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ORIGINAL ARTICLE

The relationship between nicotine dependence and addiction severity amongst cocaine abusers

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Abstract
The Addiction Severity Index (ASI) and the Fagerström Test of Nicotine Dependence (FTND) are two widely used instruments in their respective domains, but have rarely been used simultaneously with a substance abuse population. It is argued that the complex link between nicotine and substance dependence continues not to be well understood, partially because the measures of smoking in published research with addiction treatment populations have not been standardized. We studied ASI and FTND responses of 102 crack-cocaine patients in order to examine the potential utility of using both instruments to enhance our understanding of these addictions and their relationship to each other. Total FTND scores were significantly related to ASI drug severity, psychiatric severity and psychiatric composite scores. Controlling for gender variance yielded similar results. We conclude that using the FTND does prove to be more sensitive than a less objective measure of smoking, but the ASI and FTND appear to be psychometrically distinct, making conjoint use for research limited with some clinical applicability.

Keywords: *Smoking, Fagerström, nicotine dependence, ASI, addiction severity, addiction.*

Cigarette-smoking rates continue to be exceedingly high among adult substance abusers despite the legal, social and scientific campaign to decrease smoking in the USA. Whereas about 26% of men and 21.0% of women in the USA are cigarette smokers (Center for Disease Control and Prevention, 2002), 65% to more than 95% of adults entering treatment for substance abuse identify themselves as regular consumers of cigarettes (Kalman, 1998; Karan, 1993; Patkar, Sterling, et al., 2002; Sterling, Gottheil, Weinstein, Kurtz, & Menduke, 1994). The probability is much greater that substance abuse patients will die from smoking-related illnesses than directly from their addiction to mood-altering chemicals (Rustin, 1998). The health consequences of smoking are well known and well documented (Center for Disease Control and Prevention, 2001; Thun, Day-Lally, Calle, Flanders, & Heath, 1995) and include decreased pulmonary function, impairment of the circulatory system's ability to transport oxygen, heart disease, and cancers of the lung,

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mouth, larynx, oesophagus, bladder and pancreas. Similarly, smoking substance abusers report significantly more medical symptoms than non-smokers, including respiratory, cardiovascular, gastrointestinal and nose/throat complaints, with frequency of problems being less for cocaine abusers than for opiate and alcohol abusers (Patkar, Lundy, et al., 2002; Patkar, Sterling, et al., 2002).

Despite these grim realities, the relationship between smoking and illicit substance abuse has only become an area of interest in recent years, sometimes as the result of ''forced'' comprehensive changes in institutional policies to be ''smoke free'' (e.g. Kotz, 1993) or the acknowledgement of the inherent contradiction of actively combating a drug/alcohol addiction while turning a ''blind eye'' to smoking (e.g. Rustin, 1998). Much of the research is anecdotal or leads to general conclusions that smoking and substance abuse are intertwined. For example, Lai, Lai, Page, and McCoy (2000) found that individuals who smoked cigarettes were much more likely to use cocaine, crack, heroin and marijuana. Alcohol, pentobarbital, amphetamine, methadone and heroin have been associated with cigarette smoking as well (Henningfield, Clayton, & Pollin, 1990).

The majority of the literature addressing the relationship between smoking and drug abuse involves cocaine addiction. Budney, Higgins, Hughes, and Bickel (1993), among the first to examine this issue, suggest that amongst a population of cocaine-dependent individuals, smokers use more cocaine than non-smokers and that tobacco use is at its highest when under the influence of cocaine and/or alcohol, triple the amount compared with days when cocaine is not used. Patkar, Vergare, Thornton, Weinstein, and Leone (2003) found that the severity of tobacco addiction was a predictor of poor outcome for cocaine-dependent African-American patients who tested cocaine-free at the time of their admission into outpatient treatment. Using 10 ''healthy volunteers'', Roll, Higgins, Stephen, and Tidey (1997) conducted a double-blind laboratory study providing intranasal cocaine or a placebo and found that the mean interval between cigarettes was significantly shorter and the total number of cigarettes smoked was greater following cocaine administration. Lundy, Paktar, and Weinstein (1998) and Lundy et al. (n.d.) corroborated these patterns through treatment follow-up data with cocaine-dependent, predominantly African-American, patients where smoking was positively related to current cocaine use and inversely related to duration of abstinence. Roll, Higgins, Budney, Bickel, and Badger (1996, p. 195) cited several studies that ''experimentally demonstrated that cocaine use can increase the rate of cigarette smoking''. Similarly, ''primarily heavy'' cigarette smokers reported significant reductions of cigarette consumption after cessation of cocaine use, but this trend was less consistent as treatment duration increased (Wiseman & McMillan, 1998a).

Thus, there is abundant evidence that smoking and cocaine use are linked; but the relationship between the two is not well understood. Many hypotheses linking smoking and substance abuse have been suggested. For example, Kalman (1998) proposed that cigarette smoking can prime the addict to use his/her drug of choice. Cigarette smoking has also been identified as a ''hold out or maintenance drug during sobriety'' and ''a conditioned stimulus for cocaine use'' (Wiseman & McMillan, 1996, pp. 581, 583). Sees and Clark (1993) speculated that similarities in using crack cocaine and cigarettes could trigger a relapse as they both require lighting and a hand-to-mouth action as well as inhaling and exhaling. Forty-three nicotine-dependent cocaine abusers themselves reported in semi-structured interviews that the sedating, stimulating and addictive effects of nicotine often led to the combined use of nicotine and cocaine (Wiseman & McMillan, 1998b). In addition, the ''addictive personality'' was widely accepted in cultural nomenclature for

many years (e.g. Van Kaam, 1968; Ulman & Paul, 1990), providing a generalized explanation for why substance abusers smoke, only to be challenged by many (e.g. Kerr, 1996; Rozin & Stoess, 1993), and eventually replaced with comprehensive theories that consider the transactional relationship between personality and biological factors (e.g. Eysenck, 1997).

We believe that the ability to draw definitive conclusions about smoking and substance abuse has been hindered by the less than systematic way studies have categorized smokers. Cigarette smoking has been inconsistently assessed using imprecise measures and anecdotal information. For example, ''smoker'' vs. ''non-smoker'', ''light'' vs. ''heavy smoker'' or ''number of cigarettes smoked'' are arbitrary categorizations that do not account for individual differences in smoking behaviours such as how many puffs are taken per cigarette, how deeply one inhales, the pattern of smoking throughout the day (e.g. hourly or in the evening only), the nicotine content of cigarettes smoked, etc.

The Fagerström Tolerance Questionnaire (Fagerström, 1978) and its modification, the Fagerström Test for Nicotine Dependence (FTND; Heatherton, Koslowski, & Frecker, 1991) were designed to provide an individualized assessment of nicotine-dependence severity, but have rarely been used in treatment or research settings involving substance abusers. The FTND has been demonstrated to predict the self-administration of nicotine and the inability to stop smoking (Piasecki & Newhouse, 2000). It has also been associated with tobacco liking and physical dependence (Moolchan et al., 2002). It is a simple six-item questionnaire. Each question is given a score based on the response of the smoker. The sum of all responses provides a nicotine-dependence score that can then be used to assess and compare systematically the degree of smoking dependence across individuals or groups. The highest score obtainable is 10, the lowest zero.

Great strides in the study of psychoactive substance abuse and addiction have been made in the past two decades, to a great extent, because of the ever-widening use of the Addiction Severity Index (ASI; McLellan et al., 1985). The ASI is the current ''gold standard'' in providing a statistically reliable assessment of chemical dependency, allowing for a systematic comparison across treatment milieus and geographic regions. The ASI assesses seven life domains leading to a severity score (assigned by a trained interviewer) and a composite score (mathematically derived from predetermined weighted scores for responses to questions for the computerized administration only). The ASI does not include questions about tobacco use.

Interestingly, with the widely accepted use of the ASI and FTND in their respective fields, along with patient smoking rates at least three times the national average in addiction treatment settings (Kalman, 1998; Karan, 1993; Patkar, Sterling, et al., 2002; Sterling et al., 1994), they have rarely been used simultaneously for diagnostic purposes or for research. We were able to locate only one article published between 1985 and 2003 (November, week 2) when combining the keywords Fagerström and Addiction Severity Index (and their derivatives). In this one article, McCarthy, Zhou, and Hser (2001) explored using the ASI to predict future smoking status of poly-substance abusers at three points in time. They initially reduced the ASI scale to one factor using principal-components analysis and found that the ASI dimensions with the highest loadings were Alcohol, Drug and Legal. When assessing the relationship between the changes in the ASI dimensions and smoking status (i.e. Fagerström score), only the Legal ASI dimension at time 2 revealed a significant, albeit modest, relationship when initial smoking status was used as a covariate. The authors also used multiple regression and found that the Alcohol and Legal dimensions of the ASI accounted for a unique, albeit modest 5%, share of

statistically significant variance in smoking status from time 1 to time 3. The nicotine addiction score was found to share a robust 38% of the variance in time 2 smoking status, but less than 1% of the variance when time 1 smoking was included as a covariate, while the Legal ASI dimension continued to explain a statistically significant, but very modest 1% of the variance over the same period.

Our research goal was to determine whether use of two widely accepted standardized instruments in the fields of smoking (i.e. a Fagerström scale) and substance abuse (i.e. ASI), used in conjunction with each other, could establish a framework for answering the many questions that exist about the relationship between cocaine and nicotine addiction. McCarthy et al. (2001) concluded that one's legal status and alcohol-use patterns could be useful to predict future smoking amongst substance abusers beyond nicotine dependence, but what they found to be statistically significant would appear to have limited clinical significance.

We anticipated that additional insights could be gained by systematically examining this relationship using a Fagerström scale (FTND) that was not statistically modified and the ASI. With a population of adult crack-cocaine addicts receiving substance abuse services in an intensive outpatient treatment facility, we expected a modest positive linear relationship between ASI composite and severity drug scores with FTND. We also anticipated that correlations with ASI results would be more robust using total FTND scores to measure nicotine dependence, rather than just counting the number of cigarettes smoked, a generic measure that can be variable. In addition, it is well known that individuals with psychiatric and alcohol abuse problems smoke at rates three times the national average (e.g. Leonard et al., 2001; Patkar, Lundy, et al., 2002). Therefore, we anticipated that the ASI psychiatric and alcohol-use dimensions would reveal significant correlations with nicotine dependence. The ASI also assesses the severity of an individual's substance abuse problem by taking into account other life circumstances that often are damaged due to the cycle of an addiction. We expected a mild linear relationship between nicotine dependence (FTND) and the ASI dimensions of employment, family and legal problems, indicative of the link between smoking and substance abuse—somewhat consistent with McCarthy et al. (2001).

Method

Setting and subjects

The data were gathered at a single substance abuse clinic that serves primarily inner-city residents living nearby. The standard treatment at the clinic is intensive outpatient group therapy 3 days per week, although many patients are seen in once-weekly individual sessions as well. Subjects were 102 crack-cocaine patients assessed at admission. The mean age of these patients was 37 years (SD=8). They were predominately African American (81%) or white (15%) with good gender balance (56% male). The average number of treatment experiences for this subject pool was 3.18 (SD=3.11). All patients entered treatment voluntarily with the exception of a few who experienced some degree of pressure from shelters, family members, probation officers or Family Services to receive treatment.

Procedure

As part of our standard intake, prospective patients were interviewed by a trained ASI interviewer, which typically took 20–40 min. In addition, they completed a questionnaire

about (tobacco) smoking, which consists of the FTND plus a few other questions about their smoking history. This questionnaire was introduced to the intake procedure in the programme of focus in 1998. At that time, it was already being used in programmes unrelated to this project. As a result, the FTND was used for continuity, despite the early favourable psychometric properties of the Revised Tolerance Questionnaire (Tate & Schmitz, 1993).

The University's Institutional Review Board approved the use of these data for this purpose.

Summary of analyses

The initial analysis looked for statistical significance amongst independent correlations between both measures of smoking (FTND and self-reports of the number of cigarettes smoked) and each dimension of the ASI. Next, a two-tailed *t* test was performed to assess the differential strength of each correlation, comparing both measures of smoking with each severity and composite score obtained with each ASI dimension.

In an unpublished analysis (Lundy et al., n.d.), relationships between ASI scores and smoking (not measured by the FTND) differed substantially when gender was taken into account. Therefore, we felt it necessary to understand the extent to which gender was a factor in this analysis. Accordingly, we repeated the initial analysis described above using gender as a covariate in an analysis of covariance (ANCOVA).

In order to highlight the differential relationship between the two measures of nicotine dependence (i.e. FTND and number of cigarettes smoked) with the severity and composite ASI dimensions, above and beyond gender differences, a stepwise multiple regression analysis was also performed. In this effort to account for the impact of gender, ASI dimensions were the dependent variables and gender was an independent variable entered at the first step, with either the FTND or number of cigarettes smoked entered at the second step.

Table I. Addiction Severity Index (ASI) scores correlated with total Fagerström Test of Nicotine Dependence (FTND) and number of cigarettes smoked per day.

ASI dimensions	Total FTND (n=102)	No. cigarettes smoked daily (n=102)
Drug severity	0.22*	0.19
Drug composite	0.02	0.10
Alcohol severity	0.06	0.00
Alcohol composite	0.03	0.07
Psychiatric severity	0.24**	0.07
Psychiatric composite	0.27**	0.11
Medical severity	0.08	0.03
Medical composite	−0.02	−0.03
Employment severity	0.09	0.16
Employment composite	−0.10	−0.09
Legal severity	0.01	0.10
Legal composite	0.11	0.03
Family/social severity	0.18	0.17
Family/social composite	0.02	0.03

*Correlation is significant at the 0.05 level; **correlation is significant at the 0.01 level.

Results

Correlations between ASI severity and composite scores with total FTND are shown in Table I. When examining severity scores, only drug severity ($r=0.22$, $p<0.05$) and psychiatric severity ($r=0.24$, $p<0.01$) were found to be significantly correlated with total FTND. The same correlations, using number of cigarettes smoked as the sole measure of smoking, were smaller and not statistically significant. Correlations between severity scores for the remaining dimensions and the two measures of smoking were not significant.

When ASI composite scores were examined, the psychiatric dimension correlated with the total FTND nicotine-dependence score at a statistically significant level ($r=0.27$, $p<0.01$). This differed considerably from the non-significant ($r=0.11$) correlation found when daily cigarette use was the correlate. Correlations with drug composite scores were small and non-significant whether FTND or number of cigarettes smoked was used. The remaining correlations with other ASI dimensions were comparable to the small and statistically insignificant correlations with the severity scores, regardless of how nicotine addiction was measured. Notably, the ASI dimension of alcohol was found to have little association with either measure of smoking dependence, whether severity or composite scores were examined.

An analysis comparing correlations of FTND with the number of cigarettes smoked across all ASI severity and composite scores revealed a statistically significant difference for both the psychiatric composite ($t=2.03$, $p<0.05$) and severity ($t=2.24$, $p<0.05$) scores. The differences between the two measures of smoking dependence were not significant for any of the other ASI dimensions.

In the ANCOVA, women had more severe problems in three areas. In the family/social area, women were higher in both composite (0.17 vs. 0.09, $p<0.05$) and severity (3.6 vs. 2.4, $p<0.05$) scores than men. They also had more psychiatric problems (composite: 0.33 vs. 0.21, $p<0.05$; severity: 4.6 vs. 3.2, $p<0.01$) and employment problems (severity: 3.0 vs. 1.7, $p<.001$). Upon initial examination, ASI drug severity scores were significantly correlated with total FTND ($r=0.34$, $p=0.01$) for men, but not women ($r=0.08$, $p=0.62$). Drug composite scores were not influenced by gender.

The stepwise regression, summarized in Table 2, revealed that both psychiatric composite ($R^2=0.111$, $p<0.01$) and severity ($R^2=0.116$, $p<0.01$) scores were more strongly associated with FTND total than when the more general number of cigarettes smoked was used to gauge nicotine addiction (composite: $R^2=0.062$, $p<.05$; severity: $R^2=0.071$, $p<0.05$). A similar trend emerged when examining ASI drug severity scores. In this situation, total FTND scores demonstrated a substantial predictive effect but fell short of statistical significance when gender effects were accounted for statistically. The relationship between both measures of nicotine dependence and ASI drug composite scores were not significant using the regression method to account for the impact of gender; nor were the other ASI dimensions.

Discussion

The goal of this study was to bring together two assessment tools that are well respected in each of their domains: the Addiction Severity Index (ASI) and the Fagerström Test for Nicotine Dependence (FTND). Each has contributed to scientific advances that have led to progress in their clinical and research domains. The fact that the two instruments have rarely been used together despite the well-established and long-suspected relationship between smoking and substance abuse could represent a blind spot in our understanding of

Table II. The association of gender and Fagerström Test of Nicotine Dependence (FTND) with Addiction Severity Index (ASI) scores using a regression model.

ASI dimensions predictor variables	R^2 change	R^2
Drug severity		
Gender only		0.003
Gender+cigarettes smoked	0.030	0.033
Gender+total FTND	0.047*	0.049
Alcohol severity		
Gender only		0.008
Gender+cigarettes smoked	0.000	0.008
Gender+total FTND	0.003	0.011
Psychiatric severity		
Gender only		0.064**
Gender+cigarettes smoked	0.007	0.071*
Gender+total FTND	0.052*	0.116**
Medical severity		
Gender only		0.021
Gender+cigarettes smoked	0.002	0.022
Gender+total FTND	0.005	0.026
Employment severity		
Gender only		0.071**
Gender+cigarettes smoked	0.032	0.103**
Gender+total FTND	0.006	0.077*
Legal severity		
Gender only		0.011
Gender+cigarettes smoked	0.007	0.018
Gender+total FTND	0.000	0.011
Family severity		
Gender only		0.054*
Gender+cigarettes smoked	0.035*	0.090*
Gender+total FTND	0.028	0.082**
Drug composite		
Gender only		0.00
Gender+cigarettes smoked	0.010	0.010
Gender+total FTND	0.001	0.001
Alcohol composite		
Gender only		0.003
Gender+cigarettes smoked	0.001	0.004
Gender+total FTND	0.004	0.007
Psychiatric composite		
Gender only		0.048*
Gender+cigarettes smoked	0.014	0.062*
Gender+total FTND	0.064**	0.111**
Medical composite		
Gender only		0.002
Gender+cigarettes smoked	0.001	0.003
Gender+total FTND	0.001	0.003
Employment composite		
Gender only		0.000
Gender+cigarettes smoked	0.007	0.007
Gender+total FTND	0.009	0.009
Legal composite		
Gender only		0.000
Gender+cigarettes smoked	0.011	0.011
Gender+total FTND	0.011	0.012

Table II. continued

ASI dimensions predictor variables	R^2 change	R^2
Family composite		
Gender only		0.053*
Gender+cigarettes smoked	0.002	0.054
Gender+total FTND	0.000	0.053

*Significant at the 0.05 level; **significant at the 0.01 level.

this complex relationship. This study, using a population of cocaine-addicted smokers, allowed for a preliminary assessment of the value and richness that could be added to research endeavours where smoking and substance abuse is considered as well as the possibility of providing clinical insights or guidance for treatment purposes.

In the broadest sense, this study confirms what is intuitively known: that smoking and substance abuse are very complex behaviours. Despite the fact that they both are chemical addictions, they were shown to be distinct in this study as the correlations between the ASI dimensions and FTND were infrequent, contrary to expectations. Because of the great deal of evidence that smoking and substance abuse are linked, it would appear that the ASI and FTND are, by and large, examining different constructs.

The ASI provides a standardized, biopsychological approach to determining the severity of one's substance abuse problem. This is appropriate as it captures the encroaching, dynamic aspects of the disease as one evolves through the stages from a substance user, to an abuser, to full-blown addiction where the casualties of those entering a treatment facility are typically quite severe, impacting multiple life domains.

Conversely, the FTND, and similar Fagerström scales, determine the severity of one's smoking behaviour through questions that assess physiologically based nicotine dependence. This is reasonable in the sense that smoking does not have the severe social or life-altering consequences, with the exception of medical, which typically appear decades after smoking is initiated. Nevertheless, one could argue that the Fagerström scale is less comprehensive than the ASI as it does not adequately account for the psychological and environmental factors of smoking, just physiological dependence.

It is reasonable to conclude that the ASI and FTND are independent measures that adequately identify different aspects of addiction. It is also worth speculating that nicotine dependence is distinct from dependency to drugs or alcohol, despite the intuitive appeal to the contrary. Based on our findings and those of McCarthy et al. (2001), the two instruments do seem to have a limited statistical relationship to each other.

The exception to this pattern is the psychiatric dimension of the ASI. Whether identified by the computer-generated composite score, or assessed by the interviewer, reflected in the severity score, psychopathology is significantly correlated with smoking in substance abusers. The fact that the psychiatric dimension of the ASI was correlated with nicotine dependence does appear to be significant as it raises many questions about the interrelationship between mental health issues, smoking and substance abuse. This finding would seem to indicate that a significant portion of smoking behaviour is synonymous with pathology that is separate (or distinct) from pathological drug addiction, at least with the cocaine-addicted population of this study. More generally, this speaks to the importance of adequately screening smoking substance abusers in treatment for mental health problems so that appropriate interventions and referrals can be identified early in treatment. It also implicitly supports the concept of a broad screening effort (such as with family

practitioners, health centres and schools) where individuals who are nicotine dependent could automatically be given additional brief screens for evolving problems that do not yet meet diagnostic criteria for a substance abuse or mental health diagnoses.

The results of this study do make a modest case for the value of using a more precise measure of nicotine dependence. When examining the ASI dimensions of psychiatric symptoms (composite and severity scores) and drug dependence (severity scores), the overall nicotine dependence score (FTND total) correlated at significantly higher rates than when the number of cigarettes smoked was used. Also, because the FTND was more robustly correlated with both psychiatry dimensions of the ASI than a cruder measure of smoking (number smoked), there would appear to be room for future research using these tools to examine the psychopathology of substance abusers which could lead to richer results than if an imprecise assessment of smoking were used.

The finding of a relationship between the ASI drug severity score and total FTND, but not drug composite score, would seem to be explainable by the way the scores are obtained. The drug composite scores are derived from the patients' drug abuse history with equal weighting of each substance identified. A trained clinical professional bases the severity score on the subjective understanding of a patient. Rather than allocating equal weight to each substance in one's history, the trained interviewer will use his/her intuition and clinical expertise in an additional line of questioning to formulate the degree of severity for each substance identified, leading to a score. This obviously leads to more subjectivity but could account for why composite scores were not correlated with smoking in this study.

The absence of a relationship between alcohol and cigarette smoking in this study is contrary to what is known about alcohol use/abuse and cigarette smoking, and contrary to McCarthy et al. (2001), which is that the two are linked. Adult cocaine abusers could be distinct from adults with alcohol abuse as a primary diagnosis, or the manner in which they use alcohol may be different from alcohol abusers. For example, using alcohol to counter the effects of chronic cocaine use following a binge is different than drinking alcohol to start one's day, or to avoid DTs, reflecting abusive patterns rather than addiction. This could partially explain why, in previous work, our group has found differences in the medical symptoms of smoking alcoholics weighed against a comparable smoking, cocaine-abusing treatment population (Patkar, Sterling, et al., 2002).

Most of the ASI dimensions (Employment, Legal, Family/Social, Medical; Severity and Composite scores) were found to have little relationship to either measure of smoking (FTND or number of cigarettes smoked daily), even though the numerical score derived for each dimension is conceptualized as a component of pathological substance abuse. (The exception was family severity scores, which were more predictive of smoking when using a gross measure of nicotine use (number of cigarettes smoked) when gender was held constant. Perhaps the quantity smoked intermittently increases as family problems/issues increase rather than the absolute level of nicotine dependence: a ''nervous'' response to the anxiety associated with these circumstances.) This overall pattern probably reflects that the ASI dimensions of Employment, Legal, Family/Social, and Medical are complicated in how they relate to addiction; derived from many factors that limit the statistical relationship with smoking measures. Intuitively, one would expect a more robust relationship between the medical severity and composite scores and smoking measures, but it is likely that the population studied was too young to have experienced significant medical problems resulting from smoking.

Gender was found to account for a significant amount of the predictive variance of many ASI dimensions, but not drug severity. This makes intuitive sense given that psychiatric

complaints (e.g. Breslau, Schultz, & Peterson, 1995; Gove, 1982; Kessler, McGonagle, Swartz, Blazer, & Nelson, 1994; Stotland, 1999) as well as family (e.g. Peters, 1994) and employment (e.g. Emslie, Hunt, & Macintyre, 1999; Evans & Steptoe, 2002) experiences and expectations of men and women have been shown to be somewhat disparate. This also supports a more focused use of the ASI in future smoking studies.

This study represents an effort to examine the utility and value of using the FTND in combination with the ASI in order to improve the understanding of the relationship between smoking and substance abuse. The findings of this research speak to how complicated the relationship between smoking and substance abuse is. The results are moderately consist with what McCarthy et al. (2001) found (even though their primary focus differed from this study), with different conclusions. Adding a Fagerström smoking dependency measure to an assessment battery is likely to add little direct, clinically significant insights to substance abuse patterns. Nevertheless, we argue that such an addition could help to enrich the understanding of concomitant problems linked to smoking and substance abuse, with psychiatric problems appearing to be the best place to start given the correlation between FTND and the psychiatry dimension of the ASI. Using precise measures of nicotine dependence and substance abuse (i.e. Fagerström and ASI) could also allow for the development of more effective smoking cessation interventions with addiction populations, with psychiatric status being an important consideration.

One limitation of this study is that a homogenous treatment population was used. The field could benefit by using these instruments with different substance-abusing populations and by taking into account how patients get to treatment (e.g. referred, mandated, etc). In addition, doing the same analysis with a population of alcohol-abusing adults could be helpful not only in looking at the utility of using the instruments in future research with alcoholics, but also in explaining the absence of a relationship in this study between smoking and alcohol and providing potential insights about providing smoking cessation treatment to different categories of substance abusers.

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