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The Stimulant Selective Severity Assessment: A replication and exploratory extension of the Cocaine Selective Severity Assessment

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Abstract

Background: Cocaine and methamphetamine have similar withdrawal symptoms and many individuals concurrently use both substances; however, no measures concurrently assess withdrawal from multiple stimulants.

Objectives: This study's aim was to explore the Stimulant Selective Severity Assessment (SSSA), a modified version of the Cocaine Selective Severity Assessment (CSSA), in a sample of stimulant users to determine if it can assess withdrawal symptoms in users of one or more stimulants.

Methods: Baseline data were analyzed from the STimulant Reduction Intervention using Dosed Exercise trial, a multisite randomized clinical trial that evaluated exercise versus health education on drug use outcomes in individuals with stimulant use disorders. Data were analyzed for internal consistency, construct validity, and scale dimensionality.

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Declaration of Interest

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Results: Internal consistency for the full sample was good ($\alpha = 0.81$; $N = 302$), with similar alphas in Cocaine (0.81; $n = 177$) and Cocaine / Other Stimulant (0.82; $n = 92$) groups, but with much lower alpha for the group without cocaine use (Other Stimulant, i.e., primarily methamphetamine, $\alpha = 0.66$; $n = 32$). Support for construct validity was evidenced by significant positive correlations ($r = 0.17$ to 0.67) with measures of stimulant craving, depressive symptoms, and pain. Four factors were revealed.

Conclusions/Importance: The Stimulant Selective Severity Assessment is a new measure that can be used to assess withdrawal symptoms in users of cocaine or cocaine plus methamphetamine, but it should not be administered to users of methamphetamine only.

Keywords

stimulant; cocaine; methamphetamine; withdrawal; measure

1. Introduction

Cocaine and methamphetamine appear to have a similar cluster of abstinence-related symptoms (Barr, Markou, & Phillips, 2002), but the literature on the time course and severity of withdrawal for these stimulants is mixed. With respect to cocaine, Gawin and Kleber's (1986) seminal paper described the initial "crash" after cessation of use as lasting up to 4 days, followed by a withdrawal phase lasting 1 to 10 weeks, with the duration and intensity of symptoms depending on the amount, frequency, and duration of cocaine use. More recent and systematic investigations of abstinence symptoms highlight their heterogeneity. For example, for 24 prospectively-followed outpatients dependent on cocaine, withdrawal symptoms decreased linearly over 28 days since last use (Coffey, Dansky, Carrigan, & Brady, 2000) while in a laboratory study of 9 non-treatment seeking individuals, withdrawal symptoms resolved within 24 hours (Walsh, Stoops, Moody, Lin, & Bigelow, 2009). Most studies have found symptoms persist beyond the initial "crash," including poor attention during the first and second weeks of abstinence (Pace-Schott et al., 2008), worsening mood in the first and second weeks of abstinence (rather than a linear decline) (Epstein & Preston, 2010), objectively measured sleep problems during the first two to three weeks of abstinence (Angarita et al., 2014; Matuskey, Pittman, Forselius, Malison, & Morgan, 2011) [despite self-reports of improved sleep (Matuskey et al., 2011)], and difficulties in impulse control at three to four weeks after cessation (Fox, Axelrod, Paliwal, Sleeper, & Sinha, 2007). With respect to methamphetamine withdrawal, a review by Pennay and Lee (2011) also revealed mixed findings regarding withdrawal duration, ranging from "a few days to a few months." Methamphetamine findings may be mixed due to a two-phase withdrawal syndrome as described by McGregor et al. (2005), with an acute phase lasting about one week and a subacute phase lasting several weeks. The inconsistent findings across and within these two types of stimulants could be due, in part, to methodological issues (e.g., some versus no exposure to drug use cues during the study period; small sample sizes; retrospective versus prospective designs) and variability in samples (see Walsh et al., 2009). Nevertheless, withdrawal symptoms do play a role in relapse and it is clear some individuals experience troublesome symptoms up to at least four weeks following last stimulant use.

Several measures have been developed to assess cocaine withdrawal. However, the Cocaine Selective Severity Assessment (CSSA) (Kampman et al., 1998) is frequently used to characterize stimulant users. The CSSA was created by reviewing the cocaine withdrawal literature and using expert clinical observations (Kampman et al., 1998) and was validated in an outpatient, primarily male (75%) crack cocaine using (85%) sample. The CSSA's psychometric properties were adequate (e.g., $\alpha = 0.80$) and discriminated cocaine-only users from users of combined cocaine/alcohol and alcohol only. However, the authors indicated additional validation is needed and the dimensionality of the scale was not reported. Despite these needs, use of the interviewer-administered CSSA has continued with limited additional psychometric validation and limited extension to other stimulant using populations.

By adapting the wording of CSSA items, it may appropriately assess withdrawal symptoms from stimulants other than cocaine, as shown by inpatient methamphetamine users (MacGregor, 2005). MacGregor et al. administered a modified CSSA and the Amphetamine Withdrawal Questionnaire (AWQ) (Srisurapanont, Jarusuraisin, & Jittiwutikan, 1999) to evaluate the time course and severity of withdrawal. The AWQ is a 10-item self-report measure based on DSM-IV withdrawal symptoms, and the CSSA was modified by replacing "cocaine" with "amphetamine" and the measure was renamed the Amphetamine Selective Severity Assessment (ASSA). The ASSA showed acceptable internal consistency ($\alpha = 0.80$) and construct validity as evaluated by correlations with the AWQ ($r = 0.64$).

Collectively, studies of methamphetamine and cocaine withdrawal have raised additional questions about clinically relevant measures and highlighted limitations to address. Direct comparisons of measurement properties across a heterogeneous stimulant using population (cocaine, methamphetamine, and polystimulant) would improve upon previous homogenous samples. With 0.2% (595,000) of the population aged 12 or older having used methamphetamine in the past month, and 0.6% (1.5 million) using cocaine in the past month (SAMHSA, 2014), measures are needed to assess withdrawal across the spectrum of stimulant users. Data that clearly characterizes the prevalence of concomitant methamphetamine and cocaine use is sparse but there is evidence that concurrent use is problematic (e.g., Wu et al., 2009). For example, 70% of individuals dependent on methamphetamine were also dependent on other substances, including cocaine (Solomon, Halkitis, Moeller, & Pappas, 2012) and in the current study's sample, 30% met past-year DSM-IV criteria for cocaine and stimulant (methamphetamine type) dependence or abuse. Validation of an efficient and clinically relevant instrument to assess withdrawal from any stimulant, including multiple stimulants, would reduce reliance on multiple measures and help with treatment planning and monitoring response to abstinence across time.

The primary aim of this paper is to provide an initial exploratory evaluation of a modified version of the CSSA in a heterogeneous sample of stimulant users, thereby filling a gap in the literature by allowing direct comparisons of withdrawal symptoms between groups of individuals diagnosed with (1) cocaine, (2) cocaine and another stimulant (primarily methamphetamine), and (3) other stimulant use disorders. The evaluation of the CSSA, herein titled the Stimulant Selective Severity Assessment (SSSA), included an examination of reliability and construct validity indices in a residential treatment sample of recently abstinent stimulant users diagnosed with past year DSM-IV stimulant abuse or dependence.

Given several withdrawal symptoms (e.g., anhedonia, sleeping, activity level) are common to other clinical issues such as depression and suicidality, measures of these additional symptoms were examined to evaluate construct validity. The dimensionality of the scale was also explored.

2. Methods

2.1 Procedures

Baseline data from the STimulant Reduction Intervention using Dosed Exercise (STRIDE) trial were analyzed. STRIDE was a multisite randomized clinical trial conducted at nine community addiction treatment programs within the National Drug Abuse Treatment Clinical Trials Network (CTN) that evaluated the impact of an exercise intervention versus a health education intervention as augmentation treatment strategies to usual care on drug use outcomes in individuals with stimulant use disorders (Trivedi et al., 2017). Participants began residential substance use treatment at the site and were approached about the study as early as possible during their treatment stay. After providing informed consent, participants completed a screening phase to ensure safety to participate prior to randomization (see Figure 1). Eligibility criteria relevant to the current study included using stimulant(s) on at least one day in the 30 days prior to residential treatment admission, meeting DSM-IV criteria for stimulant abuse or dependence in the past 12 months, not meeting criteria for opioid dependence or psychotic disorder, and not considered a high suicide risk.

2.2 Measures

2.2.1 Stimulant withdrawal symptoms.—A modified version of the 18-item interviewer administered Cocaine Selective Severity Assessment (CSSA) (Kampman et al., 1998), which assesses physical and psychological symptoms associated with cocaine abstinence, was created. Two CSSA items assessed “cocaine” craving and craving frequency. Given their relevance to the total score (Kampman et al., 1998), two items each were added to assess “methamphetamine” and “other stimulant” craving and craving frequency. The resulting 22-item measure was titled the Stimulant Selective Severity Assessment (SSSA) and was administered at baseline (i.e., the day of randomization). Randomization occurred after completing the screening phase (typically took 5 to 8 days, mostly due to time required to have physical exam, maximal exercise test on a treadmill, and receive lab results) to evaluate eligibility. Screening phase assessments were limited to only those that directly evaluated eligibility. Each item is scored on a 0 to 7 scale. For paired items 1 (hyperphagia) and 2 (hypophagia) and paired items 11 (hyposomnia) and 12 (hypersomnia), if one item is > 0, the other must equal 0. The total score is a sum of items 1–22, with a range of 0–140. Higher scores indicate greater intensity or frequency of withdrawal symptoms (see Table 1). The CSSA has good inter-rater reliability ($r = 0.92$, $p < 0.001$) and internal consistency ($\alpha = 0.80$) based on the initial evaluation in an outpatient, primarily male sample (Kampman et al., 1998).

2.2.2 Substance abuse and dependence.—The Composite International Diagnostic Interview (CIDI) v2.1 (WHO: Composite International Diagnostic Interview, 1997), a

structured diagnostic interview administered by trained research assistants, evaluated Diagnostic and Statistical Manual-IV abuse and dependence for each substance used.

2.2.3 Substance use.—The Timeline Followback (TLFB) (Sobell & Sobell, 1996) method, a semi-structured, retrospective interview using calendar prompts, assessed frequency of drug use in the 30 days prior to treatment entry. The Addiction Severity Index-Lite (ASI) (McLellan, Luborsky, O'Brien, & Woody, 1980) evaluated years of lifetime use.

2.2.4 Stimulant craving.—The 10-item self-report Cocaine Craving Questionnaire-Brief (Sussner et al., 2006) assesses current craving. Items are rated from 0 to 6, an average total score is calculated, and higher scores indicate greater craving. “Cocaine” in each item was replaced with “cocaine, methamphetamine, or other stimulants” to create the Stimulant Craving Questionnaire-Brief (STCQ-Brief). The STCQ-Brief is an invariant tool for measuring craving in methamphetamine and cocaine users and, in the current sample, methamphetamine users scored higher than cocaine users (Northrup, Green, Walker, Greer, & Trivedi, 2015).

2.2.5 Depressive symptom severity.—The severity of depressive symptoms was assessed with the 16-item Quick Inventory of Depressive Symptomatology - Clinician-rated version (QIDS-C₁₆) (Rush et al., 2003). Items are rated from 0 to 3, and a score is calculated that ranges from 0 to 27, with higher scores indicating greater severity. The internal consistency coefficient is high (α of 0.90) (Trivedi et al., 2004) and it has good concurrent validity.

2.2.6 Suicidality and suicide propensity.—The 17-item Concise Associated Symptoms Tracking - Self-report (CAST-SR) (Trivedi, Wisniewski, Morris, Fava, Kurian, et al., 2011) assesses symptoms related to suicidal thoughts and behaviors and has good internal consistency. Items assess symptoms of irritability, anxiety, mania, insomnia, and panic. Items are rated from 0 (*strongly disagree*) to 4 (*strongly agree*). The total score ranges from 0 to 68, with higher scores indicating greater symptoms. The 14-item Concise Health Risk Tracking - Self-report (CHRT-SR) (Trivedi, Wisniewski, Morris, Fava, Gollan, et al., 2011) is designed to track symptoms related to suicidal thoughts and behaviors and has good internal consistency. Items are rated from 0 (*strongly disagree*) to 4 (*strongly agree*). A Propensity score with a range of 0–44 is derived by summing items 1–11 and higher scores indicate more symptoms.

2.2.7 Anhedonia.—The 14-item Snaith-Hamilton Pleasure Scale (SHAPS) (Snaith RP, 1995) self-report measures anhedonia. The total score ranges from 0 to 14 (2 = “normal” and 3 = “abnormal”). The SHAPS has adequate construct validity, satisfactory test-retest reliability, and high internal consistency.

2.2.8 Pain.—The 4-item self-report Pain Frequency, Intensity and Burden Scale (P-FIBS) measures the frequency, intensity, and burden of pain over the past week, and the use of medication to manage pain and has excellent reliability (α = 0.90) (de la Cruz et al., 2014). Items are rated from 0 to 8 and the total score ranges from 0 to 32, with higher scores indicating worse symptoms.

2.3 Analytical Plan

To examine the SSSA's psychometric properties by DSM-IV stimulant diagnosis, the sample was divided into groups based on meeting abuse and/or dependence criteria for (1) cocaine only, (2) both cocaine and other stimulant (per the DSM-IV nomenclature), or (3) other stimulant only. Validity of group membership was confirmed by evaluating TLFB self-reported stimulant use by group. The psychometric properties of the SSSA were evaluated for the entire sample and by diagnostic group. Internal consistency was evaluated using Cronbach's coefficient alphas and raw item-total score correlations. When overall differences were evident at $p < .05$, pairwise comparisons using the Tukey adjustment for multiple comparisons were used to evaluate group differences. Construct validity was evaluated using Pearson's correlations of the SSSA's total score with the clinical symptom measures. Exploratory factor analysis with oblique rotation was conducted. The number of factors was selected following the parallel analysis method of Glorfeld (1995) which uses factor analysis of simulated random data sets with the same number of items and observations as the real data set to generate eigenvalues which are compared to eigenvalues from a factor analysis of the real data set.

3. Results

3.1 Participants

Participants ($N = 302$) were 38.97 (10.81 *SD*) years old and had completed 12.36 (1.99 *SD*) years of education. Participants were primarily male (60%), White/Not Hispanic (45%) or Black/Not Hispanic (43%), approximately one-third (31%) were employed, and most had never been married (53%; see Table 1). In the 30 days prior to treatment entry, the majority of participants (79%) used cocaine on an average of 11.54 (8.94 *SD*) days. Approximately one third (27%) used methamphetamine on 13.85 (9.68 *SD*) days. Very few participants used amphetamines [1%; 14.50 (7.85 *SD*) days] or other stimulants (e.g., Ritalin) [2%; 13.14 (7.86 *SD*) days].

3.2 Diagnostic Groups

While the parent study's inclusion criteria allowed for meeting stimulant abuse or dependence, most participants met criteria for dependence. The sample was divided into diagnostic groups based on meeting past year DSM-IV criteria as follows: Cocaine Use Disorder ($n = 177$; 97% met criteria for cocaine abuse, 97% for cocaine dependence), Cocaine / Other Stimulant Use Disorder ($n = 92$; 100% cocaine abuse, 88% cocaine dependence, 97% stimulant abuse, 91% stimulant dependence), and Other Stimulant Use Disorder ($n = 32$; 100% stimulant abuse, 94% stimulant dependence). There were significant differences by group in past 30 days of cocaine, methamphetamine, and amphetamine use as well as years of cocaine and methamphetamine use (see Table 2). Specifically, all diagnostic groups differed in their recent cocaine use, with the most use days in the Cocaine Use Disorder group (11.69 ± 8.95 ; 46% used 10+ days in the month prior to residential treatment) and the next highest use days in the Cocaine / Other Stimulant Use Disorder group (6.88 ± 8.75 ; 32% used 10+ days). All groups differed in their methamphetamine use, with the most use in the Other Stimulant Use Disorder group (13.19 ± 10.48 ; 56% used 10+ days) and the next highest use in the Cocaine / Other Use Disorder group (7.39 ± 9.77 ; 33%

used 10+ days). These data confirm the validity of the diagnostic groups. They further indicate the typical stimulant of choice for those diagnosed with Other Stimulant Use Disorder was methamphetamine.

Participants scored low on measures of craving (STCQ-Brief), depressive symptoms (QIDS-C), suicidal thoughts (CAST-SR, CHRT-SR), anhedonia (SHAPS), and pain (P-FIBS) (see Table 2). There were few significant differences in these scores by diagnostic group. The Cocaine group scored significantly lower than the Cocaine / Other Stimulant group on the STCQ-Brief, QIDS-C, and CAST-SR. The Cocaine group also scored significantly lower than the Other Stimulant group on the QIDS-C.

3.3 SSSA Internal Consistency

At the time of SSSA administration during residential treatment, an average of 16.57 (9.22 *SD*) days had passed since the last stimulant use, with no differences by diagnostic group ($p = 0.126$). The total SSSA score and each item's mean, standard deviation, range, and item-total score correlation (r_{it}), as well as Chronbach's alpha, are shown in Table 3 for the entire sample and by each diagnostic group. The total SSSA score for the full sample was 16.46 (14.72 *SD*) and significantly differed by diagnostic group ($p < 0.0001$), such that the Cocaine group's SSSA score of 13.35 (13.44 *SD*) was significantly less than the Cocaine / Other Stimulant group's score of 21.47 (16.47 *SD*) and the Other Stimulant group's score of 20.41 (12.80 *SD*). These significant differences in the SSSA total score by diagnostic group were reflected in significant differences on 15 of the 22 items' means. In general, when item means differed, pairwise comparisons revealed the Cocaine / Other Stimulant group or the Other Stimulant group had significantly higher means. The means of the craving and craving frequency items (items 4 – 9, Table 3) were significantly different by diagnostic group. The Cocaine group scored the highest on the *cocaine craving* and *cocaine craving frequency* items. The Cocaine group scored the lowest on the four *methamphetamine* and *other amphetamine craving* and *craving frequency* items. There were no significant differences on these items between the Cocaine / Other Stimulant and the Other Stimulant groups.

Item-total score correlations (r_{it}) for the entire sample ranged from 0.10 to 0.55 and each diagnostic group had a similar r_{it} range, although some items in the Other Stimulant group were unexpectedly inversely correlated with the total SSSA score (r_{it} range = -0.09 to 0.55). Internal consistency for the full sample was good (raw $\alpha = 0.81$), with similar alphas in the Cocaine (0.81) and Cocaine / Other Stimulant (0.82) groups. However, internal consistency for the group without cocaine use (Other Stimulant group $\alpha = 0.66$) was questionable and was potentially influenced by this group's small sample size or dimensionality of the measure. Of note, increases in raw coefficient alphas from 0.66 to 0.81 to 0.82 within each group paralleled the increases in the standard deviations of the total score from 12.80 to 13.44 to 16.47.

3.4 Scale Dimensionalities

The dimensionality of the SSSA was explored. Our analyses revealed four factors (see Table 4). Factor 1 represented methamphetamine craving while factor 3 represented cocaine craving. Other stimulant craving did not clearly load on one factor and was equally

represented by factors 1 and 3 (factor loadings were 0.54 – 0.57). Factor 2 was primarily comprised of mood-related items (anxiety, energy level, tension, attention, depression, irritability). Factor 4 contained four items—bradycardia, activity level, paranoid ideation, and suicidality. Finally, the following items did not meet the standard (factor loading above 0.3) for factor assignment: hyperphagia/hypophagia, carbohydrate craving, and hypersomnia/hyposomnia item factor loadings were below 0.3; the anhedonia item factor loading was greater than 0.3 on two factors and, thus, was not assigned to a factor.

3.5 Construct Validity

Correlations of the total SSSA score with substance use and clinical characteristics, in the entire sample and by diagnostic group, are shown in Table 5. With respect to correlations with substance use characteristics, few were significant and the patterns were inconsistent. Days of methamphetamine use in the 30 days prior to treatment admission, as well as years of methamphetamine use, were positively and significantly correlated with the SSSA total score in the entire sample. Days of cocaine use prior to treatment admission and years of cocaine use were positively and significantly correlated with the SSSA total score in the Other Stimulant group. However, past 30-day cocaine use was inversely and significantly correlated with the SSSA total score in the entire sample.

With respect to clinical characteristics, the majority of the correlations with the SSSA total score were significant and in the positive direction. The SSSA total score was significantly and positively correlated with the STCQ-Brief ($r = 0.40$ to 0.47), the QIDS-C ($r = 0.55$ to 0.67), and the CAST-SR ($r = 0.41$ to 0.62) for the entire sample and each of the three diagnostic groups. The SSSA total score was significantly and positively correlated with the CHRT-SR ($r = 0.35$ to 0.64) and P-FIBS ($r = 0.17$ to 0.27) in the entire sample, the Cocaine group, and Cocaine / Other Stimulant group but was not significant in the Other Stimulant Use group. Finally, the SSSA total score was significantly and positively correlated with the SHAPS score ($r = 0.22$ to 0.44) in the Cocaine/Other Stimulant and Other Stimulant groups but was not significant in the Cocaine group or the entire sample.

4. Discussion

We modified a measure of cocaine withdrawal (Kampman et al., 1998), and named it the Stimulant Selective Severity Assessment, to determine if one measure is able to concurrently evaluate withdrawal from multiple stimulants. Indicators of internal consistency demonstrate the SSSA performs well with individuals with Cocaine Use Disorder and with individuals with Cocaine/Other Stimulant Use Disorder but were poor for the Other Stimulant diagnostic group which mainly was comprised of methamphetamine users. Correlations of the SSSA's total score with measures of stimulant use, stimulant craving, and other clinical characteristics (i.e., depressive symptoms, pain) were significant and in the moderate range. Yet, the SSSA is not redundant to those measures, as 55% to 97% of the variance in SSSA scores was unexplained by the frequency of stimulant use or the clinical characteristics evaluated. Together, these results provide support that the SSSA may be used to monitor abstinence symptoms in individuals with concurrent cocaine and other stimulant (i.e., methamphetamine) use disorder. To monitor abstinence symptoms in individuals with

cocaine use disorder as their primary problem, either the original CSSA or our SSSA may be used. The SSSA had lower reliability in methamphetamine-only users and, therefore by definition, lower average correlations among items and low variance. Thus, our results indicate the SSSA should not be used with methamphetamine-only users.

We replicated Kampman et al.'s (1998) findings in a large sample of cocaine-only users ($n = 177$) and extended the work to a large sample of concurrent users of cocaine and other stimulants ($n = 92$). Our data indicating the measure should not be used in methamphetamine-only users is inconsistent with one other previous evaluation of the ASSA measure of amphetamine withdrawal (McGregor et al., 2005), also based on Kampman et al.'s CSSA. However, McGregor and colleagues evaluated their measure in a less diverse sample (e.g., one female) and assessed people closer in time to their last use. Relatedly, it is unknown whether assessing craving overall or by drug type, as we did in the SSSA, is more important. A separate evaluation of craving with this study's sample found that participants diagnosed with methamphetamine or polystimulant use disorder tended to experience stronger craving than cocaine-only users (Northrup et al., 2015), suggesting assessing craving by drug type is important. Finally, it appears the SSSA has four factors, two of which represent craving, but we are unable to put these results in the context of the existing literature, as the dimensionality of the CSSA or other modifications of it have not been reported.

There are several limitations to our evaluation. First, this manuscript reports results from a secondary analysis of an existing dataset; the parent study was designed as an efficacy trial of an exercise intervention and was not specifically designed to evaluate the psychometric properties of the SSSA. Consequently, due to the timing of informed consent in the parent study, the most significant limitation is that data are limited to symptoms reported approximately two weeks since last stimulant use. This report should, therefore, be assessed as an evaluation of withdrawal symptoms at approximately the mid-point of cocaine abstinence (Coffey et al., 2000) and the subacute withdrawal period from methamphetamine (McGregor et al., 2005). It does not assess the "crash" or acute withdrawal symptoms from stimulants. Nevertheless, despite this limitation, the SSSA was able to reliably document withdrawal symptoms for cocaine use. Second, given this was a secondary data analysis, there may be unmeasured additional variables that could have been related to withdrawal symptoms that we were unable to account for in our analyses (e.g., we do not have data on medications participants may have taken to alleviate symptoms). Thirdly, while we recommend the SSSA should not be used with methamphetamine-only users, until additional evaluation of the measure is performed, we cannot rule out that sub-optimal performance may have been due to sample limitations, namely, the number of days since last stimulant use at assessment and the small sample size ($n = 32$). Finally, only two of the four items assessing craving and craving frequency is applicable to users of cocaine while all four items are applicable to polystimulant users. The wording of those items was important for the parent study and allowed for monitoring craving separately. Thus, SSSA total scores of cocaine-only users should not be compared to total scores of those who use cocaine and methamphetamine.

There is a need for standardized assessment of stimulant withdrawal to assist with problem identification, treatment planning (Sofuoglu, Poling, Gonzalez, Gonsai, & Kosten, 2006), and to help predict treatment outcome (Poling, Kosten, & Sofuoglu, 2007). Based on our findings, the SSSA performs well with some stimulant users. We do not recommend using the SSSA to evaluate and monitor abstinence symptoms in users of only methamphetamine. Our data suggest the SSSA may be used to monitor withdrawal symptoms in users of cocaine plus methamphetamine and that either the SSSA or CSSA may be used to evaluate withdrawal in users of cocaine-only.

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References

- Angarita G, Canavan S, Forselius E, Bessette A, Pittman B, & Morgan PT (2014). Abstinence-related changes in sleep during treatment for cocaine dependence. *Drug and Alcohol Dependence*, 134, 343–347. [PubMed: 24315572]
- Barr AM, Markou A, & Phillips AG (2002). A ‘crash’ course on psychostimulant withdrawal as a model of depression. *Trends Pharmacol Sci*, 23(10), 475–482. [PubMed: 12368072]
- Coffey SF, Dansky BS, Carrigan MH, & Brady KT (2000). Acute and protracted cocaine abstinence in an outpatient population: a prospective study of mood, sleep and withdrawal symptoms. *Drug Alcohol Depend*, 59(3), 277–286. [PubMed: 10812287]
- dela Cruz A, Bernstein I, Greer TL, Walker R, Rethorst C, Granneman BD, . . . Trivedi MH (2014). Self-rated measure of pain frequency, intensity, and burden: Psychometric properties of a new instrument for the assessment of pain. *Journal of Psychiatric Research*, 59(155–160). [PubMed: 25194231]
- Epstein DH, & Preston KL (2010). Daily life hour by hour, with and without cocaine: an ecological momentary assessment study. *Psychopharmacology (Berl)*, 211(2), 223–232. doi:10.1007/s00213-010-1884-x [PubMed: 20532873]
- Fox HC, Axelrod SR, Paliwal P, Sleeper J, & Sinha R (2007). Difficulties in emotion regulation and impulse control during cocaine abstinence. *Drug Alcohol Depend*, 89(2–3), 298–301. doi:10.1016/j.drugalcdep.2006.12.026 [PubMed: 17276626]
- Gawin F, & Kleber HD (1986). Abstinence symptomatology and psychiatric diagnosis in cocaine abusers. Clinical observations. *Archives of General Psychiatry*, 43(107), 107–113. [PubMed: 3947206]
- Glorfeld L (1995). An improvement on Horn’s parallel analysis methodology for selecting the correct number of factors to retain. *Educational and Psychological Measurement*, 55(3), 377–393.
- Kampman KM, Volpicelli JR, McGinnis DE, Alterman AI, Weinrieb RM, D’Angelo L, & Epperson LE (1998). Reliability and validity of the Cocaine Selective Severity Assessment. *Addictive Behaviors*, 23(4), 449–461. [PubMed: 9698974]
- Matuskey D, Pittman B, Forselius E, Malison RT, & Morgan PT (2011). A multistudy analysis of the effects of early cocaine abstinence on sleep. *Drug Alcohol Depend*, 115(1–2), 62–66. doi:10.1016/j.drugalcdep.2010.10.015 [PubMed: 21144676]

- McGregor C, Srisurapanont M, Jittiwutikarn J, Laobhripatr S, Wongtan T, & White JM (2005). The nature, time course and severity of methamphetamine withdrawal. *Addiction*, 100(9), 1320–1329. doi:10.1111/j.1360-0443.2005.01160.x [PubMed: 16128721]
- McLellan AT, Luborsky L, O'Brien CP, & Woody GE (1980). An improved diagnostic instrument for substance abuse patients: The Addiction Severity Index. *Journal of Nervous & Mental Diseases*, 168, 26–33.
- Northrup T, Green C, Walker R, Greer TL, & Trivedi MH (2015). On the invariance of the Stimulant Craving Questionnaire (STCQ) across cocaine and methamphetamine users. *Addictive Behaviors*, 42, 144–147. [PubMed: 25462663]
- Pace-Schott EF, Morgan PT, Malison RT, Hart CL, Edgar C, Walker M, & Stickgold R (2008). Cocaine users differ from normals on cognitive tasks which show poorer performance during drug abstinence. *Am J Drug Alcohol Abuse*, 34(1), 109–121. doi:10.1080/00952990701764821 [PubMed: 18161649]
- Pennay AE, & Lee NK (2011). Putting the call out for more research: the poor evidence base for treating methamphetamine withdrawal. *Drug Alcohol Rev*, 30(2), 216–222. doi:10.1111/j.1465-3362.2010.00240.x [PubMed: 21355922]
- Poling J, Kosten TR, & Sofuoglu M (2007). Treatment Outcome Predictors for Cocaine Dependence. *American Journal of Drug & Alcohol Abuse*, 33(2), 191–206. doi:10.1080/00952990701199416 [PubMed: 17497542]
- Rush A, Trivedi M, Ibrahim H, Carmody T, Arnow B, Klein D, . . . Keller M (2003). The 16-Item Quick Inventory of Depressive Symptomatology (QIDS), clinician rating (QIDS-C), and self-report (QIDS-SR): A psychometric evaluation in patients with chronic major depression. *Biological Psychiatry*, 54(5), 573–583. [PubMed: 12946886]
- SAMHSA. (2014). Results from the 2013 national survey on drug use and health: Summary of national findings. (NSDUH Series H-48, HHS Publication No. (SMA) 14–4863). Rockville, MD: Substance Abuse and Mental Health Services Administration Retrieved from <http://www.samhsa.gov/data/sites/default/files/NSDUHresultsPDFWHTML2013/Web/NSDUHresults2013.pdf>.
- Snaith RP, HM, Humayan A, Hargreaves D, Trigwell P (1995). A scale for the assessment of hedonic tone: The Snaith-Hamilton Pleasure Scale. *British Journal of Psychiatry*, 167, 99–103. [PubMed: 7551619]
- Sobell LC, & Sobell MB (1996). Timeline Followback user's guide: A calendar method for assessing alcohol and drug use. Retrieved from Toronto:
- Sofuoglu M, Poling J, Gonzalez G, Gonsai K, & Kosten T (2006). Cocaine Withdrawal Symptoms Predict Medication Response in Cocaine Users. *The American Journal of Drug and Alcohol Abuse*, 32(4), 617–627. doi:10.1080/00952990600920680 [PubMed: 17127550]
- Solomon TM, Halkitis PN, Moeller RW, & Pappas MK (2012). Levels of methamphetamine use and addiction among gay, bisexual, and other men who have sex with men. *Addiction Research & Theory*, 20(1), 21–29. doi:doi:10.3109/16066359.2011.552816
- Srisurapanont M, Jarusuraisin N, & Jittiwutikan J (1999). Amphetamine withdrawal: I. Reliability, validity and factor structure of a measure. *Aust N Z J Psychiatry*, 33(1), 89–93. [PubMed: 10197890]
- Sussner B, Smelson D, Rodrigues S, Kline A, Losonczy M, & Ziedonis D (2006). The validity and reliability of a brief measure of cocaine craving. *Drug and Alcohol Dependence*, 83, 233–237. [PubMed: 16384655]
- Trivedi MH, Greer TL, Rethorst CD, Carmody TJ, Granneman BD, Walker R, . . . Nunes EV (2017). Randomized trial comparing exercise to health education for stimulant use disorder: Results from STimulant Reduction Intervention using Dosed Exercise (CTN-0037; STRIDE). *Journal of Clinical Psychiatry*. doi:doi: 10.4088/JCP.15m10591
- Trivedi MH, Rush AJ, Ibrahim HM, Carmody TJ, Biggs MM, Suppes T, . . . Kashner TM (2004). The Inventory of Depressive Symptomatology, Clinician Rating (IDS-C) and Self-Report (IDS-SR), and the Quick Inventory of Depressive Symptomatology, Clinician Rating (QIDS-C) and Self-Report (QIDS-SR) in public sector patients with mood disorders: a psychometric evaluation. *Psychological Medicine*, 34(1), 73–82. [PubMed: 14971628]

- Trivedi MH, Wisniewski SR, Morris DW, Fava M, Gollan JK, Warden D, . . . Rush AJ (2011). Concise Health Risk Tracking scale: A brief self-report and clinician rating of suicidal risk. *Journal of Clinical Psychiatry*, 72(6), 757–764. [PubMed: 21733476]
- Trivedi MH, Wisniewski SR, Morris DW, Fava M, Kurian BT, Gollan JK, . . . Rush AJ (2011). Concise Associated Symptoms Tracking scale: A brief self-report and clinician rating of symptoms associated with suicidality. *Journal of Clinical Psychiatry*, 72(6), 765–774. [PubMed: 21733477]
- Walsh SL, Stoops WW, Moody DE, Lin SN, & Bigelow GE (2009). Repeated dosing with oral cocaine in humans: assessment of direct effects, withdrawal, and pharmacokinetics. *Exp Clin Psychopharmacol*, 17(4), 205–216. doi:10.1037/a0016469 [PubMed: 19653786]
- WHO: Composite International Diagnostic Interview, v. (1997). Geneva: World Health Organization.
- Wu LT, Blazer DG, Patkar AA, Stitzer ML, Wakim PG, & Brooner RK (2009). Heterogeneity of stimulant dependence: a national drug abuse treatment clinical trials network study. *Am J Addict*, 18(3), 206–218. doi:10.1080/10550490902787031 [PubMed: 19340639]

TAU = Treatment as Usual

Figure 1.
STRIDE design schematic.

Table 1.
Demographic characteristics of the entire sample and by DSM-IV stimulant diagnosis group

Demographics	Entire Sample <i>N</i> = 302	Stimulant Diagnostic Group			<i>P</i> -value
		Group 1: Cocaine Use Disorder <i>n</i> = 177	Group 2: Cocaine & Other Stimulant Use Disorder <i>n</i> = 92	Group 3: Other Stimulant Use Disorder <i>n</i> = 32	
Age, mean (SD)	38.97 (10.81)	41.58 (10.68)	36.79 (9.95)	31.34 (8.48)	<.0001 ^{1,2,3}
Education, mean (SD)	12.36 (1.99)	12.22 (1.99)	12.55 (1.79)	12.52 (2.49)	0.385
Female, <i>n</i> (%)	121 (40)	58 (33)	41 (45)	21 (66)	0.0012
Race/Ethnicity					
White/Not Hispanic, <i>n</i> (%)	136 (45)	40 (23)	71 (77)	25 (78)	<.0001
Black/Not Hispanic, <i>n</i> (%)	131 (43)	118 (67)	8 (9)	4 (13)	<.0001
Other/Not Hispanic, <i>n</i> (%)	4 (1)	7 (4)	4 (4)	1 (3)	0.954
Hispanic/Latino, <i>n</i> (%)	31 (10)	16 (9)	12 (13)	3 (9)	0.582
Currently Employed, <i>n</i> (%)	95 (31)	53 (30)	27 (29)	14 (44)	0.269
Marital Status					
Married, <i>n</i> (%)	40 (13)	22 (12)	13 (14)	5 (16)	0.852
Widowed, <i>n</i> (%)	10 (3)	4 (2)	5 (5)	1 (3)	0.386
Divorced/Separated, <i>n</i> (%)	91 (30)	60 (34)	24 (26)	7 (22)	0.230
Never married, <i>n</i> (%)	161 (53)	91 (51)	50 (54)	19 (59)	0.682

Note. Diagnostic groups total *n* = 301 because one person could not be diagnosed due to missing data. Data rows in the Entire Sample column is for *n* = 300 to 302 due to missing values. Age and education means were compared with an ANOVA (followed by pairwise *t*-tests) and female, race/ethnicity, currently employed, and marital status variables' response frequencies were compared with chi-square tests.

¹ Groups 1 and 2 significantly differed (*p* < .05)

² Groups 1 and 3 significantly differed (*p* < .05)

³ Groups 2 and 3 significantly differed (*p* < .05)

Table 2. Substance use and clinical characteristics of the entire sample and by DSM-IV stimulant diagnosis group

	Entire Sample <i>N</i> = 302	Stimulant Diagnostic Group			<i>P</i> -value
		Group 1: Cocaine Use Disorder <i>n</i> = 177	Group 2: Cocaine & Other Stimulant Use Disorder <i>n</i> = 92	Group 3: Other Stimulant Use Disorder <i>n</i> = 32	
Substance Use Characteristics, mean (SD)					
TLFB					
Days of Cocaine Use	9.12 (9.22)	11.69 (8.95)	6.88 (8.75)	1.38 (5.55)	0.000 ^{1,2,3}
Days of Methamphetamine Use	3.72 (7.92)	0.11 (1.43)	7.39 (9.77)	13.19 (10.48)	0.000 ^{1,2,3}
Days of Amphetamine Use	0.19 (1.84)	0.00 (0.00)	0.27 (2.61)	1.03 (3.44)	0.012 ²
Days of Other Stimulant Use	0.30 (2.27)	0.11 (1.50)	0.39 (2.84)	1.13 (3.56)	0.062
Addiction Severity Index-Lite (ASL-LITE)					
Years of Cocaine Use	10.34 (9.88)	13.58 (10.06)	7.09 (7.88)	1.81 (4.72)	<.0001 ^{1,2,3}
Years of Methamphetamine Use	2.36 (4.50)	0.10 (0.63)	5.59 (5.71)	5.47 (5.26)	<.0001 ^{1,2}
Years of Amphetamine Use	0.70 (3.72)	0.32 (3.62)	1.24 (4.20)	1.28 (2.47)	0.103
Stimulant Craving Questionnaire-Brief (STCQ-Brief)	0.79 (0.94)	0.66 (0.85)	0.97 (0.91)	0.99 (1.31)	0.018 ¹
Clinical Characteristics, mean (SD)					
Quick Inventory of Depressive Symptomatology (QIDS-C) Total Score	5.35 (3.08)	4.57 (2.48)	6.42 (3.62)	6.53 (3.21)	<.0001 ^{1,2}
Concise Associated Symptoms Tracking (CAST-SR) Total Score	21.35 (11.21)	19.58 (10.60)	24.21 (12.11)	22.94 (10.19)	0.004 ¹
Concise Health Risk Tracking - Self-report (CHRT-SR) Propensity Score	8.56 (6.90)	8.01 (6.41)	9.66 (7.87)	8.44 (6.37)	0.176
Snaith-Hamilton Pleasure Scale (SHAPS) Total Score	1.70 (2.14)	1.83 (2.23)	1.63 (2.11)	1.22 (1.68)	0.294
Pain Frequency, Intensity and Burden Scale (P-FIBS) Total Score	4.99 (6.87)	5.20 (7.35)	4.78 (6.03)	4.44 (6.51)	0.795

Note. Data in the Entire Sample column is based on *n* = 300 to 302 due to missing values. Diagnostic groups total *n* = 301 because one person could not be diagnosed due to missing data.

¹ Groups 1 and 2 significantly differed (*p* < .05)

² Groups 1 and 3 significantly differed (*p* < .05)

³ Groups 2 and 3 significantly differed (*p* < .05)

Table 3.

Stimulant Selective Severity Assessment (SSSA) item means and standard deviations, ranges, inter-item correlations, scale total, and Cronbach's alpha for the entire sample and by DSM-IV stimulant diagnosis group

SSSA Items	Stimulant Diagnostic Group									
	Entire Sample			Group 1: Cocaine Use Disorder			Group 2: Cocaine & Other Stimulant Use Disorder			P-value
	M (SD)	r _{it}	M (SD)	M (SD)	r _{it}	M (SD)	M (SD)	r _{it}	M (SD)	
	N = 302 ^a			n = 177			n = 92			n = 32
1. hyperphagia	1.07 (2.06)	0.10	0.87 (1.79)	0.12	1.10 (2.17)	0.06	2.09 (2.76)	-0.01	0.008 ^{2,3}	
2. hypophagia	0.19 (0.89)	0.26	0.16 (0.83) ^c	0.12	0.30 (1.12)	0.46	0.00 (0.00)	--	0.208	
3. carbohydrate craving	1.91 (2.39)	0.33	1.64 (2.26)	0.28	2.14 (2.49)	0.35	2.66 (2.65)	0.33	0.046	
4. cocaine craving	0.87 (1.42)	0.39	1.10 (1.58)	0.58	0.65 (1.06) ^e	0.35	0.28 (1.11) ^d	0.38	0.002 ^{1,2}	
5. cocaine craving frequency	0.84 (1.36)	0.42	1.03 (1.45)	0.62	0.69 (1.19) ^d	0.31	0.28 (1.11) ^d	0.38	0.006 ²	
6. methamphetamine craving ^b	0.62 (1.28) ^c	0.38	0.16 (0.52) ^e	0.30	1.25 (1.58) ^d	0.44	1.38 (1.98) ^c	0.24	<0.0001 ^{1,2}	
7. methamphetamine craving frequency ^b	0.59 (1.26)	0.37	0.15 (0.48) ^e	0.31	1.20 (1.59) ^c	0.40	1.25 (2.03)	0.29	<0.0001 ^{1,2}	
8. other stimulant craving ^b	0.94 (1.53)	0.52	0.69 (1.41)	0.58	1.28 (1.51) ^d	0.41	1.34 (1.95)	0.50	0.003 ¹	
9. other stimulant craving frequency ^b	0.92 (1.57)	0.55	0.67 (1.45)	0.62	1.32 (1.61)	0.41	1.22 (1.86)	0.53	0.003 ¹	
10. bradycardia	0.48 (1.34)	0.10	0.42 (1.28)	0.13	0.67 (1.56)	0.06	0.31 (0.90) ^f	0.02	0.246	
11. hyposomnia	0.82 (1.56) ^c	0.24	0.83 (1.54) ^c	0.62	0.71 (1.53) ^c	0.33	1.06 (1.78) ^c	0.01	0.533	
12. hypersomnia	0.39 (1.08)	0.17	0.36 (0.97) ^d	0.23	0.45 (1.18)	0.18	0.44 (1.41)	-0.09	0.789	
13. anxiety	1.31 (1.92)	0.53	0.98 (1.74)	0.52	1.90 (2.16)	0.52	1.50 (1.83)	0.30	0.001 ¹	
14. energy level	0.87 (1.71)	0.40	0.70 (1.60)	0.54	1.25 (1.97)	0.28	0.69 (1.36) ^d	-0.04	0.036 ¹	
15. activity level	0.30 (1.02)	0.39	0.23 (0.88) ^c	0.43	0.46 (1.30)	0.42	0.25 (0.80) ^e	-0.06	0.223	
16. tension	0.87 (1.60)	0.46	0.67 (1.46)	0.40	1.19 (1.83)	0.56	1.06 (1.48) ^d	0.22	0.034 ¹	
17. attention	0.82 (1.64)	0.52	0.57 (1.32)	0.56	1.12 (1.93)	0.44	1.31 (2.09)	0.55	0.006 ^{1,2}	
18. paranoid ideation	0.22 (0.87)	0.24	0.20 (0.75) ^e	0.07	0.22 (0.99)	0.40	0.31 (1.5) ^c	0.44	0.811	

SSSA Items	Stimulant Diagnostic Group							
	Entire Sample		Group 1: Cocaine Use Disorder		Group 2: Cocaine & Other Stimulant Use Disorder		Group 3: Other Stimulant Use Disorder	
	M (SD)	r _{it}	M (SD)	r _{it}	M (SD)	r _{it}	M (SD)	r _{it}
	<i>N</i> = 302 ^a		<i>n</i> = 177		<i>n</i> = 92		<i>n</i> = 32	
19. anhedonia	0.51 (1.50)	0.52	0.33 (1.11)	0.40	0.90 (2.10)	0.66	0.34 (1.13)	0.36
20. depression	0.91 (1.70)	0.52	0.71 (1.52)	0.50	1.16 (1.84)	0.62	1.28 (2.11)	0.24
21. suicidality	0.02 (0.17) ^g	0.15	0.02 (0.17) ^g	0.11	0.02 (0.21) ^g	0.24	0.00 (0.00)	--
22. irritability	1.10 (1.75)	0.47	0.84 (1.65)	0.48	1.50 (1.81)	0.45	1.34 (1.91) ^c	0.31
Scale Total	16.46 (14.72)		13.35 (13.44)		21.47 (16.47)		20.41 (12.80)	
Cronbach's Alpha (raw)	0.81		0.81		0.82		0.66	

Note. All items are scored on a 0 – 7 scale, with 7 representing greater intensity or frequency of the domain. For items 1 & 2 and 11 & 12, if one item in the pair is > 0, the other item must = 0. Items were endorsed across the full 0 – 7 range unless noted. Total SSSA score range is 0 – 140. Bolded p-values indicate the overall test for a difference among groups' means is significant at $p < .05$.

^aDiagnostic groups total $n = 301$ because one person could not be diagnosed due to missing data.

^bItems added to the Cocaine Selective Severity Assessment to create the Stimulant Selective Severity Assessment.

^cScores ranged from 0 – 6.

^dScores ranged from 0 – 5.

^eScores ranged from 0 – 4.

^fScores ranged from 0 – 3.

^gScores ranged from 0 – 2.

^hGroups 1 and 2 significantly differed ($p < .05$)

ⁱGroups 1 and 3 significantly differed ($p < .05$)

^jGroups 2 and 3 significantly differed ($p < .05$)

Table 4.

Stimulant Selective Severity Assessment (SSSA) factor loadings for the entire sample

Items	Factor 1	Factor 2	Factor 3	Factor 4
1 & 2. Hyperphagia & hypophagia ^a	0.090	0.068	0.056	0.171
3. carbohydrate craving	0.139	0.199	0.198	−0.055
4. cocaine craving	−0.061	−0.033	0.878	0.089
5. cocaine craving frequency	−0.026	0.015	0.875	0.018
6. methamphetamine craving ^b	0.912	−0.013	−0.052	0.044
7. methamphetamine craving frequency ^b	0.922	−0.035	−0.046	0.032
8. other stimulant craving ^b	0.579	0.046	0.552	−0.064
9. other stimulant craving frequency ^b	0.543	0.077	0.553	−0.050
10. bradycardia	−1.041	−0.046	−0.016	0.412
11 & 12. Hyposomnia & hypersomnia ^a	−0.025	0.241	0.073	0.165
13. anxiety	0.036	0.591	0.081	−0.006
14. energy level	0.059	0.346	0.074	0.172
15. activity level	−0.044	0.026	0.017	0.439
16. tension	−0.044	0.717	−0.025	−0.092
17. attention	0.080	0.528	0.066	0.089
18. paranoid ideation	−0.010	0.127	−0.035	0.410
19. anhedonia	0.104	0.335	0.009	0.499
20. depression	0.048	0.453	0.044	0.292
21. suicidality	0.052	−0.102	0.069	0.359
22. irritability	0.015	0.650	−0.001	−0.031
Variance Explained (eliminating other factors)	2.377	2.213	2.226	1.117

Note. Factor loadings of 0.03 or greater are bolded to indicate the best factor to which the item belongs. Items with factor loadings of 0.3 or greater on more than one factor, and items with no factor loadings 0.03 or greater, were not assigned to a factor.

^aFor items 1 & 2 and 11 & 12, if one item in the pair is > 0, the other item must = 0. Therefore, for the factor analysis each item pair was used in the analysis.

Table 5.

Correlations among the total baseline Stimulant Selective Severity Assessment score and substance use and clinical characteristics in the entire sample and by stimulant diagnosis

Substance Use Characteristics	Entire Sample N = 301	Stimulant Diagnostic Group		
		Cocaine Use Disorder n = 177	Cocaine & Other Stimulant Use Disorder n = 92	Other Stimulant Use Disorder n = 32
Timeline Followback (TLFB) ^a				
Days of Cocaine Use	-0.15*	0.01	-0.06	0.51***
Days of Methamphetamine Use	0.26***	0.14	0.11	-0.34
Days of Amphetamine Use	0.05	NA	-0.14	0.20
Days of Other Stimulant Use	0.06	0.12	-0.01	-0.16
Addiction Severity Index-Lite (ASI-LITE)				
Years of Cocaine Use	-0.11	-0.10	0.07	0.63***
Years of Methamphetamine Use	0.15**	0.13	0.02	-0.22
Years of Amphetamine Use	0.04	0.02	-0.03	0.19
Stimulant Craving Questionnaire-Brief (STCQ-Brief)	0.45***	0.47***	0.40***	0.44*
Clinical Characteristics				
Quick Inventory of Depressive Symptomatology (QIDS-C) Total Score	0.66***	0.62***	0.67***	0.55***
Concise Associated Symptoms Tracking (CAST-SR) Total Score	0.56***	0.49***	0.62***	0.41*
Concise Health Risk Tracking - Self-report (CHRT-SR) Propensity Score	0.47***	0.35***	0.64***	0.31
Snaith-Hamilton Pleasure Scale (SHAPS) Total Score	0.11	0.05	0.22*	0.44*
Pain Frequency, Intensity and Burden Scale (P-FIBS) Total Score	0.17**	0.18*	0.27*	-0.10

Note. Diagnostic groups total $n = 301$ because one person could not be diagnosed due to missing data. Data in the Entire Sample column is based on $n = 300$ to 301 due to missing values.

^a Spearman's correlation was calculated because the assumption of a normal distribution was violated due to including non-users' zero days of use. Pearson correlation was calculated for the remaining variables.

* $p < .05$

** $p < .01$

*** $p < .001$.