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Influence of Psychiatric and Personality Disorders on Smoking Cessation among Individuals in Opiate Dependence Treatment

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Abstract

Objective—We aimed to evaluate how psychiatric and personality disorders influence smoking cessation goals and attempts among people with opiate dependence who smoke. This information could aid the development of more effective cessation interventions for these individuals.

Methods—Participants ($N=116$) were recruited from two methadone clinics, completed the Millon Clinical Multiaxial Inventory–III, and were asked about their smoking behavior and quitting goals. We used the Least Absolute Shrinkage and Selection Operator (LASSO) method, a technique commonly used for studies with small sample sizes and large number of predictors, to develop models predicting having a smoking cessation goal, among those currently smoking daily, and ever making a quit attempt, among those who ever smoked.

Results—Almost all participants reported ever smoking ($n = 115$, 99%); 70% ($n = 80$) had made a serious quit attempt in the past; 89% ($n = 103$) reported current daily smoking; and, 59% ($n = 61$) had a goal of quitting smoking and staying off cigarettes. Almost all ($n = 112$, 97%) had clinically significant characteristics of a psychiatric or personality disorder. White race, anxiety, and a negativistic personality facet (expressively resentful) were negative predictors of having a cessation goal. Overall narcissistic personality pattern and a dependent personality facet

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(interpersonally submissive) were positive predictors of having a cessation goal. Somatoform disorder, overall borderline personality pattern, and a depressive personality facet (cognitively fatalistic) were negative predictors of ever making a quit attempt. Individual histrionic (gregarious self-image), antisocial (acting out mechanism), paranoid (expressively defensive), and sadistic (pernicious representations) personality disorder facets were positive predictors of ever making a quit attempt. Each model provided good discrimination for having a smoking cessation goal or not (C-statistic of .76, 95% CI[0.66, 0.85]) and ever making a quit attempt or not (C-statistic of .79, 95% CI[0.70, 0.88]).

Conclusions—Compared to existing treatments, smoking cessation treatments that can be tailored to address the individual needs of people with specific psychiatric disorders or personality disorder traits may better help those in opiate dependence treatment to set a cessation goal, attempt to quit, and eventually quit smoking.

Keywords

smoking; psychiatric disorders; personality disorders; drug treatment; quit attempt; cessation goal; opiate; methadone

More than 80% of individuals receiving opiate dependence treatment currently smoke cigarettes (Guydish et al., 2015). Compared to people in the general population who smoke and those who smoke and use drugs other than opiates, individuals who smoke and have opiate dependence smoke more cigarettes per day and are more dependent on nicotine (McClure, Acquavita, Dunn, Stoller, & Stitzer, 2014; Nahvi, Richter, Li, Modali, & Arnsten, 2006). Therefore, this population has an increased risk for the health problems associated with tobacco use (Hurt et al., 1996). Factors associated with increased smoking and difficulty quitting among people in opiate dependence treatment include social networks of other people who smoke, a drug treatment culture that supports continued smoking, lack of education about the risks of smoking and benefits of quitting, fear of drug relapse, and inability to access smoking cessation counseling and pharmacotherapy (Cooperman, Richter, Bernstein, Steinberg, & Williams, 2015). In addition, existing smoking cessation interventions, including interventions that address known barriers to smoking cessation in those with opiate dependence, are minimally effective in this population (Cooperman, Richter, Bernstein, Steinberg, & Williams, 2014; Zirakzadeh, Shuman, Stauter, Hays, & Ebbert, 2013). Although some factors that are associated with increased smoking among those with opiate dependence have been identified, research on factors that inhibit smoking cessation intervention efficacy in these individuals is in its infancy. To develop more effective smoking cessation interventions for people with opiate dependence who smoke, further research on barriers to smoking cessation in this population is needed.

Psychiatric and personality disorders are known to be prevalent among people with opiate dependence and are associated with smoking cessation difficulty in other populations (Cacciola, Rutherford, Alterman, McKay, & Snider, 1996; Carpentier et al., 2009; Donald, Chartrand, & Bolton, 2013; Goodwin, Pagura, Spiwak, Lemeshow, & Sareen, 2011; Haro et al., 2004; Rentrop, Zilker, Lederle, Birkhofer, & Horz, 2014; Smith, Mazure, & McKee, 2014; Teplin, O'Connell, Daitey, & Varenbut, 2004); however, these factors have not been investigated among people in opiate dependence treatment who smoke. To elucidate how

psychiatric and personality disorders could impede smoking cessation in people with opiate dependence and determine specific psychiatric disorders and personality traits that could be targets for intervention to improve smoking cessation treatment for individuals with opiate dependence who smoke, we evaluated the relationships between psychiatric disorders, personality disorders, and individual personality disorder facets (i.e., traits) and smoking cessation goals and quit attempts among these individuals.

Large population studies clearly demonstrate the relationships between smoking and psychiatric and personality disorders. For example, data from the National Epidemiologic Survey of Alcohol and Related Conditions (NESARC; $N=43,093$) showed that current smoking has a significant positive relationship with psychotic disorders, mania, hypomania, phobias, depression, dysthymia, and anxiety (Smith et al., 2014). NESARC data also showed that current smoking and nicotine dependence have the strongest positive associations with antisocial and dependent personality disorders, and negative relationships with avoidant and obsessive-compulsive personality disorders (Zvolensky, Jenkins, Johnson, & Goodwin, 2011). Other large population studies have found that nicotine dependence has a significant positive relationship with schizotypal, borderline, narcissistic, and obsessive-compulsive personality disorders and a significant negative relationship with schizoid personality disorder (Becona, Fernandez del Rio, Lopez-Duran, Pineiro, & Martinez, 2013; Pulay et al., 2010).

Psychiatric and personality disorders also strongly affect desire to quit and cessation success. Data from the NESARC survey found that stopping nicotine use between survey waves had a significant negative association with having any psychiatric disorder (Donald et al., 2013; Goodwin et al., 2011; Smith et al., 2014). A study of individuals participating in a smoking cessation intervention found that borderline, antisocial, and avoidant personality disorders had significant negative associations with smoking abstinence post-treatment; however, schizoid and schizotypal personality disorders were significantly associated with greater smoking abstinence at follow-up (Pineiro, Fernandez Del Rio, Lopez-Duran, Martinez, & Becona, 2013). Another study found that individuals with personality disorders were significantly more likely to drop out of smoking cessation treatment prematurely (Fernandez Del Rio, Lopez, & Becona, 2010).

Most people in opiate dependence treatment have a psychiatric or personality disorder (Cacciola et al., 1996; Carpentier et al., 2009; Haro et al., 2004; Rentrop et al., 2014; Teplin et al., 2004). Mood disorders (25-60%), anxiety disorders (22%-46%), posttraumatic stress disorder (27%-52%), antisocial personality disorder (26%-75%), and borderline personality disorder (18%-51%) are the most common among those in opiate dependence treatment (Applebaum et al., 2010; Batki, Canfield, & Ploutz-Snyder, 2011; Carpentier et al., 2009; Craig, 2000; Darke, Kaye, & Finlay-Jones, 1998; Darke et al., 2007; Darke, Williamson, Ross, Teesson, & Lynskey, 2004; Himelhoch et al., 2012; Mackesy-Amiti, Donenberg, & Ouellet, 2012; Mason et al., 1998; Mills, Teesson, Darke, Ross, & Lynskey, 2004; Ross et al., 2005; Savant et al., 2013; Villagonzalo et al., 2011). Other studies have found that 21% of people in opiate dependence treatment have attention deficit hyperactivity disorder, 37% have obsessive compulsive disorder, and 29% to 44% have dependent, avoidant, schizoid,

histrionic, or narcissistic personality disorder (Calsyn, Wells, Fleming, & Saxon, 2000; Craig, 2000; Peles, Schreiber, Sutzman, & Adelson, 2012).

To advance tobacco dependence treatment among individuals in opiate dependence treatment who smoke, a better understanding of the links between psychiatric and personality disorders and smoking-related attitudes and behaviors in this population is needed. Although depression and anxiety are known to be associated with cigarette smoking among people in opiate dependence treatment (Chisolm, Tuten, Brigham, Strain, & Jones, 2009; Meyer, Lin, & Brown, 1996; Pajusco et al., 2012), the associations between other psychiatric and personality disorders and smoking behavior among people with opiate dependence are currently unknown. Therefore, we investigated the relationships between psychiatric and personality disorders and having a smoking cessation goal and ever making a quit attempt among people in opiate dependence treatment who currently smoke and ever smoked. Based upon previous research, we hypothesized high rates of psychiatric and personality disorders among study participants, and, with the exception of obsessive-compulsive, avoidant, schizotypal and schizoid personality disorders (disorders where the relationship between the disorder and smoking cessation is positive or unclear in previous studies), the presence of these disorders will be negatively associated with having a smoking cessation goal and ever making a quit attempt. Further, to evaluate potential primary targets for intervention, we developed multivariate models to determine the psychiatric and personality disorders that are most predictive of having a cessation goal or ever making a quit attempt among individuals in opiate dependence treatment who currently smoke and ever smoked, even when demographics are considered. The results of this study could provide information to help: 1) develop new interventions that address the psychiatric and personality disorders that are barriers to smoking cessation goals and attempts among individuals in opiate dependence treatment, 2) identify those in opiate dependence treatment who are least likely to have a smoking cessation goal and make a quit attempt due to psychiatric or personality disorders so that they can be targeted for receiving smoking cessation interventions that meet their needs, and 3) identify people in opiate dependence treatment who are more likely to have a goal to quit smoking and make a quit attempt, as compared to others, so that currently existing resources and interventions could be targeted to those most likely to be successful.

Methods

Participants and Procedures

Participants ($N=116$) were recruited from two urban methadone maintenance clinics in New Jersey (that collectively serve approximately 1200 individuals with opiate dependence) through flyers, word of mouth, and approaching potential participants in clinic waiting areas. Participants were age 18 or above, English-speaking, able to give informed consent, enrolled in methadone maintenance treatment, and able to complete all study assessments. After written informed consent, study participants completed questionnaires and a face-to-face interview. Participants were provided with a \$20 gift card after completing study measures. The Rutgers Health Sciences Institutional Review Board approved all study procedures and measures.

Measures

Smoking behavior, quit attempts, and nicotine dependence—Participants were asked if they ever smoked cigarettes, and, if “yes,” if they ever smoked daily. If they ever smoked daily, they were asked whether they are currently smoking daily. Those indicating current daily smoking were asked, “On average, how many cigarettes do you smoke per day?” Participants endorsing having ever smoked were asked, “How many times in your life have you made a serious attempt to quit smoking?” A serious attempt was defined as 24 hours or more smoke free. A dichotomous variable was created to indicate having ever made a serious quit attempt or never having made a serious quit attempt. Time to first cigarette after waking was used to assess nicotine dependence. This measure is known as a reliable and valid measure of nicotine dependence (Baker et al., 2007). Time to first cigarette was dichotomized to indicate smoking within 30 minutes of waking versus not smoking within 30 minutes of waking.

Smoking goals—Participants who reported current smoking were asked, “At this time, what is your goal with regard to smoking?” on a scale from 1 (to quit and stay off cigarettes forever) to 5 (to continue to smoke). A dichotomous variable was created to indicate wanting to quit and stay off cigarettes forever versus those whose goal was to “not smoke for a limited time,” “be able to control” how they smoke, “quit someday, but not now,” or “continue to smoke.” We dichotomized the variable to facilitate interpretation of the multivariate model. The variable was labeled “smoking cessation goal” versus “no smoking cessation goal.”

Psychiatric and personality disorders—Psychiatric and personality disorders were measured with the Millon Clinical Multiaxial Inventory-III (MCMI-III; Millon & Davis, 1997; Millon, Millon, Davis, & Grossman, 2006). The MCMI-III measures psychiatric disorders or “clinical syndromes” (i.e., anxiety, somatoform disorder, bipolar disorder, dysthymia, alcohol dependence, drug dependence, posttraumatic stress disorder, thought disorder, major depression, and delusional disorder). The MCMI-III also measures personality pathology according to the theory of Theodore Millon (Millon et al., 2006), and includes disordered personality patterns beyond the disorders included in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V; American Psychiatric Association, 2013). Personality disorders measured by the MCMI-III, but not included in the DSM-V are: depressive, sadistic, negativistic, and masochistic. We included these personalities in our analyses. Further, to provide more nuanced information about an individual's functioning and personality structure, the MCMI-III has three “facet” (i.e., individual trait) measures for each personality disorder pattern.

The MCMI-III is a self-administered, reliable, and valid instrument that measures psychiatric and personality pathology on a continuum (Millon & Davis, 1997; Millon et al., 2006). Scores were calculated with the Pearson Q Local Scoring and Reporting System. For psychiatric disorders (i.e., “clinical syndromes”), scores of 75 or above indicate the likely presence of the disorder. For personality disorders and individual traits, scores of 75 or above indicate the presence of a clinically significant personality pattern or facet (i.e., trait). MCMI-III scores were dichotomized to indicate likely psychiatric disorder presence or not

(score of ≥ 75 or <75) for each disorder. We also dichotomized MCMI-III scores to indicate the presence of a clinically significant personality disorder pattern or personality disorder individual facet or not (score of ≥ 75 or <75) for each personality disorder and personality disorder facet. The dichotomized variables were used as independent variables in the multivariate analyses. Although the MCMI-III is typically self-administered, a research assistant read the items aloud to those who had difficulty reading.

Statistical analyses

Descriptive analyses, including frequencies, means, medians, and percentages, were conducted. Logistic regression models were built to predict having a smoking cessation goal, among those currently smoking, and ever making a quit attempt, among those who ever smoked. Since the number of participants compared to the number of possible predictors is small, we first used chi-square tests to screen possible predictors ($p < 0.10$). Variables screened were the MCMI-III clinical syndromes (i.e., psychiatric disorders), the MCMI-III personality disorder overall patterns and individual facets, demographic variables, number of cigarettes smoked per day, and nicotine dependence. Variables meeting the $p < 0.10$ criterion were subsequently used to build the multivariable logistic regression models using the Least Absolute Shrinkage and Selection Operator (LASSO) method (Tibshirani, 1996; Friedman, Hastie, & Tibshirani, 2010).

LASSO is a statistical method commonly used for studies that have small sample sizes and a large number of predictors (e.g., studies of the relationship between individual genes and clinical outcomes). LASSO combines shrinkage and variable selection to reduce overfitting and produce more reliable prediction models than traditional methods (i.e., the forward and backward elimination algorithms based on p-values; Steyerberg, Eijkemans, Harrell, & Habbema, 2000; Tibshirani, 1996). LASSO does not determine predictors by p-values but shrinks the regression coefficients towards 0 by the tuning parameter. As the tuning parameter increases, more regression coefficients are shrunk to 0. In this paper, we used the 10-fold cross-validation approach to determine the optimal tuning parameter that minimized the mean cross-validated error. With LASSO analyses, p-values or confidence intervals are not calculated; however, only predictor variables that contributed to outcome variable predictions (with non-zero coefficient estimates) were selected by the LASSO analyses for the final models.

The C-statistic (area under the receiver operating characteristic curve) was computed for each produced model to assess how well the combination of predictors selected by the LASSO analyses distinguished individuals with a smoking cessation goal vs. no smoking cessation goal or quit attempt vs. no quit attempt. In general, a C-statistic greater than 0.7 indicates good discrimination, while a value of 0.5 indicates discrimination equivalent to tossing a coin (Harrell, 2001). All analyses were conducted using SAS and R packages, *glmnet*, *epicalc*, and *pROC*, available on CRAN at <http://cran.r-project.org>.

Results

Participants

Participants ($N = 116$) had a mean age of 40 years ($SD = 10.6$) and most were female ($n = 76$, 66%). Almost half ($n = 57$, 49%) were never married; 19% ($n = 22$) were married; and, the remainder were separated, divorced, or “other” marital status ($n = 37$, 31%). Most participants were White ($n = 84$, 73%), while 23% ($n = 26$) were Black; 15% ($n = 17$) were Hispanic; and, 5% ($n = 6$) were “other” race/ethnicity. Most had completed 12th grade ($n = 88$, 76%), though few were currently employed ($n = 17$, 15%).

Smoking behavior, nicotine dependence, smoking cessation goal, and quit attempts

Nearly all participants reported ever smoking ($n = 115$, 99%), ever ($n = 113$, 97%) daily smoking, and current ($n = 103$, 89%) daily smoking. Those currently smoking smoked a median of 10 cigarettes per day ($IQR = 5.0-20.0$); 71% ($n = 75$) reported smoking within 30 minutes of waking. About half ($n = 61$, 54%) of participants who currently smoked reported having a goal to quit smoking. Most individuals who had ever smoked ($n = 80$, 70%) had made a serious quit attempt during their lifetime.

Psychiatric and personality disorders

Almost all participants had at least one psychiatric disorder or clinically significant characteristics of at least one personality disorder (97%; Table 1). Current drug dependence (87%), anxiety (77%), and major depression (53%) were present in most participants. The presence of bipolar disorder (20%), dysthymia (32%), alcohol dependence (35%), and posttraumatic stress disorder (22%) was also high. Somatoform disorder (8%), thought disorder (2%), and delusional disorder (14%) were less common. Almost all participants had a clinically significant overall pattern of at least one personality disorder (93%). The most common clinically significant personality disorder patterns among participants were: antisocial (41%), dependent (41%), narcissistic (37%), and depressive (28%). Between 60% and 88% of participants had a clinically significant individual antisocial trait (acting out mechanism, 88%; interpersonally responsible, 80%; Table 2), sadistic trait (temperamentally hostile, 66%; eruptive organization, 75%), paranoid trait (cognitively mistrustful, 69%; expressively defensive, 60%; projection mechanism, 69%), or narcissistic trait (cognitively expansive, 63%).

Bivariate analyses

Based on the chi-square test ($p < 0.10$), White race, anxiety, and an individual facet of a negativistic personality (expressively resentful) were selected as potential negative predictors of having a cessation goal. Overall narcissistic personality pattern and an individual dependent personality facet (interpersonally submissive) were selected as potential positive predictors of having a cessation goal. Based on the chi-square test ($p < 0.10$), somatoform disorder, overall borderline personality pattern, and an individual depressive personality facet (cognitively fatalistic) were selected as potential negative predictors of ever making a quit attempt. Individual histrionic (gregarious self-image), antisocial (acting out mechanism), paranoid (expressively defensive), and sadistic (pernicious representations)

personality disorder facets were selected as potential positive predictors of ever making a quit attempt.

Multivariable models predicting having a goal to quit and ever making a quit attempt

The model predicting having a smoking cessation goal retained all potential variables and had a C-statistic of .76, 95% CI[0.66, 0.85], indicating good discrimination. According to the model, White participants and individuals with anxiety or who were expressively resentful were about half as likely to have a goal to quit smoking as compared to other participants. However, participants with an overall narcissistic personality pattern were approximately 1.5 times more likely to have a smoking cessation goal, and interpersonally submissive participants were more than twice as likely to have a smoking cessation goal (see Table 3). The model predicting ever making a quit attempt retained all potential variables and had a C-statistic of .79, 95% CI[0.70, 0.88], indicating good discrimination. According to the model, participants with somatoform disorder or overall borderline personality characteristics or who were cognitively fatalistic were a quarter to half as likely to have ever made a quit attempt, as compared to other participants. Participants who were expressively defensive were slightly more likely to have ever made a quit attempt as compared to others; however, participants with a gregarious self-image, acting out mechanism, or pernicious representations were one and a half to two and a half times more likely to have ever made a quit attempt.

Discussion

Almost all study participants currently smoked, which is similar to previous studies of people in opiate dependence treatment (Clarke, Stein, McGarry, & Gogineni, 2001; Clemmey, Brooner, Chutuape, Kidorf, & Stitzer, 1997; Nahvi et al., 2006; Richter & Arnsten, 2006; Richter, Gibson, Ahluwalia, & Schmelzle, 2001). Also, like other studies of people with opiate dependence, almost all participants had a psychiatric or personality disorder (Applebaum et al., 2010; Cacciola et al., 1996; Carpentier et al., 2009; Haro et al., 2004; Rentrop et al., 2014; Teplin et al., 2004). As hypothesized, psychiatric and personality disorders predicted having a smoking cessation goal and ever making a quit attempt, even when considering demographic variables. However, contrary to our hypothesis that predicted all psychiatric and personality disorders, with the exception of a few personality disorders, would have negative relationships with having a smoking cessation goal and ever making a quit attempt, several personality disorders and personality disorder facets, other than those predicted (i.e., obsessive-compulsive, avoidant, schizotypal and schizoid), had positive relationships with having a smoking cessation goal and ever making a quit attempt. Further, several psychiatric disorders, personality disorders, and personality disorder individual facets contributed to strong discriminatory models for having a smoking cessation goal and ever making a quit attempt, suggesting that attention to these disorders and personality facets may be important for increasing smoking cessation in people with opiate dependence.

White race and anxiety were negative predictors of having a smoking cessation goal. These findings are supported by previous research that has found, in general, White (compared to non-White) people who smoke are: 1) significantly less likely to believe that quitting

smoking is important to their health, 2) significantly less likely to want to quit smoking in the next 30 days, and 3) significantly less interested in smoking cessation services (Karvonen-Gutierrez, Ewing, Taylor, Essenmacher, & Duffy, 2012). Few research studies have investigated the relationship between anxiety disorders and smoking cessation goals. However, one study found that individuals with (vs. without) panic disorder who smoke were more likely to report anxiety symptoms as a barrier to quitting smoking, were more motivated to smoke to reduce negative affect, and had lower confidence in ability to quit smoking (Zvolensky et al., 2005). Further, anxiety disorders have been found to have a positive relationship with nicotine dependence and pre-quit withdrawal symptoms (Piper, Cook, Schlam, Jorenby, & Baker, 2011). These results suggest that interventions to bolster motivation and confidence among people in opiate dependence treatment who smoke may be needed for White individuals so that they are more willing and interested in setting a smoking cessation goal. Further, for some people with opiate dependence who smoke, anxiety may need to be treated to support smoking cessation goals and confidence.

Among participants who currently smoked, overall narcissistic personality pattern was a positive predictor of having a cessation goal. Also, a dependent personality facet was a positive predictor, and a negativistic personality facet was a negative predictor of a smoking cessation goal. Those with clinically significant narcissistic personality disorder traits may report a smoking abstinence goal due to inflated confidence in their ability to succeed at quitting. Interpersonally submissive (dependent personality facet) individuals are compliant and need guidance from others (Millon et al., 2006). The interpersonally submissive participants may have been more likely to report a cessation goal, as compared to other participants, due to their need to be compliant with smoking cessation messages and guidelines from authority figures. In contrast, expressively resentful (negativistic personality facet) individuals find pleasure in resisting the expectations of others and likely resist societal pressures and messages to quit smoking. In sum, consideration of these personality disorders or personality disorder facets could help explain discrepancies between expressed quitting intentions and continued smoking behavior among people with opiate dependence who smoke. Since individuals with narcissistic personality disorder or who are interpersonally submissive may have inflated confidence in ability to quit or may express a smoking cessation goal without having the intent to follow-through, smoking cessation interventions that include assessment of these personality disorder characteristics could better address possible discrepancies between stated goals and lack of quit attempts among those in opiate dependence treatment. Also interventions that allow individuals with opiate dependence who are expressively resentful to develop goals for smoking cessation on their own, without pressure from others or with a client-centered intervention such as motivational interviewing, could better help individuals with this personality trait set a cessation goal and attempt to quit as compared to other treatments.

Somatoform disorder and overall borderline personality disorder pattern were negatively associated with ever making a quit attempt. Individuals with somatoform disorder are preoccupied with illness, and somatic symptoms may be used to acquire attention (Millon et al., 2006). Among those with somatoform disorder, the health issues related to smoking are less likely to be a motivator for making a quit attempt; in fact, smoking-related health issues may support their preoccupation with physical complaints. The negative relationship

between borderline personality disorder and smoking cessation has been found in other studies (Donald et al., 2013; Pineiro, Fernandez Del Rio, et al., 2013). Individuals with borderline personality disorder have deficits in emotion regulation and distress tolerance and may rely on smoking to manage difficult emotions and stress, making smoking cessation more difficult (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Carmody, Vieten, & Astin, 2007; Khantzian, 1997; Wills & Shiffman, 1985). Among individuals with opiate dependence and somatoform disorders, treatments that target motivators other than the health implications of continued smoking could be more effective than interventions that focus on education about the health effects of smoking. Interventions such as dialectical behavior therapy that teach emotion regulation and distress tolerance skills could help people with opiate dependence and borderline personality disorder develop healthy coping skills to deal with emotions and stress so that they don't need to rely on smoking as a coping method.

A facet of depressive personality disorder (cognitively fatalistic) was a negative predictor, and facets of histrionic (gregarious self-image), antisocial (acting out mechanism), paranoid (expressively defensive), and sadistic (pernicious representations) personality disorders were positive predictors of ever making a quit attempt. Cognitively fatalistic participants were less likely to have ever made a quit attempt as compared to other participants, possibly due to their hopeless and defeatist point of view on most matters, including quitting smoking (Millon et al., 2006). The positive relationship between gregarious self-image and ever making a quit attempt may be due to the need to please and attract others and to appear physically attractive (Millon et al., 2006). Although one study found a negative relationship between antisocial personality disorder and smoking cessation post-treatment, another study found that smoking abstinence maintenance, at 6-month follow-up was higher among individuals with antisocial personality disorder as compared to others (Fernandez del Rio, Lopez Duran, & Becona Iglesias, 2010; Pineiro, Fernandez Del Rio, et al., 2013). Individuals who act out to deal with internal tension (an antisocial personality facet) are unrestrained and lack remorse when expressing offensive thoughts and actions. Perhaps, because these individuals have less of a need to restrain negative thoughts and actions, they rely less on smoking to deal with feelings and impulses (Millon et al., 2006). People with pernicious representations (a sadistic personality trait) have had early relationships that have led to aggression and malevolent attitudes (Millon et al., 2006). The meaning of the positive relationship between pernicious representations and quit attempts in this sample is unclear since prior research has found a negative relationship between sadistic personality traits and smoking cessation (Pineiro, Lopez-Duran, Fernandez Del Rio, Martinez, & Becona, 2013). Further research is needed to better understand how pernicious representations and subsequent attitudes and behavior impact smoking cessation. Expressively defensive people (a paranoid personality trait) are resistant to external influences (Millon et al., 2006), and, in the case of those with opiate dependence, where their social networks and environment often support smoking, this resistance could support making a quit attempt. In sum, assessment of these personality disorder facets could help identify individuals in opiate dependence treatment who could be most and least responsive to existing smoking cessation treatments.

This study has some limitations. First, the study sample is limited to English-speaking people who chose to participate in the study in two opiate dependence treatment programs.

We do not have information on the individuals who were not recruited or did not choose to participate. The findings in this study may not be generalizable to clinic patients who did not participate in the study, individuals who attend other opiate treatment programs, or people in opiate dependence treatment who do not speak English. Second, smoking behavior was assessed by self-report, limiting the validity and reliability of the quit attempt findings. Third, this was a cross-sectional study, and cause-effect relationships cannot be determined. Future, longitudinal, studies that track demographics of those who do not participate in the research, include different treatment settings, and include non-English speakers are warranted to better understand the relationships among psychiatric and personality pathology, smoking behavior, smoking cessation goals, quit attempts, and smoking cessation.

Almost all individuals in opiate dependence treatment smoke and are experiencing psychiatric and personality disorders. Further, psychiatric disorders, personality disorders, and individual personality disorder facets differentially impact smoking cessation goals and attempts in this population. Since desire to quit is needed for cessation and attempting to quit is an active step towards cessation, tailoring of smoking cessation interventions to address the disorders or facets that have a negative relationship to having a smoking cessation goal or quit attempt could increase motivation and quit attempts in this population. The low long-term abstinence rates in smoking cessation treatment trials in opiate dependence treatment settings could be due to lack of attention to psychiatric and personality disorders in existing smoking cessation interventions. This study suggests the importance of considering these comorbid conditions, and is a first step towards understanding how these factors are related to smoking attitudes and behavior among people in opiate dependence treatment. Further research is needed on the mechanisms through which psychiatric disorders and personality disorder characteristics impact smoking cessation goals, quit attempts, and cessation success among people in opiate dependence. The development of and research on smoking cessation interventions that include assessment and treatment of psychiatric disorders, personality disorders, and personality disorder individual facets is needed. As compared to existing treatments, smoking cessation treatments that can be tailored to address the individual needs of those with specific psychiatric disorders or personality disorder traits may better help people in opiate dependence treatment to set a cessation goal, attempt to quit, and eventually quit smoking.

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References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. fifth edition.. American Psychiatric Publishing; Washington DC: 2013.

- Applebaum AJ, Bullis JR, Traeger LN, O'Cleirigh C, Otto MW, Pollack MH, Safren SA. Rates of mood and anxiety disorders and contributors to continued heroin use in methadone maintenance patients: A comparison by HIV status. *Neurobehavioral HIV Medicine*. 2010; 2010(2):49–57. doi: 10.2147/NBHIV.S12371. [PubMed: 24062619]
- Baker TB, Piper ME, McCarthy DE, Bolt DM, Smith SS, Kim SY, Colby S, Conti D, Giovino GA, Hatsukami D, Hyland A, Krishnan-Sarin S, Niaura R, Perkins KA, Toll BA. Time to first cigarette in the morning as an index of ability to quit smoking: Implications for nicotine dependence. *Nicotine & Tobacco Research*. 2007; 9(Suppl 4):S555–570. doi: 10.1080/14622200701673480. [PubMed: 18067032]
- Baker TB, Piper ME, McCarthy DE, Majeskie MR, Fiore MC. Addiction motivation reformulated: An affective processing model of negative reinforcement. *Psychological Review*. 2004; 111(1):33–51. doi: 10.1037/0033-295X.111.1.33 2004-10332-002. [PubMed: 14756584]
- Batki SL, Canfield KM, Ploutz-Snyder R. Psychiatric and substance use disorders among methadone maintenance patients with chronic hepatitis C infection: Effects on eligibility for hepatitis C treatment. *American Journal on Addictions*. 2011; 20(4):312–318. doi: 10.1111/j.1521-0391.2011.00139.x. [PubMed: 21679262]
- Becona E, Fernandez del Rio E, Lopez-Duran A, Pineiro B, Martinez U. Axis II disorders and cigarette smoking among adults from the general population. *Journal of Personality Disorders*. 2013; 27(3):411–424. doi: 10.1521/pedi_2012_26_051. [PubMed: 22928853]
- Cacciola JS, Rutherford MJ, Alterman AI, McKay JR, Snider EC. Personality disorders and treatment outcome in methadone maintenance patients. *Journal of Nervous and Mental Disease*. 1996; 184(4):234–239. [PubMed: 8604033]
- Calsyn DA, Wells EA, Fleming C, Saxon AJ. Changes in Millon Clinical Multiaxial Inventory scores among opiate addicts as a function of retention in methadone maintenance treatment and recent drug use. *American Journal of Drug and Alcohol Abuse*. 2000; 26(2):297–309. doi:10.1081/ADA-100100606. [PubMed: 10852362]
- Carmody TP, Vieten C, Astin JA. Negative affect, emotional acceptance, and smoking cessation. *Journal of Psychoactive Drugs*. 2007; 39(4):499–508. doi:10.1080/02791072.2007.10399889. [PubMed: 18303707]
- Carpentier PJ, Krabbe PF, van Gogh MT, Knapen LJ, Buitelaar JK, de Jong CA. Psychiatric comorbidity reduces quality of life in chronic methadone maintained patients. *American Journal on Addictions*. 2009; 18(6):470–480. doi: 10.3109/10550490903205652. [PubMed: 19874168]
- Chisolm MS, Tuten M, Brigham EC, Strain EC, Jones HE. Relationship between cigarette use and mood/anxiety disorders among pregnant methadone-maintained patients. *American Journal on Addictions*. 2009; 18(5):422–429. doi: 10.3109/10550490903077721. [PubMed: 19874163]
- Clarke JG, Stein MD, McGarry KA, Gogineni A. Interest in smoking cessation among injection drug users. *American Journal on Addictions*. 2001; 10(2):159–166. doi: 10.1080/105504901750227804. [PubMed: 11444157]
- Clemmey P, Brooner R, Chutuape MA, Kidorf M, Stitzer M. Smoking habits and attitudes in a methadone maintenance treatment population. *Drug and Alcohol Dependence*. 1997; 44(2-3):123–132. doi:10.1016/S0376-8716(96)01331-2. [PubMed: 9088784]
- Cooperman, NA.; Richter, K.; Bernstein, SL.; Williams, JM. Pilot study of a tailored smoking cessation intervention for opiate dependent smokers in methadone treatment.. Poster presented at the Annual Meeting of the Society for Research on Nicotine and Tobacco; Seattle, WA.. 2014.
- Cooperman NA, Richter KP, Bernstein SL, Steinberg ML, Williams JM. Determining smoking cessation related information, motivation, and behavioral skills among smokers who are opiate dependent in methadone treatment. *Substance Use and Misuse*. 2015; 50(5):566–581. doi: 10.3109/10826084.2014.991405. [PubMed: 25559697]
- Craig RJ. Prevalence of personality disorders among cocaine and heroin addicts. *Substance Abuse*. 2000; 21(2):87–94. doi:10.1080/08897070009511421. [PubMed: 12466649]
- Darke S, Kaye S, Finlay-Jones R. Antisocial personality disorder, psychopathy and injecting heroin use. *Drug and Alcohol Dependence*. 1998; 52(1):63–69. doi:10.1016/S0376-8716(98)00058-1. [PubMed: 9788008]

- Darke S, Ross J, Williamson A, Mills KL, Havard A, Teesson M. Borderline personality disorder and persistently elevated levels of risk in 36-month outcomes for the treatment of heroin dependence. *Addiction*. 2007; 102(7):1140–1146. doi:10.1111/j.1360-0443.2007.01876.x. [PubMed: 17567402]
- Darke S, Williamson A, Ross J, Teesson M, Lynskey M. Borderline personality disorder, antisocial personality disorder and risk-taking among heroin users: Findings from the Australian Treatment Outcome Study (ATOS). *Drug and Alcohol Dependence*. 2004; 74(1):77–83. doi: 10.1016/j.drugalcdep.2003.12.002S0376871603003363. [PubMed: 15072810]
- Donald S, Chartrand H, Bolton JM. The relationship between nicotine cessation and mental disorders in a nationally representative sample. *Journal of Psychiatric Research*. 2013; 47(11):1673–1679. doi:10.1016/j.jpsychires.2013.05.011. [PubMed: 23890363]
- Fernandez Del Rio E, Lopez A, Becona E. Personality disorders and premature dropout from psychological treatment for smoking cessation. *Psychological Reports*. 2010; 106(3):679–684. doi: 10.2466/PRO.106.3.679-684. [PubMed: 20712155]
- Fernandez del Rio E, Lopez Duran A, Becona Iglesias E. Personality disorders and abstinence from tobacco consumption in a psychological treatment to stop smoking. *Psicothema*. 2010; 22(3):357–362. [PubMed: 20667260]
- Friedman J, Hastie T, Tibshirani R. Regularization paths for generalized linear models via coordinate descent. *Journal of Statistical Software*. 2010; 33(1):1–22. doi: 10.18637/jss.v033.i01. [PubMed: 20808728]
- Goodwin RD, Pagura J, Spiwak R, Lemeshow AR, Sareen J. Predictors of persistent nicotine dependence among adults in the United States. *Drug and Alcohol Dependence*. 2011; 118(2-3): 127–133. doi:10.1016/j.drugalcdep.2011.03.010. [PubMed: 21514748]
- Guydish J, Passalacqua E, Pagano A, Martinez C, Le T, Chun J, Tajima B, Docto L, Garina D, Delucchi K. An international systematic review of smoking prevalence in addiction treatment. [Review]. *Addiction*. 2015; 111:220–230. doi: 10.1111/add.13099. [PubMed: 26392127]
- Haro G, Mateu C, Martinez-Raga J, Valderrama JC, Castellano M, Cervera G. The role of personality disorders on drug dependence treatment outcomes following inpatient detoxification. *European Psychiatry*. 2004; 19(4):187–192. doi: 10.1016/j.eurpsy.2004.04.004 S0924933804000756. [PubMed: 15196598]
- Harrell, FE. *Regression modeling strategies with applications to linear models, logistic regression, and survival analysis*. Springer; New York, NY: 2001.
- Himelhoch S, Weber E, Medoff D, Charlotte M, Clayton S, Wilson C, Ware R, Benford J. Posttraumatic stress disorder and one-year outcome in methadone maintenance treatment. *American Journal on Addictions*. 2012; 21(6):524–530. doi: 10.1111/j.1521-0391.2012.00271.x. [PubMed: 23082830]
- Hurt RD, Offord KP, Croghan IT, Gomez-Dahl L, Kottke TE, Morse RM, Melton LJ 3rd. Mortality following inpatient addictions treatment. Role of tobacco use in a community-based cohort. *JAMA: The Journal of the American Medical Association*. 1996; 275(14):1097–1103. [PubMed: 8601929]
- Karvonen-Gutierrez CA, Ewing LA, Taylor NJ, Essenmacher CA, Duffy SA. Ethnicity predicts perceptions of smoking and smoking cessation among veterans. *Journal of Psychiatric and Mental Health Nursing*. 2012; 19(3):203–210. doi: 10.1111/j.1365-2850.2011.01757.x. [PubMed: 22074190]
- Khantzian EJ. The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harvard Review of Psychiatry*. 1997; 4(5):231–244. doi: 10.3109/10673229709030550. [PubMed: 9385000]
- Mackesy-Amiti ME, Donenberg GR, Ouellet LJ. Prevalence of psychiatric disorders among young injection drug users. *Drug and Alcohol Dependence*. 2012; 124(1-2):70–78. doi: 10.1016/j.drugalcdep.2011.12.012. [PubMed: 22226707]
- Mason BJ, Kocsis JH, Melia D, Khuri ET, Sweeney J, Wells A, Borg L, Millman RB, Kreek MJ. Psychiatric comorbidity in methadone maintained patients. *Journal of Addictive Diseases*. 1998; 17(3):75–89. doi: 10.1300/J069v17n03_07. [PubMed: 9789161]

- McClure EA, Acquavita SP, Dunn KE, Stoller KB, Stitzer ML. Characterizing smoking, cessation services, and quit interest across outpatient substance abuse treatment modalities. *Journal of Substance Abuse Treatment*. 2014; 46(2):194–201. doi: 10.1016/j.jsat.2013.07.009. [PubMed: 23988192]
- Meyer TJ, Lin MM, Brown LS Jr. Nicotine dependence and depression among methadone maintenance patients. *Journal of the National Medical Association*. 1996; 88(12):800–804. [PubMed: 8990806]
- Millon T, Davis RD. The MCMI-III: Present and future directions. *Journal of Personality Assessment*. 1997; 68(1):69–85. doi: 10.1207/s15327752jpa6801_6. [PubMed: 16370772]
- Millon, T.; Millon, C.; Davis, R.; Grossman, S. MCMI-III manual. Third ed.. Pearson Education, Inc.; Minneapolis, MN: 2006.
- Mills KL, Teesson M, Darke S, Ross J, Lynskey M. Young people with heroin dependence: Findings from the Australian Treatment Outcome Study (ATOS). *Journal of Substance Abuse Treatment*. 2004; 27(1):67–73. doi: 10.1016/j.jsat.2004.05.001 S0740547204000467. [PubMed: 15223096]
- Nahvi S, Richter K, Li X, Modali L, Arnsten J. Cigarette smoking and interest in quitting in methadone maintenance patients. *Addictive Behaviors*. 2006; 31(11):2127–2134. doi:10.1016/j.addbeh.2006.01.006. [PubMed: 16473476]
- Pajusco B, Chiamulera C, Quaglio G, Moro L, Casari R, Amen G, Faccini M, Lugoboni F. Tobacco addiction and smoking status in heroin addicts under methadone vs. buprenorphine therapy. *International Journal of Environmental Research and Public Health*. 2012; 9(3):932–942. doi: 10.3390/ijerph9030932 ijerph-09-00932. [PubMed: 22690174]
- Peles E, Schreiber S, Sutzman A, Adelson M. Attention deficit hyperactivity disorder and obsessive-compulsive disorder among former heroin addicts currently in methadone maintenance treatment. *Psychopathology*. 2012; 45(5):327–333. doi:10.1159/000336219. [PubMed: 22796643]
- Pineiro B, Fernandez Del Rio E, Lopez-Duran A, Martinez U, Becona E. The association between probable personality disorders and smoking cessation and maintenance. *Addictive Behaviors*. 2013; 38(8):2369–2373. doi:10.1016/j.addbeh.2013.03.017. [PubMed: 23628430]
- Pineiro B, Lopez-Duran A, Fernandez Del Rio E, Martinez U, Becona E. Gender differences in personality patterns and smoking status after a smoking cessation treatment. *BMC Public Health*. 2013; 13:306. doi:10.1186/1471-2458-13-306. [PubMed: 23565918]
- Piper ME, Cook JW, Schlam TR, Jorenby DE, Baker TB. Anxiety diagnoses in smokers seeking cessation treatment: Relations with tobacco dependence, withdrawal, outcome and response to treatment. *Addiction*. 2011; 106(2):418–427. doi: 10.1111/j.1360-0443.2010.03173.x. [PubMed: 20973856]
- Pulay AJ, Stinson FS, Ruan WJ, Smith SM, Pickering RP, Dawson DA, Grant BF. The relationship of DSM-IV personality disorders to nicotine dependence—results from a national survey. *Drug and Alcohol Dependence*. 2010; 108(1-2):141–145. doi:10.1016/j.drugalcdep.2009.12.004. [PubMed: 20079976]
- Rentrop M, Zilker T, Lederle A, Birkhofer A, Horz S. Psychiatric comorbidity and personality structure in patients with polyvalent addiction. *Psychopathology*. 2014; 47(2):133–140. doi: 10.1159/000351784. [PubMed: 23942425]
- Richter KP, Arnsten JH. A rationale and model for addressing tobacco dependence in substance abuse treatment. *Substance Abuse Treatment, Prevention and Policy*. 2006; 1:23. doi: 10.1186/1747-597X-1-23.
- Richter KP, Gibson CA, Ahluwalia JS, Schmelzle KH. Tobacco use and quit attempts among methadone maintenance clients. *American Journal of Public Health*. 2001; 91(2):296–299. doi: 10.2105/AJPH.91.2.296. [PubMed: 11211643]
- Ross J, Teesson M, Darke S, Lynskey M, Ali R, Ritter A, Cooke R. The characteristics of heroin users entering treatment: Findings from the Australian treatment outcome study (ATOS). *Drug and Alcohol Review*. 2005; 24(5):411–418. doi:10.1080/09595230500286039. [PubMed: 16298835]
- Savant JD, Barry DT, Cutter CJ, Joy MT, Dinh A, Schottenfeld RS, Fiellin DA. Prevalence of mood and substance use disorders among patients seeking primary care office-based buprenorphine/naloxone treatment. *Drug and Alcohol Dependence*. 2013; 127(1-3):243–247. doi:10.1016/j.drugalcdep.2012.06.020. [PubMed: 22771144]

- Smith PH, Mazure CM, McKee SA. Smoking and mental illness in the US population. *Tobacco Control*. 2014; 23:e147–e153. doi:10.1136/tobaccocontrol-2013-051466. [PubMed: 24727731]
- Steyerberg EW, Eijkemans MJ, Harrell FE Jr, Habbema JD. Prognostic modelling with logistic regression analysis: A comparison of selection and estimation methods in small data sets. *Statistics in Medicine*. 2000; 19(8):1059–1079. doi: 10.1002/(SICI)1097-0258(20000430)19:8<1059::AID-SIM412>3.0.CO;2-0. [PubMed: 10790680]
- Teplin D, O'Connell T, Daiter J, Varenbut M. A psychometric study of the prevalence of DSM-IV personality disorders among office-based methadone maintenance patients. *American Journal of Drug and Alcohol Abuse*. 2004; 30(3):515–524. doi.org/10.1081/ADA-200032270. [PubMed: 15540490]
- Tibshirani R. Regression shrinkage and selection via the Lasso. *Journal of the Royal Statistical Society Series B-Methodological*. 1996; 58(1):267–288.
- Villagonzalo KA, Dodd S, Ng F, Mihaly S, Langbein A, Berk M. The relationship between substance use and posttraumatic stress disorder in a methadone maintenance treatment program. *Comprehensive Psychiatry*. 2011; 52(5):562–566. doi: 10.1016/j.comppsy.2010.10.001. [PubMed: 21109242]
- Wills, TA.; Shiffman, S. Coping and substance use: A conceptual framework.. In: Shiffman, S.; Wills, TA., editors. *Coping and substance use*. Academic Press; New York, NY: 1985.
- Zirakzadeh A, Shuman C, Stauter E, Hays JT, Ebbert JO. Cigarette smoking in methadone maintained patients: An up-to-date review. *Current Drug Abuse Reviews*. 2013; 6(1):77–84. doi.org/10.2174/1874473711306010009. [PubMed: 23506370]
- Zvolensky MJ, Jenkins EF, Johnson KA, Goodwin RD. Personality disorders and cigarette smoking among adults in the United States. *Journal of Psychiatric Research*. 2011; 45(6):835–841. doi: 10.1016/j.jpsychires.2010.11.009. [PubMed: 21168156]
- Zvolensky MJ, Schmidt NB, Antony MM, McCabe RE, Forsyth JP, Feldner MT, Leen-Feldner E, Karekla M, Kahler CW. Evaluating the role of panic disorder in emotional sensitivity processes involved with smoking. *Journal of Anxiety Disorders*. 2005; 19(6):673–686. doi: 10.1016/j.janxdis.2004.07.001. [PubMed: 15927780]

Table 1

Psychiatric disorders and clinically significant personality patterns (N=116)

	Disorder or Personality Pattern n (%) ^a
Any psychiatric or personality disorder	112 (96.6)
Personality Disorders	
Any personality disorder	108 (93.1)
Any cluster A ^b	40 (34.5)
Any cluster B ^c	87 (75.0)
Any cluster C ^d	65 (56.0)
Antisocial	47 (40.5)
Dependent	47 (40.5)
Narcissistic	43 (37.1)
Depressive	33 (28.4)
Schizoid	28 (24.1)
Masochistic	27 (23.3)
Paranoid	26 (22.4)
Avoidant	25 (21.6)
Borderline	20 (17.2)
Negativistic	18 (15.5)
Histrionic	9 (7.8)
Compulsive	7 (6.0)
Sadistic	6 (5.2)
Schizotypal	4 (3.4)
Psychiatric Disorders	
Any psychiatric disorder	112 (96.6)
Any mood disorder ^e	93 (80.2)
Drug dependence	101 (87.1)
Anxiety	89 (76.7)
Major depression	61 (52.6)
Alcohol dependence	41 (35.3)
Dysthymia	37 (31.9)
Posttraumatic stress disorder	25 (21.6)
Bipolar disorder	23 (19.8)
Delusional disorder	16 (13.8)
Somatoform disorder	9 (7.8)
Thought disorder	2 (1.7)

^aBased on the Millon Clinical Multiaxial Inventory-III clinical syndrome (i.e., psychiatric disorder) or personality disorder score 75.

^bParanoid, schizoid, or schizotypal.

^cAntisocial, borderline, histrionic, or narcissistic.

^dAvoidant, dependent, or compulsive.

^eMajor depression, dysthymia, or bipolar.

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Table 2Personality disorder facets ($N=116$)

Personality Disorder	Personality Disorder Facets	n (%) ^a
Antisocial	Expressively impulsive	46 (39.7)
	Acting-out mechanism	102 (87.9)
	Interpersonally irresponsible	93 (80.2)
Sadistic	Temperamentally hostile	76 (65.5)
	Eruptive organization	87 (75.0)
	Pernicious representations	68 (58.6)
Paranoid	Cognitively mistrustful	80 (69.0)
	Expressively defensive	70 (60.3)
	Projection mechanism	80 (69.0)
Narcissistic	Admirable self-image	52 (44.8)
	Cognitively expansive	73 (62.9)
	Interpersonally exploitive	64 (52.2)
Negativistic	Temperamentally irritable	41 (35.3)
	Expressively resentful	61 (52.6)
	Discontented self-image	52 (44.8)
Schizotypal	Estranged self-image	57 (49.1)
	Cognitively autistic	59 (50.9)
	Chaotic representations	40 (34.5)
Avoidant	Interpersonally aversive	59 (50.9)
	Alienated self-image	44 (37.9)
	Vexatious representations	50 (43.1)
Schizoid	Temperamentally apathetic	32 (27.6)
	Interpersonally unengaged	43 (37.1)
	Expressively impassive	57 (49.1)
Masochistic	Discredited representations	57 (49.1)
	Cognitively diffident	42 (36.2)
	Undeserving self-image	37 (31.9)
Borderline	Temperamentally labile	40 (34.5)
	Interpersonally paradoxical	56 (48.3)
	Uncertain self-image	36 (31.0)
Histrionic	Gregarious self-image	27 (23.3)
	Interpersonally attention-seeking	36 (31.0)
	Expressively dramatic	46 (39.7)
Depressive	Temperamentally woeful	29 (25.0)
	Worthless self-image	40 (34.5)
	Cognitively fatalistic	24 (20.7)
Dependent	Inept self-image	39 (33.6)
	Interpersonally submissive	33 (28.4)
	Immature representations	40 (34.5)

Personality Disorder	Personality Disorder Facets	n (%) ^a
Compulsive	Cognitively constricted	22 (19.0)
	Interpersonally respectful	32 (27.6)
	Reliable self-image	31 (26.7)

^aBased on the Millon Clinical Multiaxial Inventory-III personality disorder facet score 75.

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Table 3

Multivariate logistic regression models predicting a smoking cessation goal and ever making a quit attempt

Model	Predictors	OR
Model predicting smoking cessation goal ($n=103$) ^a	White race	0.50
	Anxiety	0.46
	Narcissistic	1.43
	Interpersonally submissive (Dependent trait)	2.27
C-statistic = .76 95% CI[0.66, 0.85]	Expressively resentful (Negativistic trait)	0.60
	Somatoform	0.52
Model predicting ever making a quit attempt ($n=113$) ^b	Borderline	0.48
	Cognitively Fatalistic (Depressive trait)	0.73
	Gregarious self-image (Histrionic trait)	2.61
	Acting-out mechanism (Antisocial trait)	1.49
C-statistic = .79 95% CI[0.70, 0.88]	Pernicious representations (Sadistic trait)	1.65
	Expressively defensive (Paranoid trait)	1.05

Note. OR = odds ratio

^a Among participants who currently smoked.

^b Among participants who ever smoked regularly or daily.