogeneous measures or narratives. Lastly, sample characteristics in the research indicate limited power and generalizability. Sample sizes in these studies were as low as 20 to 29 participants in each drug group (Aharonovich et al., 2001; Greene et al., 1993), and three studies utilized mostly men—one with participants each carrying a personality disorder diagnosis (Aharonovich et al., 2001; Castaneda, 1994; Schinka, Curtiss, & Mulloy, 1994).

After raising concerns with the assessments used in previous studies to assess the drug specificity aspect of the SMH, Suh and colleagues (2008) used content, supplementary, and Harris-Lingoes scales of the MMPI-II instead of the previously investigated clinical diagnostic scales (Butcher, Graham, Williams, & Ben-Porath, 1990). These scales are considered homogeneous and provide the clinical descriptions and underlying factors of the syndromes assessed by the standard clinical

scales, such as traits and attitudes (Hathaway & McKinley, 1989). Using these scales, Suh et al. (2008) found evidence in partial support of the hypothesis, finding alcohol users to have a greater tendency to over-control their anger, use repression, and refrain from acknowledging their emotions; heroin users had a tendency to experience higher levels of anger, trauma, and negativity; and cocaine users were more apt to maintain restless and exhilarating psychological states.

Rationale for the Current Study and Hypotheses

We believe previous methodological limitations compromised investigation of the SMH, and the earlier described limitations could be addressed in three ways using: (1) multiple points of data/raters to determine drug of choice (DOC), increasing reliability; (2) a larger sample, increasing power, and (3) theory-driven measures to capture the underlying affective and defensive (characterological) functioning of individuals diagnosed with a SUD. To reliably determine DOC, we used multiple points of treatment data, including biological measures (urinalysis), and created a decision-making process, or algorithm, for multiple raters to follow to determine an individual's DOC. We believe that following this algorithm strengthens the analysis by accounting for poly-drug use and supplementing individuals' self-report of drug use, which has been found unreliable and variable when used alone (Magura & Kang, 1996).

The SMH has only been tested once with the Personality Assessment Inventory (PAI; Morey, 1991), which was too broad when used alone (Schinka et al., 1994), and has yet to be tested with the Young Schema Questionnaire (YSQ; Young, 2005) both of which function to assess characterological problems and modes of affect regulation unique to the individual. Often, researchers have not had the ability to assess alcohol use disorders and SUDs concurrently (Aharonovich et al., 2001; Greene et al., 1993; Hall & Queener, 2007). The assessments used in this study more accurately pertain to the theory, and could provide insight into its validity, or perhaps into areas that need re-evaluating to better distinguish between substance use groups. Furthermore, Suh and colleagues' (2008) findings using different assessments have yet to be replicated. Replication in research is essential for theoretical development through confirmation and disconfirmation of results, building a knowledge base that aids in the construction of new and the refinement of old psychological theories (Brandt et al., 2014).

After creating an algorithm for multiple raters to reliably determine DOC, we conducted this project as a partial replication and expansion of Suh et al.'s (2008) study, using a large clinical inpatient treatment

sample with drastically different demographics. We had the opportunity to use multiple personality assessments, in order to assess the applicability of the theory across measures. If psychological attributes and patterns in personality functioning exist that distinguish depressant, stimulant, and opiate dependency from each other, and if we can detect these patterns, we then have usable scaffolding upon which we can add to models of acquisition of SUDs, its maintenance, and treatment. Analyzing psychological, personality, and maladaptive schema data concomitantly might further this process. The hypotheses of this study have been broken down into three substance categories derived from the SMH. We hypothesize that when compared against each other, each drug category will demonstrate differences in emotional regulation and psychological defenses. Specifically, we expect that when compared against each other:

(1) Individuals with a CNS depressant as DOC will exhibit defenses of repression, over-controlling anger, and emotional inhibition to avoid acknowledging their depression; through demonstrating higher levels of Repression (R; MMPI-II), Over-controlled Hostility (O-H; MMPI-II), and Emotional Inhibition (EI; YSQ), and lower levels of Subjective Depression (Dep-1; MMPI-II), Paranoia (PAR; PAI), and Aggression (AGG; PAI) on assessment measures.

(2) Individuals with an opiate as DOC will exhibit higher levels of aggression, hostility, depression, and trauma, greater deficits in ego functioning, and externalizing/antisocial behavior connected to their use; through demonstrating higher levels of Posttraumatic Stress (Pk; MMPI-II), Subjective Depression (Dep-1; MMPI-II), Cynicism (CYN; MMPI-II), Aggression (AGG; PAI), Antisocial Tendencies (ANT; PAI), and Insufficient Self-Control (ISC; YSQ); and lower levels of Ego Strength (ES; MMPI-II) on assessment measures.

(3) Individuals with a Stimulant as DOC will experience anhedonia, paranoia, have a propensity to mania, and display lower levels of emotional inhibition through exhibiting higher levels of Psychomotor Acceleration (Ma2; MMPI-II), Subjective Depression (Dep-1; MMPI-II), Cynicism (CYN; MMPI-II), Paranoia (PAR; PAI), and Insufficient Self-Control (ISC; YSQ) on assessment measures.

METHOD

After Institutional Review Board approval, archival data were gathered from a treatment facility for substance abuse and dependence located in the Southeast United States. Program participants included insured, contract-based, and private-pay clients primarily from the treatment facility's region. Participants engaged in a variety of inpatient,

intensive outpatient, and/or outpatient treatment programs, with stays generally ranging from 1–3 months. Medical record data was gathered from 2007–2009 program participants, including demographic information, medical and treatment history, drug screens, treatment participation, and psychological assessments. Upon admission to treatment, all patients engaged in numerous semi-structured interviews with staff and medical professionals and completed an assessment battery. Initially, individuals were assessed for withdrawal using the Clinical Opiate Withdrawal Scale (COWS; Wesson & Ling, 2003) and Clinical Institute Withdrawal Assessment of Alcohol Scale (CIWA-Ar; Sullivan, Sykora, Schneiderman, Naranjo, & Sellers, 1989), and those identified as experiencing withdrawal were monitored and did not complete assessments until deemed medically and psychiatrically stable.

Measurements

Minnesota Multiphasic Personality Inventory–2nd Edition (MMPI-II). The MMPI-II (Hathaway & McKinley, 1989) is a 567-item self-administered questionnaire in true/false format that assesses the existence of various forms of Axis-I psychopathology. The MMPI-II is frequently used to assess psychopathology in clinical and research settings because of its high reliability and validity (Butcher et al., 1989; Butcher & Williams, 2000; Greene, 1991). The standard clinical scales of the MMPI-II have been shown to accurately identify diagnoses, but are insufficient in assessing unique, affect-related constructs due to their heterogeneous and multidimensional contents (Suh et al., 2008). Therefore, in this investigation, subscales from the supplementary, content, and Harris-Lingoes scales of the MMPI-II were used (Butcher et al., 1990; Butcher & Williams, 2000; Graham, 2002; Greene, 2000). These scales are more relevant in terms of the SMH as they are heterogeneous and assess more intricate psychological constructs, characteristics, clinical descriptions and underlying factors of syndromes assessed by the standard clinical scales of the MMPI-II. For analysis, we used the specific subscales of (1) Subjective Depression (Dep-1), depression, anergia, and anhedonia; (2) Cynicism (CYN), anger and negative feelings toward self/others; (3) Psychomotor Acceleration (Ma2), a proclivity for increased energy, restlessness, and excitement; (4) Posttraumatic Stress (Pk), trauma, emotional turmoil, intrusive thoughts, and feeling misunderstood/mistreated; (5) Repression (R), the tendency to avoid or deny unpleasant affect; (6) Ego Strength (ES), adaptability, resiliency, and personal resourcefulness; and (7) Over-controlled Hostility (O-H), the rigid inhibition of frustration (Hathaway & McKinley, 1989). The subscales used in this investigation have all shown high reliability and

validity, internal consistency, and construct validity (Ben-Porath, McCully, & Graham, 2000; Graham, 2002; Lilienfeld, 1999; Spiro, Butcher, Levenson, Aldwin, & Bose, 2000).

Personality Assessment Inventory (PAI). The PAI (Morey, 1991) is a 344-item self-report measure of personality in which examinees select the response that best pertains to them, endorsing a statement as not at all true, slightly true, mainly true, or very true. Test–retest reliability of the PAI demonstrated that the instrument taps relatively enduring patient characteristics rather than current clinical state alone (Morey, 1991; Parker, Daleiden, & Simpson, 1999). The PAI consists of 22 scales that provide a comprehensive overview of psychopathology in adults, and has been shown to be a reliable measure of psychopathology (Hopwood, Baker, & Morey, 2008; Morey 1991, 1996), with adequate convergent and discriminant validity in its substance use subscales when compared to other measures of SUDs (Parker et al., 1999). To analyze constructs relevant to self-medication, we used the specific subscales of (1) Paranoid (PAR), a tendency for vigilance, resentment, and a readiness to spot inequities in the way one is treated; (2) Antisocial features (ANT), egocentricity, adventuresomeness, and low empathy; and (3) Aggression (AGG), assertiveness, poor anger control, and/or a proclivity for violence (Morey, 1991).

Young Schema Questionnaire–3rd Edition, Long Form (YSQ-L3). The YSQ-L3 (Young, 2005) is a 232-item self-administered questionnaire that assesses for the presence of Early Maladaptive Schemas. The items are answered on a 6-point scale, with higher item scores (ranging from 1–6) reflecting a more unhealthy level of a particular maladaptive schema. The YSQ-L3 measures 18 cognitive schemas across five separate domains. Evidence supports the reliability and validity of this measure (Lee, Taylor, & Dunn, 1999; Oei & Barnoff, 2007; Schmidt, Joiner, Young, & Telch, 1995; Waller, Meyer, & Ohanian, 2001). For the purpose of this study, we used specific schemas of (1) Emotional Inhibition (EI), excessive inhibition of spontaneous action, feeling, or communication; and (2) Insufficient Self-Control (ISC), pervasive difficulty or refusal to control/delay frustration or restrain emotions and impulses (Young, Klosko, & Weishaar, 2003).

Substance Abuse Subtle Screening Inventory–3 (SASSI-3). The SASSI-3 (Miller, 1999) is a 94-item true/false questionnaire assessing for the possibility of a substance use disorder in individuals. The SASSI has two sides, with questions on the first side producing eight empirically derived scales that discriminate between known groups of substance abusers and persons who do not have a substance use problem. The second side assesses for a client's willingness to admit alcohol or drug

abuse problems (Lazowski, Miller, Boye, & Miller, 1998). Both sides are taken into account when assessing for abuse/dependence problems. The SASSI has a *DSM-IV* substance dependence diagnostic criterion correspondence rate of 94%, excellent test–retest reliability, and is considered a valid and reliable measure of detecting substance dependence in respondents in multiple settings (Lazowski et al., 1998).

Addiction Severity Index, 5th Ed. (ASI). The ASI (McLellan et al., 1992) is a well-known and widely used structured interview designed to assess the severity of drug and alcohol use by analyzing addiction-related impairment in seven areas of functioning: medical, psychological, family/social, legal, employment, alcohol, and drug. The reliability and validity of this measure in treated substance abusers have been well documented (Appleby, 1997; Argeriou, McCarty, Mulvey, & Daley, 1994; McLellan et al., 1992).

Medical Records Information. Data was gathered from two sources in medical history, including a patient's initial history and physical exam (H&P) and urinanalysis reports upon intake. Initial H&P exams were conducted by medical professionals, where information pertaining to self-reported drug of choice, drug use history, treatment history, and familial drug history was gathered. In addition to other data, this medical information was reviewed by raters when evaluating patients' drug of choice.

Procedure

The information collected came from patients' medical records and assessments recorded via computer systems at the treatment facility, which was condensed into a database using SPSS 18.0. Patients from different treatment programs were included, and also those that did not finish treatment, relapsed, or left against medical advise (AMA). Per validity and reliability standards of both assessments, patients with incomplete or invalid assessments on the MMPI-II [Lie Scale (L) > 70, Infrequency (F) > 99, or Defensiveness (K) > 80)] and PAI [Negative Impression Management (NIM) > 93 or Infrequency (INF) > 82)] were excluded from analysis, reducing the subject pool from an initial N = 450 to N = 332.

Determining Drug of Choice. In order to accurately and reliably determine each patient's DOC to the best extent possible, multiple points of information pertaining to substance use was separated and independently analyzed by two raters. We collected information generated from the patient's personal assessment of their drug preference and reported use patterns, medical data, and substance-use variables from

objective psychological assessments administered at treatment outset. More specifically, we extracted the following information: self-reported DOC, usage reported upon intake (substance tolerance), substance usage history, treatment history, urinalysis, discharge diagnosis (given by a licensed clinical psychologist and two board-certified physicians), and substance use scales from the SASSI, PAI, and ASI. Once the information was gathered, we compared self-reported DOC against medical data and assessment records, and created a stepwise decision-making process to determine drug preference when discrepancies in information existed. We first took the self-reported DOC into account, and then compared this against corroborating information, such as discharge diagnosis. If these pieces of information were congruent, we then concluded the DOC to be the self-reported DOC. When discrepancies existed, individuals reported multiple DOCs, carried multiple SUD diagnoses, and/or in situations of polysubstance use, we incorporated additional information in order to arrive at a decision, including viewing urinalysis reports, considering pre-treatment use/tolerance levels, and relevant substance-use assessment variables.

For example, if an individual identified their DOC as "beer" on their initial intake assessment, and was diagnosed upon discharge with "alcohol dependence" (and no other substance use diagnosis), their DOC was determined to be alcohol and they were categorized into the "CNS depressant" group. If an individual identified a DOC as "heroin," and was given a diagnosis of "opiate dependence" and "alcohol abuse," their DOC was determined to be heroin and they were categorized into the "Opiate" group. If an individual identified their DOC as "beer" and carried more than one substance use dependence or polysubstance dependence diagnosis, we would assess recent usage patterns, urinalysis reports, and assessment variables to distinguish if a preference for one substance over another could be determined. The algorithm we developed to determine drug of choice is too complicated and lengthy to fully present in the body of this article. A detailed description is appended in supplementary materials (see Appendixes A and B.

Using this algorithm, individuals were categorized into one of five drug-of-choice groups: (1) Depressant (alcohol, benzodiazepines, barbiturates), (2) Opiate (narcotics, analgesics), (3) Stimulant (cocaine, amphetamines), (4) Marijuana, and (5) Indeterminate. Any instance after reviewing data/following the algorithm where a rater felt it impossible to confidently determine a drug-of-choice category, that individual was automatically classified as "Indeterminate." For analysis, only the Depressant, Opiate, and Stimulant groups (#1–3) were used, due to their relevance to the SMH, reducing the sample from $N = 332$ to $N = 304$. An interrater reliability analysis using Cohen's Kappa and standards

outlined by Shrout and Fleiss (1979) was performed to determine consistency among raters prior to analyzing data.

Data Analysis. Included in the data analysis were 304 individuals with valid assessments classified with depressants, opiates, or stimulants as their DOC. Independent samples *t*-tests were used to assess for variable differences by gender, and chi square analyses to assess for group differences by gender. Using 5 of the 6 MMPI-II variables initially investigated by Suh et al. (2008), we also included variables from additional personality-driven assessments that are congruent with the conceptual basis of the SMH. In total we selected 12 theory-congruent variables to compare between groups from the MMPI-II (Dep-1, O-H, Pk, CYN, Ma2, R, ES), PAI (PAR, AGG, ANT), and YSQ (EI, ISC). We tested the SMH by taking each DOC group, selecting the relevant scales that were hypothesized to distinguish that group from the others, and using multivariate analysis to test whether each group's score on those variables really does set them apart. Using combinations of variables across categories, we chose to conduct three MANOVAs for analysis (IV: DOC group, DV: personality variables) in order to assess whether each group differs from the other two groups on the variables predicted (i.e., depressants group vs. combined opiates/stimulants groups; opiates group vs. combined depressants/stimulants groups; and stimulants group vs. combined depressants/opiates groups). Hotelling's *T* (1931), or multivariate analysis, was chosen as the primary analysis because it most concisely and powerfully tests the theory-driven notion that each DOC group differs from the other two groups across combinations of specific personality variables while controlling for Type I error.

If multivariate analysis demonstrated statistical significance, we followed with univariate analysis to determine whether the directionality of each variable was as predicted, and to clarify what might be "driving" the relationships between personality and drug of choice. With this analysis being multivariate, effect sizes are reported as partial η^2, or partial eta squared. Effect sizes of partial η^2, according to Cohen (1988), fall within the following parameters: 0.0099 = small effect, 0.0588 = medium effect, and 0.1379 = large effect.

RESULTS

Patient Demographics

The sample consisted of 232 males (69.9%) and 100 females (29.9%). Age ranged from 17–71 years old (M = 37.7, SD = 12.34). Ethnic distribution consisted of 301 Caucasians (90.1%), 11 African Americans (3.3%), 5 Native Americans (1.5%), 3 identified as "Other" (0.6%), and

12 chose not to answer (3.6%). Distribution of relationship status was 120 married (35.9%), 108 single (32.3%), 58 divorced (17.4%), 24 separated (7.2%), 5 widowed (1.5%), 4 engaged (1.2%), 1 partnered (0.3%), and 12 chose not to answer (3.6%).

Treatment Demographics

In regards to the longest period of past sobriety, 105 individuals reported less than 1 month (32.0%), 39 as 1–3 months (11.7%), 32 as 4–6 months (9.6%), 40 as 6 months to 1 year (12.0%), 42 as 1–3 years (12.6%), 32 as five years or more (9.6%), and 42 did not answer (12.6%). Total time spent in current treatment ranged from 1–381 days ($M = 59.6$; $SD = 49.8$). Of those who entered current treatment, 235 completed their stay (70.4%), 48 left against medical advice (14.4%), 43 were "Administratively Discharged" for rule violations (12.9%), and 6 were "Therapeutically Discharged" to a higher level of medical or psychiatric care (1.8%).

Assessing Drug of Choice

Using the algorithm described above, individuals were categorized into one of five conditions by two independent raters. Each rater was given 70 randomly selected cases to test inter-rater reliability, classifying over 20% of the sample to provide adequate power. Using Cohen's Kappa, we demonstrated a rater agreement of 0.91, $p < .001$, which is considered "very good agreement" (Altman, 1991; Fleiss & Cohen, 1973). Of the cases assessed, 174 individuals were identified as preferring "Depressants" (52.1%), 96 as preferring "Opiates" (28.7%), 34 as preferring "Stimulants" (10.2%), 15 as "Marijuana" (4.5%), and 11 as "Indeterminate" (3.3%).

Gender Differences

According to independent samples *t*-tests with a Bonferroni correction of $p < .004$, females exhibited significantly higher levels of Subjective Depression than males, Dep-1: Female (F) Mean = 67.98 ($SD = 15.16$); Male (M) Mean = 61.24 ($SD = 14.36$). This is consistent with previous research that females have higher rates of depression than males (Nolen-Hoeksema & Hilt, 2009). Chi square analysis indicated that gender did not significantly differ between drug-of-choice groups (chi square = 0.73, $df = 2$, $p = .69$).

Hypothesis I: CNS Depressants versus Other. Per Khantzian (2003), individuals preferring depressants are emotionally over-controlled and inhibitive. As such, we anticipated depressant SUDs to reflect this style

TABLE 1. Hypothesis I: Univariate Analysis of the 6 Measures Hypothesized to Differentiate Depressant Group from Other (Opiate/Stimulant) Groups, and Directionality

Variable	Depressant Mean	Other Mean	*F*	*p*	Partial η^2	Predicted Direction?
Paranoia	50.20 (10.54)	55.52 (10.95)	16.34	.001	.057	Yes
Aggression	50.20 (12.64)	53.58 (14.18)	4.29	.039	.016	Yes
Repression	53.29 (10.01)	53.17 (10.38)	0.004	.953	< .001	Yes
Over-Controlled Hostility	51.78 (9.62)	48.27 (10.49)	8.17	.005	.029	Yes
Subjective Depression	61.38 (14.63)	67.68 (14.45)	12.43	.001	.044	Yes
Emotional Inhibition	9.87 (13.45)	8.92 (10.45)	0.39	.531	< .001	Yes

of emotional functioning in higher levels of Repression (R; MMPI-II), Over-controlled Hostility (O-H; MMPI-II), and Emotional Inhibition (EI; YSQ), while reporting lower levels of Anhedonia (Dep-1; MMPI-II), Paranoia (PAR; PAI), and Aggression (AGG; PAI) when compared to other drug groups. In our first analysis, those in the Depressant group were coded as "1," and Opiate or Stimulant groups as "0."

Because this hypothesis specifies six comparisons, we first tested the omnibus model using a MANOVA comparing depressant users to other users across all the proposed indices, taken together. The overall model was statistically significant, indicating that across the six measures taken together, the Depressant group and Other group responded differently: $F(6, 266) = 5.27$, $p < .001$; Hotelling's Trace = .12, partial $\eta^2 = .11$.

Table 1 summarizes the six univariate differences on the criterion variable, specifying differences, and their directionality. As per Table 1, four of the six univariate comparisons were statistically significant, and all group differences were in the hypothesized direction. Specifically, the Depressant group significantly differed from Other groups in their levels of Paranoia, $F(1, 266) = 16.34$, $p < .001$, partial $\eta^2 = .06$; Subjective Depression, $F(1, 266) = 12.43$, $p < .001$, partial $\eta^2 = .04$; Over-controlled Hostility, $F(1, 266) = 8.17$, $p = .005$, partial $\eta^2 = .03$; and Aggression, $F(1, 266) = 4.29$, $p = .039$, partial $\eta^2 = .02$. In sum, the depressant group exhibited lower levels of paranoia, aggression, and depression and higher levels of over-controlled hostility when compared to other substance users. No significant differences were observed in levels of repression or emotional inhibition. This partially supports the SMH in regard to drug specificity of depressant users, in that the groups function dif-

ferently with regard to emotionality and defense, but not entirely as predicted by SMH.

Hypothesis 2: Opiate versus Other. Per Khantzian (1999), individuals identified as preferring opiates struggle to regulate intense affect, are increasingly aggressive/hostile, experience depression and trauma, and display antisocial behavior in conjunction with their use. Accordingly, we anticipated those identified as preferring opiates to reflect this style of emotional functioning by having higher levels of reported Posttraumatic Stress (Pk; MMPI-II), Anhedonia (Dep-1; MMPI-II), Cynicism (CYN; MMPI-II), Antisocial Tendencies (ANT; PAI), Aggression (AGG; PAI) and Insufficient-Self Control (ISC; YSQ) than other substance users, while having lower levels of Ego Strength (ES; MMPI-II). In the second multivariate analysis, we coded individuals in the Opiate group as "1," and Depressant/Stimulant group as "0."

The second multivariate analysis indicated the overall model as significant, meaning that across the seven measures combined, the Opiate group and Other group responded differently, $F(7, 263) = 5.29$, $p < .001$, Hotelling's Trace = .14, partial $\eta^2 = .12$. Table 2 summarizes the seven univariate analyses, indicating significance and directionality. As per Table 2, five of the seven univariate comparisons were statistically significant, and all group differences occurred in the hypothesized direction. Specifically, Opiate SUDs differed significantly on their levels of Posttraumatic Stress, $F(1, 263) = 6.91$, $p = .01$, partial $\eta^2 = .03$; Subjective Depression, $F(1, 263) = 7.68$, $p = .006$, partial $\eta^2 = .03$; Cynicism, $F(1, 263) = 12.66$ $p < .001$, partial $\eta^2 = .05$; Ego Strength, $F(1, 263) = 4.38$, $p = .04$, partial $\eta^2 = .02$; and Antisocial Tendencies, $F(1, 263) = 22.56$, $p < .001$, partial $\eta^2 = .08$. In sum, the Opiate group displayed higher levels of Posttraumatic Stress, Subjective Depression, Cynicism, and Antisocial Behavior and lower levels of Ego Strength when compared to other groups. No significant differences were observed for the Opiate group on levels of Insufficient Self-Control or Aggression. This partially supports the SMH, in that the groups function differently with regard to emotionality and defense, but not entirely as predicted by the SMH.

Hypothesis 3: CNS Stimulants versus Other. The third hypothesis pertained to Stimulant SUDs. As per the SMH (Khantzian, 1999), we hypothesized that when compared to other groups, Stimulant SUDs experience anhedonia, have a propensity to mania, paranoia, and aggression, and struggle to regulate their emotions. We anticipated these differences to be reflected through higher levels of Hypomania (Ma2; MMPI-II), Subjective Depression (Dep-1; MMPI-II); Cynicism (CYN; MMPI-II), Paranoia (PAR; PAI), and Insufficient-Self Control (ISC; YSQ). For the third multivariate analysis, we coded individuals identi-

TABLE 2. Hypothesis II: Univariate Analysis of the Seven Measures Hypothesized to Differentiate Opiate Group from Other (Depressant/Stimulant) Groups, and Directionality

Variable	Opiate Mean	Other Mean	*F*	*p*	Partial η^2	Predicted Direction?
Posttraumatic Stress	65.39 (14.79)	60.18 (15.29)	6.91	.009	.025	Yes
Subjective Depression	67.66 (14.58)	62.34 (14.71)	7.68	.006	.028	Yes
Cynicism	54.16 (9.62)	49.51 (10.17)	12.66	.001	.045	Yes
Ego Strength	39.26 (13.50)	42.96 (13.50)	4.38	.037	.016	Yes
Insufficient Self-Control	26.95 (22.66)	23.42 (21.30)	1.54	.216	.006	Yes
Aggression	53.52 (14.99)	50.63 (12.55)	2.73	.100	.010	Yes
Antisocial Tendencies	63.74 (13.16)	56.44 (11.05)	22.56	.001	.077	Yes

fied as addicted to a Stimulant as "1" and Opiate/Depressant SUDs as "0."

The third multivariate analysis indicated that across the combined five measures, Stimulant SUDs do not respond differently than Other SUDs, $F(5, 265) = 0.50$, $p = .77$, Hotelling's Trace = .01, partial $\eta^2 = .01$. With regard to the Stimulant group, there were no significant differences between groups, and the SMH was not supported.

Post-Hoc Discriminant Function Analysis

We elected to conduct a post-hoc discriminant analysis (DA; Khattree & Naik, 2000) in an attempt to better understand the underlying functions that distinguish Depressant and Opiate users from each other in our sample through examining their unique profiles together. Discriminant analysis allows researchers to determine the underlying dimensionality of the data and the interrelationships among variables. We used the following significant predictor variables from the previous analysis: Antisocial Tendencies, Paranoia, Aggression, Cynicism, Depression, Trauma, Over-controlled Hostility, and Ego Strength. The last result is a profile of differences between the Opiate and Depressant groups. We turned to descriptive multivariate modeling to see if there is a clinical profile that makes theoretical sense. Discriminate analysis is an ordinary least squares model much like linear regression: $Y_I = B_0 + X_1B_1 + X_2B_2 + \ldots + X_N B_N$. However, in discriminant analysis the outcome

TABLE 3. Significance of Differences between Groups

Scale	Raw P	Bootstrap P
PAI Antisocial	< .0001	< .0001
PAI Aggression	0.03	0.14
PAI Paranoia	0.002	0.001
MMPI-II Depression	0.004	0.03
MMPI-II Ego Strength	0.04	0.20
MMPI-II OC Hostility	0.04	0.19
MMPI-II PTSD	0.01	0.046
MMPI-II Cynicism	0.0004	0.003

Note. Distribution-free bootstrap re-sampling ran nonparametric t-test 10,000 times for each variable.

Y is a category with two or more classes. First, as shown in Table 3, we ran eight independent *t*-tests using both traditional and bootstrap *t*-tests (Efron, 1993). Ignoring multiple testing in the left column, all eight *t*-tests were significant ($p < .05$). With bootstrap correction (Westfall & Young, 1993) five of eight tests were significant.

Next, we ran a discriminant function with SAS CANDISC in which X_1, $X_2 \ldots X_8$ were the eight personality variable scores shown in Table 3. The eight scores were *z*-scores (Mean = 0.00, *SD* = 1.00), letting us view group differences as Cohen's *d* effect sizes. The model had a significant canonical correlation, $r = 0.33$, $p > .0001$, suggesting that a statistically significant profile exists. Cohen (1992) suggests that $r = 0.30$ is a "medium" effect size. Effect sizes of the variables ranged from 0.27 to 0.65. Figure 1 displays the profiles of both Depressant and Opiate users on the eight personality variables.

DISCUSSION AND CONCLUSION

The omnibus theory that individuals with SUDs differ in their emotional and characterological functioning based on drug of choice was supported for those preferring Depressants and Opiates. Taken together, findings support the notion that the SMH informs us about how personality is associated with drug of choice. Across the three hypotheses, there were 18 predictions (six for Hypothesis I; seven for Hypothesis II; and five for Hypothesis III). Of the 18 group comparisons, 17 were in the predicted direction; 9 were significantly different differences; and the a-priori MANOVA for Hypotheses I and II were statistically significant.

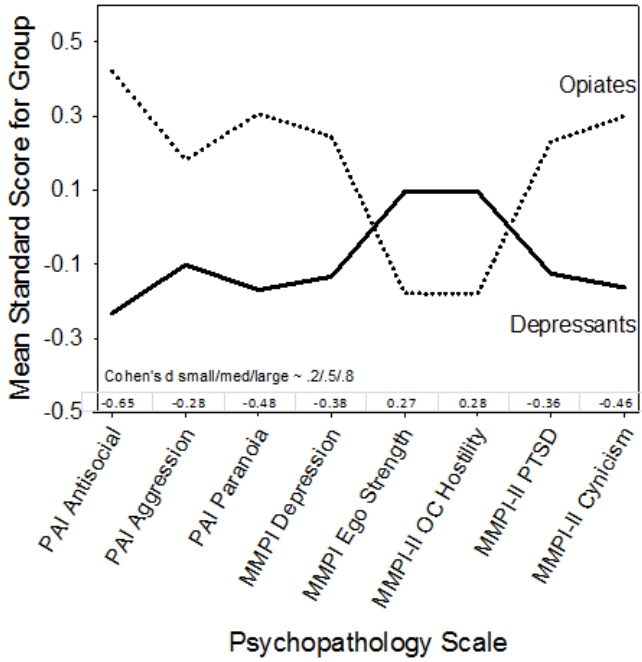

FIGURE 1. Discriminant function analysis: Profiles of Depressant and Opiate groups. Note. Small numbers above X-Axis are the effect size of the group difference, Cohen's d = (X1 – X2) / SD_{pooled}. According to Cohen, small/medium/large ~ .2/.5/.8.

Group 1 (Depressants)

According to Khantzian (2003), individuals addicted to a depressant (alcohol, benzodiazepine, or barbiturate) inhibit and over-contain their emotional experience, using rigid defenses such as repression and denial. The use of a depressant acts to soften this rigid defensive structure and reduce an individual's internal tension state. Operating in this manner, alcohol users are notoriously alexithymic and present with flattened or "cut off" affect, and following extended periods of sobriety (Aguilar de Arcos, Verdejo-Garcia, Peralta-Ramirez, Sanchez-Barrera, & Perez-Garcia, 2005; de Timary, Luts, Hers, & Luminet, 2008). Identifying these concepts in subscales of the MMPI-II, PAI, and YSQ, we believed depressant users would differ on assessments when compared to other drug users, and in six specific areas.

In partial support of the first hypothesis, multivariate analysis indicated that Depressant SUDs respond differently than Other SUDs across the six predicted scales taken together. Group differences on all six of the relevant scales were in the predicted direction, four significantly. Specifically, as predicted, the Depressant group presented with significantly lower levels of Paranoia, Depression, and Aggression, and significantly higher levels of Over-controlled Hostility when compared to other SUDs. The Depressant group also had higher, but not significant, levels of both Emotional Inhibition and Repression.

According to research, those with an alcohol use disorder experience higher rates of depressive disorders than the general population, and at elevated levels among treatment seekers (Grant et al., 2004; Lynskey, 1998). With these statistics in mind, one might anticipate higher reflections on assessments that pertain to depressive experience. In our sample, and accordance with the SMH, these scores were lower and in the nonclinical range on the MMPI-II. Overall, the group reported lower levels of symptomology/psychopathology than other groups. We believe this reflects a dismissal of affect or denial. Taken with findings from Suh et al. (2008), there is building evidence that a denial-based defensive system is characteristic of alcohol abusers. Surprisingly, we did not find repression or emotional inhibition to significantly differ between drug groups. We believe this may be a function of the population studied. Depressant users seeking treatment are considered to have higher occurrences of psychopathology (Grant et al., 2004), and in being an "acute" population, could also reflect under-developed, faltering, or regressed psychological defenses. In creating his hierarchy of ego defenses, Valliant (1994) characterized repression and isolation of affect as more developed, or "neurotic" defenses than that of denial, which is considered more primitive. This is also supported by Kernberg (1975), who theorized denial to function at different levels, where primitive levels of denial are akin to splitting-off experiences and higher levels of denial are related to repression.

Group 2 (Opiates)

The SMH (Khantzian, 1999) posits that individuals identified as addicted to an opiate, narcotic, or analgesic use the drug to attenuate feelings of aggression, rage, and depression often associated with trauma. Opiate SUDs rarely possess a defensive structure able to regulate overwhelming emotion. Instead, there is collapse (i.e., psychic trauma; Dodes, 1990; Khantzian, 1999). Opiates act as a coping mechanism and

mute psychic pain, blunt acute helplessness, and give temporary relief to a compromised ego structure (Dodes, 2009; Khantzian, 1999; Wurmser, 1974). In comparing assessments, we anticipated Opiate SUDs to reflect emotional hypersensitivity, poor emotional control, and a higher incidence of trauma than their counterparts.

In partial support of the second hypothesis, multivariate analysis indicated that Opiate SUDs respond differently than Other SUDs across the seven predicted scales taken together. Five of the seven predictor variables were significant, and all group differences were in the hypothesized direction. We found opiate SUDs to display significantly higher levels of Subjective Depression, Cynicism, Antisocial Tendencies, and Posttraumatic Stress than other groups. Concurrent with the SMH, the Opiate group also had significantly lower levels of Ego Strength than other SUDs. In particular, Cynicism and Antisocial attitudes seem to be driving this relationship. Both scales are associated with skepticism and mistrust of others, which may relate to early trauma, which is thought of as integral to understanding opiate SUDs (Darke, 2012).

Group 3 (Stimulants)

Identifying both "high" and "low" energy users, the SMH posits that the need to regulate inner emptiness, boredom, and depressive states or to maintain restlessness drives individuals to the energizing effects of cocaine (Khantzian & Albanese, 2008; Suh et al., 2008). Conceptualizing cocaine use as a "flight from depression," we anticipated that this group would be increasingly disinhibited, risk taking, and display higher levels of depression, a lack of self-control, and restlessness when compared to other groups. Multivariate analysis of the Stimulant group did not confirm predicted differences between stimulant users and other SUDs.

It is tempting to attribute the failure of Hypothesis III to low power ($n = 34$). Still, the group differences were very small, even if four of the five were in the predicted direction. Even *with* more power, the effect size is anemic. More likely these findings reflect either a mistranslation of the theory, or a failure of the theory itself. With Khantzian proposing two "types" of stimulant users (one "low" depressed, and one "high" manic), we might better have *first* investigated to see if cocaine SUDs do indeed have different response styles. If "low" and "high" energy groups exist, their response styles would perhaps differ in their levels of hypomania, risk taking, and depression. As no previous research has translated the theory in this manner, we believe it might be an area for

further investigation to ascertain whether a mistranslation has muddled empirical findings. Recent research (Suh et al., 2008) providing empirical support for the SMH found Psychomotor Acceleration (Ma2, MMPI-II) to predict stimulant SUDs, which we could not replicate. The same study did not observe any significant findings surrounding cocaine disorders and depression, and suggested using alternative scales to capture the relationship (which we did, and still found no significance).

Since the introduction of the SMH, research has demonstrated a rise in rates of antisocial personality disorder among treatment-seeking cocaine users, which is now thought to affect between 45–55% of patients (Poling, Kosten, & Sofuoglu, 2007; Rounsaville et al., 1991). Also, individuals dependent on cocaine have demonstrated higher rates of childhood ADHD, estimated at 35%, and reportedly use cocaine to treat their symptoms (Carroll & Rounsaville, 1993). Theorists agree that stimulant SUDs display higher levels of sensation/stimulus-seeking behavior and impulsivity, which also reflect antisocial and/or attention-disordered traits (Khantzian, 1999; Poling, Kosten, & Sofuoglu, 2007). This also provides an alternative explanation for why Suh et al. (2008) found Psychomotor Acceleration to be related to cocaine SUDs. According to Hathaway and McKinley (1989), individuals scoring high in Psychomotor Acceleration are tense, restless, and excited and may seek out risk, excitement, or danger as a way of overcoming boredom. This can be interpreted as a "flight from depression," but also could be due to an attention deficit or related to antisocial tendencies. Although our sample size was small, with the alternative explanations posed and changes in the population's epidemiology and treatment-seeking characteristics documented, further research and possible revisions to this aspect of Khantzian's theory may be necessary. In sum, it may be that the psychological makeup of stimulant SUDs is more heterogeneous than other substance use groups, thus presenting a special challenge for theory and research.

Discriminant Function Analysis

Post-hoc discriminant function analysis details the nature of differences between opiate and depressant users, when considered together. The profiles of Depressant and Opiate groups along the significant personality variables taken from our first analysis (Figure 1) demonstrate sizeable differences among areas of emotionality and interpersonal volatility. In comparison, the Opiate group appears more dysregulated in general, where affective experience may be felt more intensely than those who use depressants. We believe the nature of these differences has important implications for treatment.

Previous work on testing the SMH has had limited success (e.g., Castaneda, 1994; Craig et al., 1988; Green et al., 1993), which may be due to incorrect assessment of emotional constructs and use of broad assessments incapable of recognizing nuances between groups (Suh et al., 2008). More recent work providing support for Self-Medication (Suh et al., 2008), including this project, used assessments that better targeted the underlying emotional functioning of SUDs, where differences between groups linger.

Of note was our ability to accurately assess each individual's drug of choice. A finalized diagnosis was also used after each individual had gone through treatment, which allowed for the potential minimization of problems at treatment entry to subside, though notably had been a concern in previous studies. With dual raters, our reliability was very strong (91%). The most challenging cases to categorize were those with complex poly-substance dependence, which generally fell in the "undifferentiated" category ($N = 11$).

Study Limitations

Hypothesis testing in this population was a difficult endeavor due to the inability to assess individuals after a long period of abstinence or observe pre-addiction personality/psychopathology. Therefore, it is possible that extended drug use or withdrawal drove or altered a person's presentation. In addition, some individuals were likely taking psychiatric and medical medications at the time of being assessed, which could have influenced their presentation on assessments. However, individuals experiencing withdrawal symptoms were identified upon treatment entry and adequately medicated/detoxified prior to completing assessment measures, which helped account for that possibility, along with the elimination of invalid assessments from the sample. Also, researchers have found that even after an extended period of sobriety, substance abusers remained deficient in their emotional regulation abilities, and that psychiatric illnesses such as depression and posttraumatic stress generally precede substance use (Deykin, Levy, & Wells, 1987; Jacobsen, Southwick, & Kosten, 2001; Thorberg & Lyvers, 2005). Still, this remains a limitation of the study. A longstanding debate in the substance use and personality literature is the notion of causality, or possibility that extensive drug use alters personality characteristics. These conclusions are also limited by the sample's retrospective and cross-sectional design. Due to the study's retrospective nature, we were unable to interview subjects directly, which would have strengthened our assessment of drug of choice by providing important subjective information on access to substances and conscious experience that in-

fluence drug choice. Lastly, we recognize that personality components reflect one of many pieces of a complex interplay of factors that propel the acquisition and maintenance of a particular substance dependency. In order to thoroughly understand the impact of emotionality on drug of choice, longitudinal studies are necessary.

Future Research

Although having similar project aims, this investigation used more varied measures and had strikingly different sample characteristics than Suh et al. (2008), and offers additional promising evidence for the SMH. The sample for this investigation was primarily White, well educated, mostly employed, health insured, and enrolled in inpatient treatment. For Suh et al. (2008), the sample had a richer ethnic distribution, were of lower socioeconomic status, varying education levels, and of an outpatient population. Both studies, although characteristically diverse, provide support for the SMH. This further highlights the need for continued use of the Harris-Lingoes and Content scales of the MMPI-II in future research, particularly for replication purposes in refining the SMH (Brandt et al., 2014). Additional research could also help clarify differences found in this Stimulant population compared to Suh et al. (2008), to determine whether the current findings are due to differences in sample characteristics, mistranslation of theory, or perhaps reflect the hypothesized changing nature of the Stimulant SUDs from depressed to antisocial characters.

Difficulties in self-regulation are core to the SMH, and remain major risk factors for relapses post-treatment, and helping individuals understand their use in relation to their interpersonal/intrapsychic world could help reduce this risk (Sinha, 2008). Approaching patients from an empathic and humanized perspective provides powerful reparation to the alienation, shame, and stigmatization associated with SUDs, and is critical to developing the therapeutic relationship in a population highly vulnerable to treatment attrition (Curran, Kirchner, Worley, Rookey & Booth, 2002; Khantzian, 2012). Clinicians can use this theory to deepen their understanding of patients through drug preference and guide intervention strategies. The differences observed between opiate and depressant disorders in personality could direct clinicians on how to approach self-regulation with each population. Specifically, those preferring opiates may need to focus on containment and emotional titration, while fostering awareness of emotional processes with depressant users. For both groups, of great importance is the understanding of current defenses, their maladaptive nature, and replacing them with more evolved and adaptive coping skills.

APPENDIX A

STEPS TO ASSESS DRUG OF CHOICE (DOC)

Information required:

- Self-reported DOC as recorded on initial assessment by MD on History and Physical
- Diagnoses given by treatment team at discharge (Clinical Director and MD)
- History of use as determined on History and Physical in initial assessment
- Drug Screen: **Be aware that *alcohol* will likely NOT be positive on a drug screen, as it can be cleared from an individual's system within 24 hours. Therefore, in conditions concerning alcohol, this item needs to be interpreted as such. Also, *marijuana* stays in an individual's system for up to 30 days after use, whereas opiates and benzodiazepines have a much shorter half-life in the body. Take this into account as individuals will stay positive for THC longer than other drugs. Also, beware if an individual is going through *medical detoxification* or *withdrawing* that there is a chance they are given *benzodiazepines* to control symptoms (keep an eye out for *DSM* 292.xx codes for withdrawals in diagnoses and/or detoxification conditions).
- Clinical Variables from objective assessment data:
  PAI drug
  PAI alcohol
  ASI drug
  ASI alcohol
  SASSI FVA
  SASSI FVOD
- Drug amount used as reported in History and Physical

Objectives:

- Note the substance
- Categorize into the following 6 conditions:
  1 = CNS Depressants (Alcohol, Benzodiazepines, Barbiturates)
  2 = Opiates, Narcotics, and Analgesics
  3 = CNS Stimulants
  4 = Marijuana
  5 = Cannot Determine DOC due to complex poly-substance dependence or "other" drug that does not fit into a category
    –This condition is reserved for individuals who are heavy poly-drug users that do not have a distinguishable preference for one drug over another
    –Also, individuals that claim no DOC and have no diagnosis fit into this category
    –Occasionally, individuals claiming behavioral addictions such as "sex addiction" or "gambling addiction" fall into this category

6 = Not enough information to determine DOC
–This condition is reserved for individuals missing vital information (e.g., H&P, diagnosis, drug screen) that make determining a DOC impossible

APPENDIX B

PROCEDURE FOR RATER TO FOLLOW:

As per "steps" described (in detail) previously:
1 = Self-reported DOC in History and Physical
2 = Diagnosis given by treatment team
3 = Self-reported use at the time of treatment entry, including amounts, in History and Physical
4 = Drug Screen
5 = Clinical Variables
6 = Amount of use reported in initial assessment

Condition A:
If 1 = X and 2 = X, then DOC = X.

Condition B:
If 1 = X and 2 = Polysubstance, then
a. Review 3. If 3 is positive for X, then DOC = X.
b. If 3 is negative for X, review 4. If 4 is positive for X, then DOC = X.
c. If 3 and 4 are negative for X, but both positive for Y, then DOC = Y.
i. Under this condition, corroborate information by reviewing 5 and 6 (a–f). If one of the variables (a–f) is clinically significant, then DOC = Y.
d. If 1 and 3 and 4 are both positive for multiple substances, review information from 6. Determine DOC by reviewing amount of drugs used per patient report. If severity of use is indistinguishable between drugs, then no DOC can be reported.

Condition C:
If 1 = X, Y, and 2 = X, then DOC = X.
If 1 = X, Y, and 2 = Y, then DOC = Y.
If 1 = X, Y, Z, and 2 = X only, then DOC = X. (This is for all cases where information from 1 contains multiple drugs with only one diagnosis given. If the individual does not have a diagnosis for these drugs it is likely they were used recreationally or abused, and the individual's dependence on a substance falls more into one specific category as determined by treatment team throughout that individual's course of treatment.)
If 1 = X, Y, and 2 = X *dependence* and Y *abuse*, then DOC = X.
If 1 = X, Y, and 2 = X *abuse* and Y *dependence*, then DOC = Y.

Condition D:
If 1 = X, Y, and 2 = X, Y, then:

a. Review 3. If 3 is only positive for one (X or Y), then the substance 3 is positive for becomes that individual's DOC.
   i. IF 3 is positive for both X and Y, but has a "2" instead of a "1" for either X or Y, then defer to the drug that has a "1" on History and Physical. This is likely a situation where a patient received a diagnosis of drug dependence based on history (and is not currently "choosing" this drug).
b. If 3 is positive for both X and Y, review 4. If only one of these substances is positive on 4, then that substance becomes the individual's DOC.
   i. HOWEVER if either X or Y is reported as *alcohol*, it is likely that this will not show on 4 (drug screen). Therefore, skip to 5 and/or 6. Compare the drug and alcohol variables (a–f) for clinical significance.
   ii. If both substances on 4 are positive for X and Y, then record both drugs as DOC and note that in the database, so we can look at #6.
      a. These individuals will be flagged and looked back into their H&P/Drug Screen to review levels of the drug in their system and amount of use. If one substance is substantially higher than the other (respectively), that that substance becomes the individual's DOC. Otherwise, it is inconclusive.

Condition E:

If 1 = X, 2 = Y, and 3 = Y (not X), then DOC = Y.
If 1 = X, 2 = Y, and 3 is positive for X and Y (or polysubstance), then:
a. Review 4. If 4 is positive for one of X or Y, then that substance would become DOC.
   i. If either X or Y is *alcohol*, skip 4 and move to 5. Compare the drug and alcohol variables (a–f) for clinical significance. If more variables relating to alcohol are significant, then that becomes the individual's DOC (and vice-versa). If all variables are clinically significant, then no drug of choice can be determined.
      a. If no discernment can be made from this information, move to information from #6 and flag this in the database.
b. Review information from 6. Determine DOC by reviewing amount of drugs used per patient report. If severity of use is indistinguishable between drugs, then no DOC can be reported.
c. If no DOC can be determined, and X and Y are both substances that fall in the same group (e.g., CNS depressants such as alcohol and a benzodiazepine), then the individual can still be grouped for the study, with no determined DOC.

Condition F:

If 1 = X, 2 = Y, but 3 and 4 = X (not Y), then DOC = X.
If 1 = X and 2 = Y, review 3.
a. If 3 is positive for X (not Y), then DOC = X.
b. If 3 is positive for both X and Y, review 4.
c. If 4 is positive for one of X or Y, then DOC is that substance.
   i. However, in the case of alcohol being X, move on to 5. If more variables relating to alcohol are significant, then that becomes the individual's DOC (and vice-versa). If all variables are clinically significant, then no drug of choice can be determined.

ii. If no DOC can be determined, and X and Y are both substances that fall in the same group (e.g., CNS depressants), then the individual can still be grouped for the study, with no determined DOC.

Condition G:

If 1 = X, Y
AND
2 = X, Y
AND
Both 3 and 4 are positive for X and Y
THEN
Review information from 6. Determine DOC by reviewing amount of drugs used per patient report. If severity of use is indistinguishable between drugs, then no DOC can be reported.

Condition H:

If 1 = X, X, and Y (e.g., multiple substances within same use category, such as two different types of opiates) AND 2 = X, then DOC = X.
If 1 = X, X, and Y, and 2 = Poly-substance, then DOC = X.
If 1 = X, X, and Y, and 2 = X, Y, then review 3. If 3 is positive for only X, then DOC = X.

a. If 3 is positive for X and Y, review 4.
b. If 4 is positive for X and Y (minus situations when alcohol/marijuana are involved), skip to 5/6 and follow the same procedure of flagging this in your database.
c. If 4 is positive for only one of X or Y (minus alcohol/marijuana), then that becomes the individual's DOC.

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Lindsey Colman McKernan, Ph.D.
Assistant Clinical Professor, Vanderbilt University School of Medicine
Osher Center of Integrative Medicine at Vanderbilt University
3401 West End Avenue, Suite 380
Nashville, TN 37203
lindsey.mckernan@vanderbilt.edu