

Original Investigation

Personality, psychiatric disorders, and smoking in middle-aged adults

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Abstract

Introduction: A number of personality traits have been associated with cigarette smoking. Current smokers generally show higher levels of negative emotionality and lower levels of behavioral constraint than former smokers and those who never smoked. However, prior investigations have not examined thoroughly whether these smoking–personality associations are unique to smoking status or simply reflect the fact that these personality traits tend to be elevated across numerous forms of psychopathology. Likewise, prior studies have not addressed whether personality shows differential associations with smoking based on the presence or absence of lifetime psychiatric disorders.

Methods: The present study examined these questions using data from 472 current, 311 former, and 324 never-smokers aged 34–44 years.

Results: Current smokers reported being more reactive to stress, more aggressive, more alienated, and less harm avoidant than both former smokers and never-smokers, whereas former smokers and never-smokers showed similar personality profiles overall. Psychiatric disorder history did not interact with smoking status in predicting personality. Controlling for differences in four major lifetime psychiatric disorders (major depression, alcohol dependence, drug dependence, and conduct disorder) reduced the differences in personality traits associated with smoking status. However, smoking status continued to relate uniquely and significantly to higher levels of negative emotionality and behavioral undercontrol with the most robust effect observed for trait alienation.

Discussion: These results provide the most comprehensive depiction to date of interrelations among personality, psychopathology, and smoking and suggest an important role of personality in smoking that is not redundant with or conditional upon lifetime psychopathology.

Introduction

Research has demonstrated consistently that smokers score higher on personality scales measuring a tendency to experience negative emotions and lower on scales indicative of the ability to constrain behavior. Over a decade ago, a major review concluded that smokers, compared with nonsmokers, were more likely to be high in traits such as depression, anxiety, anger, social alienation, impulsivity, sensation seeking, and psychoticism and low in traits such as conscientiousness and agreeableness (Gilbert & Gilbert, 1995). More recent reports demonstrated a link between smoking and higher neuroticism, extraversion, hostility, aggression, novelty seeking, impulsiveness, excitement seeking, and sensation seeking and lower agreeableness, conscientiousness, self-discipline, and constraint (Calhoun, Bosworth, Siegler, & Bastian, 2001; Etter, Pelissolo, Pomerleau, & De Saint-Hilaire, 2003; Kubicka, Matejcek, Dytrych, & Roth, 2001; Munafó & Black, 2007; Munafó, Zetteler, & Clark, 2007; Terracciano & Costa, 2004; Vollrath & Torgersen, 2008; Whiteman, Fowkes, Deary, & Lee, 1997) with neuroticism demonstrating a consistent relationship with tobacco dependence (Breslau, Kilbey, & Andreski, 1993; Kawakami, Takai, Takatsuka, & Shimizu, 2000; Kendler et al., 1999; McChargue, Cohen, & Cook, 2004).

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Although significant smoking–personality associations have been demonstrated in a range of studies, these studies generally have not assessed a history of psychiatric disorders, with a few notable exceptions (Breslau et al., 1993; Degenhardt & Hall, 2001; Kendler et al., 1999), and no studies have sought explicitly to provide a comprehensive examination of the overlap and interactions between personality and psychiatric disorders as they relate to smoking. This is an important omission. Smoking and tobacco dependence have been related consistently to increased rates of externalizing disorders, including drug and alcohol use disorders, attention-deficit disorder, disruptive behavior disorders, and antisocial personality disorder (ASPD; Breslau, 1995; Burke, Loeber, White, Stouthamer-Loeber, & Pardini, 2007; Degenhardt & Hall, 2001; Kahler et al., 2008; Kendler et al., 1999; Lasser et al., 2000; Rohde, Kahler, Lewinsohn, & Brown, 2004a, 2004b; Rohde, Lewinsohn, Brown, Gau, & Kahler, 2003). With regard to internalizing disorders, smokers are significantly more likely than nonsmokers to meet criteria for major depressive disorder and anxiety disorders (Breslau, Kilbey, & Andreski, 1991; Breslau, Peterson, Schultz, Chilcoat, & Andreski, 1998; Brown, Lewinsohn, Seeley, & Wagner, 1996; Degenhardt & Hall, 2001; John, Meyer, Rumpf, & Hapke, 2004; Kendler et al., 1999; Lasser et al., 2000; Lyons et al., 2008). Tobacco dependence is related consistently to major depression and anxiety disorders (Breslau, 1995; Breslau et al., 1991; Dierker & Donny, 2008; Goodwin, Zvolensky, & Keyes, 2008).

Although a number of studies have linked smoking either to psychiatric comorbidity or to personality, little research has been conducted to integrate these two distinct literatures. Recent theories of psychopathology have posited that specific psychiatric disorders represent facets of two underlying core psychopathological processes, internalizing disorders and externalizing disorders (Krueger, 1999), which parallel the personality constructs of negative emotionality and behavioral undercontrol, respectively. In this two-dimensional conceptualization of psychopathology, psychiatric disorders are seen as representing extreme points on a continuum of emotional and behavioral functioning. Given this conceptualization, the nature of the observed personality differences between smokers and nonsmokers is unclear. Personality and psychopathology may overlap to such an extent that personality has little unique association with smoking when controlling for lifetime psychopathology. Alternatively, psychiatric history may moderate the association between personality and smoking. For example, Krueger et al. (1996) found that personality traits were more strongly related to a given psychiatric disorder when examining those with comorbid psychopathology than when examining only “pure” cases of the disorder. Likewise, smoking may be more strongly related to personality variation associated with psychiatric comorbidity than it is with variation in personality among those with no psychiatric disorder history. Examining personality traits as they relate to smoking in the presence and the absence of psychiatric conditions is an important step to understanding where along the negative emotionality (internalizing disorders) and behavioral undercontrol (externalizing disorders) dimensions, smoking is related to variation in personality.

This study examined the extent to which personality traits show associations with smoking status (never, former, or current) and lifetime tobacco dependence that are independent from or conditional upon the effects of comorbid psychopa-

thology. Data were from adults participating in a large cohort study in southeastern New England, the Transdisciplinary Tobacco Use Research Center: New England Family Study (TTURC: NEFS). We assessed traits related to negative emotionality (stress reaction, alienation, and aggression) and behavioral constraint (harm avoidance and control) using the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982) and assessed lifetime alcohol dependence, substance dependence, major depressive disorder, and conduct disorder. Following Krueger et al. (1996), analyses were conducted to determine which personality traits differed significantly by smoking status in the sample as a whole and in the presence and the absence of lifetime psychiatric disorders. Analyses were then conducted to determine whether lifetime psychiatric diagnoses accounted for differences in personality traits associated with smoking status and tobacco dependence.

Methods

Participants

Participants were offspring of pregnant women enrolled in the Collaborative Perinatal Project (CPP) between 1959 and 1966 (Broman, 1984; Niswander & Gordon, 1972). Mothers were enrolled during pregnancy, and their offspring were followed periodically through age 7. The TTURC: NEFS was established in 1999 to locate and interview a subsample of the adult CPP offspring at the Providence, RI, and Boston, MA, sites. This multi-study program project included three major substudies, all investigating risks for nicotine dependence and comorbid psychopathology across three generations. One project focused on sibling concordance for nicotine-related behaviors, a second involved a smoking cessation trial for current smokers, and a third investigated the development of smoking behaviors among adolescent offspring.

Participants in the present study were selected as part of the TTURC: NEFS, using a multistage sampling procedure that oversampled families in which multiple siblings participated. For this project, screening questionnaires were mailed to 4,579 of the 15,721 Boston and Providence TTURC: NEFS offspring who survived until age 7. Of the 3,121 questionnaires returned (68.2%), 2,271 were selected for participation as meeting eligibility criteria for one or more of the three substudies of the overall project. These included adult respondents who (a) had a child between the ages of 12 and 17 years, (b) reported that they were a current smoker, and/or (c) had a sibling who also returned a screening questionnaire. Of these respondents, we enrolled 1,674 TTURC: NEFS offspring (73.7%); the remaining subjects could not be relocated or scheduled or refused to complete the full study assessment. Data from 49 individuals were excluded from the final sample because they received a pilot version of the survey ($n = 11$) or because of problems with the interview administration ($n = 38$). We report here only on those who completed the MPQ and all diagnostic and smoking assessments. This yielded a sample of 1,130 completed adult assessments (64% female and 60% married). The mean age was 39 years ($SD = 1.9$, range = 34–44). The sample was 86% non-Hispanic White, 7% Black, 1% Hispanic/Latino, and 6% of other backgrounds. Some 5% of participants completed less than a high school education, 18% completed high school or general education development (GED) test only, 47% completed some postsecondary education, 19% completed

college, and 11% completed a graduate degree. The sample included 740 subjects with no siblings in the analytical sample, 164 sibling pairs, 15 sibling trios, 3 sibling quartets, and 1 sibling quintet from a total of 923 families.

Procedure

Upon completing informed consent and an in-person interview, all participants ($N=1,625$) were given a set of self-report questionnaires to complete. Some questionnaires were completed in person, but most were returned by mail. The completion rate for these questionnaires was 73%. We tested for potential differences between completers and noncompleters of the MPQ, using a p value of .01 because of the large number of comparisons. Current smokers (64.4% completion) were less likely to complete the MPQ than were never-smokers (71.2%) and former smokers (73.35), $\chi^2(2, n=1,590)=10.01$. Completion rates were significantly lower for men than for women (62.1% vs. 74.6%), $\chi^2(1, N=1,625)=28.93$; for non-White participants than for White participants (58.6% vs. 71.6%), $\chi^2(1, n=1,622)=17.99$; and for those without a history of major depressive disorder than for those with such a history (67.3% vs. 76.6%), $\chi^2(1, n=1,605)=12.25$. Completion of the MPQ was not significantly associated with education or marital status nor was it associated with lifetime alcohol dependence, substance dependence, or conduct disorder.

Measures

Smoking status. Smoking histories were obtained by the Lifetime Interview of Smoking Trajectories and the Quitting Methods Questionnaire, developed by the Methods and Measurement core of the TTURC: NEFS. These instruments obtain detailed information on participants' experiences with tobacco smoking beginning from experimentation, progression to regular smoking, levels of consumption, and patterns of quit attempts. In addition, tobacco dependence according to *DSM-IV* criteria (American Psychiatric Association, 1994) was assessed using a modified version of the Composite International Diagnostic Interview (CIDI; World Health Organization, 1990). This module is described in detail in Dierker et al. (2007).

Data were available to classify 1,107 participants (98.0% of the sample) according to whether they were never-smokers, former smokers, or current smokers. Never-smokers were defined as those individuals who had never smoked on a weekly or more frequent basis and had smoked fewer than 100 cigarettes in their lifetime. Former smokers were defined as regular smokers (at least weekly) or nonregular smokers who had smoked at least 100 cigarettes who were not currently smoking. Current smokers were defined as regular smokers (at least weekly) or nonregular smokers who had smoked at least 100 cigarettes who were currently smoking at least 1 day/week. We excluded smokers who currently smoked less than once per week and those who currently smoked only cigars or pipes.

Diagnostic measures

Lifetime psychiatric diagnoses were assessed with well-established structured interviews that were modified slightly for the TTURC: NEFS, as described below. Because we compared smoking groups based on lifetime status, we focused on lifetime disorders rather than on current disorders, which are considerably more rare and reflect only current functioning. The CIDI was used to assess

lifetime major depressive disorder. The primary change made to the CIDI was to incorporate questions to identify depressive episodes that occurred as a result of physical illness, use of medications, drug use, heavy alcohol use, or bereavement and, therefore, did not meet formal *DSM-IV* criteria for a major depressive disorder.

Lifetime occurrence of *DSM-IV* alcohol dependence also was assessed with a slightly modified version of the CIDI. The module differed from the standard CIDI in that (a) dependence symptoms were assessed regardless of responses to abuse symptoms, (b) withdrawal symptoms were assessed individually, and (c) withdrawal was coded as present only if at least two symptoms were endorsed, consistent with *DSM-IV* criteria. For the present study, only alcohol dependence was examined because it is a more well-defined and reliable syndrome than alcohol abuse. We used the fourth version of the Diagnostic Interview Schedule (DIS-IV; Robins, Helzer, Croughan, & Ratcliff, 1981) to assess lifetime dependence on substances other than alcohol. The DIS-IV was used because it provides a particularly efficient assessment of multiple classes of drugs. The DIS also assesses specific withdrawal symptoms for all major drug classes.

Lifetime conduct disorder and ASPD were assessed with an interview that combined the conduct disorder section of the CIDI and both the conduct disorder and the ASPD modules of the DIS-IV (there is no ASPD section of the current CIDI). We modified skip-out criteria to ensure that all subjects would report on a core set of approximately 20 childhood and 30 adult antisocial behaviors (for breadth in symptom counts). For those with multiple positive responses, we obtained the information needed to generate diagnoses according to *DSM-IV* criteria (e.g., three or more in the same year, impairment, and lack of remorse), consistent with the format of both the CIDI and the DIS. For the present study, we analyzed lifetime conduct disorder (5.1% prevalence) rather than ASPD because it was slightly more common than the ASPD diagnosis (4.0% prevalence); by definition, all participants with ASPD also had evidence of conduct disorder prior to age 15.

Personality. Personality traits were measured with 18-item subscales selected from the MPQ (Tellegen, 1982), three related to negative emotionality (stress reaction, alienation, and aggression) and two related to behavioral undercontrol (harm avoidance and control). The MPQ has been well validated in longitudinal and genetic research (Krueger, 2000; Roberts, Caspi, & Moffitt, 2001). The stress reaction subscale ($\alpha=.91$ in the present study) assesses a tendency to be easily upset, nervous, sensitive, and prone to worry and guilt. Aggression ($\alpha=.89$) indicates a tendency to hurt, frighten, and victimize others and to enjoy observing violence. Alienation ($\alpha=.93$) is similar to the construct of cynical hostility and indicates a tendency to feel betrayed, mistreated, victimized, and unlucky. Harm avoidance ($\alpha=.82$) reflects a desire to avoid injury, dangerous situations, and risk. Finally, control ($\alpha=.86$) reflects a tendency to be cautious, planful, reflective, organized, and rational. All items are rated on a 0 = definitely false to 3 = definitely true scale. All scales were T scored for analysis purposes.

Data analyses

We first examined differences among never-smokers, former smokers, and current smokers on the demographic characteristics

of gender, age, race/ethnicity, and education. We next ran bivariate analyses examining lifetime rates of alcohol dependence, substance dependence, conduct disorder, and major depressive disorder across the three smoking groups. We also examined the correlations among personality scales and psychiatric diagnoses. We then examined mean levels of personality traits across smoking groups using generalized estimating equations (GEE), an analytical method that extends regression to account for the nonindependence in our data due to the inclusion of siblings. Within-sibling correlation was modeled using an exchangeable correlation matrix. The GEE model was used to test for significant smoking group differences while controlling for sex and race/ethnicity. These analyses were then repeated with the sample stratified by history of psychiatric disorder (positive vs. negative). In addition, the interaction between smoking status and psychiatric disorder history was tested to determine whether smoking–personality associations were moderated by psychiatric history. Finally, to determine further the extent to which psychiatric diagnoses accounted for the association between smoking status and personality, we ran regression analyses predicting personality traits with sex, race/ethnicity, smoking group, and four lifetime psychiatric diagnoses (alcohol dependence, substance dependence, conduct disorder, and major depressive disorder) as independent variables. We also used GEE analyses to examine differences in personality associated with lifetime tobacco dependence among ever-smokers and whether these differences were accounted for by lifetime psychiatric diagnoses.

Because we examined five personality traits in each of these analyses, we used a Bonferroni-corrected α level of .01 to determine significance to reduce the odds of Type I error. For each analysis, we present model coefficients (i.e., B) indicating the adjusted difference in T -scores between smoking groups that differed significantly. This difference provides an index of the magnitude of the differences observed, given that the sample SD of the T -scores is 10. Thus, a model coefficient of 5.0 would be equivalent to a medium effect size of Cohen's $d = .50$ (i.e., 5.0/10).

Results

Smoking status and demographics

Of the 1,107 subjects with known lifetime smoking status and MPQ data, 472 (42.6%) were classified as never-smokers, 311 (28.1%) as former smokers, and 324 (29.3%) as current smokers. The mean age, proportion female, and racial breakdown of these three smoking groups are presented in Table 1. Based on GEE analyses that accounted for sibling correlations, current and former smokers were significantly less likely than never-smokers to be male and to have completed college. Current smokers also were less likely than never-smokers to be married. Compared with former smokers, current smokers were less likely to be White, to have completed college, and to be married. Although we found differences in marital status and education associated with smoking status, we did not control for these variables in our primary analyses of personality traits because both marital status and education may represent outcomes that result from personality traits or factors that influence personality. Analyses repeated while controlling for marital status and education yielded similar results, although the magnitude and

significance of effects were reduced by these covariates. By contrast, sex and race/ethnicity clearly precede both smoking and the emergence of personality traits and, therefore, are more likely to be considered confounders in the smoking–personality association. We controlled for these demographic differences in all analyses of smoking status.

Smoking status and lifetime psychiatric diagnoses

Lifetime rates of psychiatric disorders showed consistent increases across never-smokers, former smokers, and current smokers (see Table 1). Specifically, current and former smokers had significantly higher rates of lifetime alcohol dependence, substance dependence, conduct disorder, and any externalizing or any psychiatric disorder compared with never-smokers. Current smokers also were more likely than never-smokers to have a history of major depressive disorder. Compared with former smokers, current smokers had higher rates of all disorders other than depression.

Correlations among personality traits and psychiatric disorders

Correlations among personality traits and psychiatric diagnoses are presented in Table 2. The measures of negative emotionality (stress reaction, aggression, and alienation) were correlated moderately to highly positively with one another, whereas other correlations among MPQ scales were of small to medium size. Correlations with the psychiatric disorders were of small to medium size and were in the anticipated direction (higher negative emotionality and low control and harm avoidance for most diagnoses).

Smoking status and personality traits

Figure 1 presents means and SE bars for the MPQ personality traits for each smoking group adjusted for gender and race/ethnicity. Controlling for gender and race in GEE analyses ($n=1,104$), we found that former smokers had significantly higher scores than never-smokers on alienation ($B=1.79$, 95% $CI=0.52-3.06$, $p=.006$) and significantly lower scores on control ($B=-2.06$, 95% $CI=-0.67$ to -3.45 , $p=.004$). Compared with never-smokers and former smokers, current smokers had significantly higher scores on stress reaction (vs. never: $B=4.13$, 95% $CI=2.70-5.56$, $p<.0001$; vs. former: $B=2.63$, 95% $CI=1.13-4.14$, $p=.0006$), aggression (vs. never: $B=4.03$, 95% $CI=2.72-5.34$, $p<.0001$; vs. former: $B=2.74$, 95% $CI=1.31-4.17$, $p=.0003$), and alienation (vs. never: $B=6.58$, 95% $CI=5.17-8.00$, $p<.0001$; vs. former: $B=4.79$, 95% $CI=3.24-6.34$, $p<.0001$) and lower scores on harm avoidance (vs. never: $B=-2.69$, 95% $CI=-1.39$ to -4.00 , $p=.0001$; vs. former: $B=-2.22$, 95% $CI=-0.80$ to -3.65 , $p=.004$). Current smokers also had significantly lower scores on control compared with never-smokers ($B=-3.34$, 95% $CI=-1.91$ to -4.77 , $p<.0001$).

In the second step of these analyses, we removed those smokers who had a history of any psychiatric disorder. This analysis comprised 646 subjects (49 subjects could not be included due to missing data on psychiatric disorder history that made it impossible to determine a negative history for each diagnosis). Figure 2 presents the personality traits for the smoking groups after these individuals were removed. In this subsample, never-smokers and former smokers did not differ significantly

Table 1. Demographic characteristics and lifetime rates of psychiatric disorders among never-smokers, former smokers, and current smokers

Variable	Never-smokers (<i>n</i> = 472)	Former smokers (<i>n</i> = 311)	Current smokers (<i>n</i> = 324)	<i>p</i> value
Demographics				
Percent male	44.1	26.4	32.7	A, B
Age, year; <i>M</i> (<i>SD</i>)	39.1 (1.89)	39.3 (1.88)	38.9 (1.79)	<i>ns</i>
Race, %				
White	86.6	89.7	81.5	C
Black	8.7	4.2	8.6	<i>ns</i>
Other	4.7	6.1	9.9	B
Education, %				
Less than high school	2.1	4.2	11.7	B, C
High school/GED	13.3	15.1	27.5	B, C
Some college	40.9	52.1	48.8	A
College	43.6	28.6	12.0	A, B, and C
Percent married	69.7	69.8	37.7	B, C
Lifetime psychiatric diagnoses				
Alcohol dependence	6.3	12.7	20.7	A, B, and C
Substance dependence	4.8	15.1	25.3	A, B, and C
Conduct disorder	1.3	6.5	9.9	A, B
Externalizing disorder ^a	11.1	22.6	35.3	A, B, and C
Major depression	22.1	28.9	33.4	B
Any disorder ^b	29.2	40.7	52.5	A, B, and C

Note. ^aHistory of alcohol dependence, substance dependence, or conduct disorder.

^bHistory of any externalizing disorder or major depressive disorder.

A = never vs. former, $p < .01$; B = never vs. current, $p < .01$; C = former vs. current, $p < .01$; GED = General Education Development test.

on any personality scales. Current smokers continued to differ significantly from never-smokers and former smokers on alienation ($B = 4.81$, 95% $CI = 3.13-6.49$, $p < .0001$, and $B = 3.52$, 95% $CI = 1.67-5.38$, $p = .0008$, respectively) and harm avoidance ($B = -2.76$, 95% $CI = -0.98$ to -4.54 , $p = .003$, and $B = -3.16$, 95% $CI = -1.25$ to -5.08 , $p = .002$, respectively). Current smokers had significantly higher aggression compared with never-smokers ($B = 2.92$, 95% $CI = 1.27-4.58$, $p = .003$) but not former smokers. Current smokers did not differ significantly from never-smokers or former smokers on stress reaction or control.

Examination of only those smokers with a history of psychiatric disorder ($n = 419$) revealed that never-smokers and former smokers did not differ significantly on any scales (Figure 3). Current smokers were significantly higher than never-smokers and former smokers on aggression ($B = 3.16$, 95% $CI = 0.85-5.48$, $p = .008$, and $B = 3.45$, 95% $CI = 1.25-5.68$, $p = .003$, respectively) and alienation ($B = 5.88$, 95% $CI = 3.53-8.23$, $p < .0001$, and $B = 5.00$, 95% $CI = 2.76-7.24$, $p < .0001$, respectively). Current smokers had significantly higher stress reaction than former smokers ($B = 3.62$, 95% $CI = 1.48-5.76$, $p = .0009$) but did not differ significantly from never-smokers. Current smokers did not differ significantly from never-smokers and former smokers on control or harm avoidance.

In summary, when variability in personality was constrained by limiting the data to those with or without lifetime psychopathology, a number of effects weakened, and differences between never-smokers and former smokers became nonsignificant. However, the overall pattern of results remained similar: current smokers showed consistent differences from never-smokers and former smokers. This interpretation was bolstered by the non-

significance of tests of whether smoking status and lifetime psychiatric disorder interacted in predicting personality ($p = .01$).

To examine further the association between personality traits and smoking while accounting for the potential overlap between psychiatric disorder and personality, we ran a series of GEE analyses in which we regressed each personality trait simultaneously on gender, race, smoking status, and each of the lifetime psychiatric disorder diagnoses (alcohol dependence, substance dependence, conduct disorder, and major depressive disorder). In these models ($n = 1,041$ participants who had valid data on each psychiatric disorder), compared with never-smokers and former smokers, current smokers were significantly higher on alienation (vs. never: $B = 4.99$, 95% $CI = 3.58-6.40$, $p < .0001$; vs. former: $B = 4.13$, 95% $CI = 2.64-5.62$, $p < .0001$) and lower on harm avoidance (vs. never: $B = -2.15$, 95% $CI = -0.77$ to -3.53 , $p = .003$; vs. former: $B = -2.08$, 95% $CI = -0.62$ to -3.53 , $p = .007$). Current smokers also were significantly higher on stress reaction ($B = 2.58$, 95% $CI = 0.70-2.58$, $p = .0002$) and aggression ($B = 2.53$, 95% $CI = 1.06-4.00$, $p = .0009$) compared with never-smokers. We found no significant differences on control. Never-smokers and former smokers did not differ significantly on any personality trait when we controlled for gender, race, and the four lifetime psychiatric disorder diagnoses.

Tobacco dependence and personality traits

We next classified those participants who had ever been smokers (i.e., former smokers and current smokers) by lifetime tobacco dependence (yes vs. no). We then ran GEE models with MPQ traits as the dependent variables and gender, race, and lifetime

Table 2. Simple correlations among Multidimensional Personality Questionnaire subscales and lifetime psychiatric diagnoses

Variable	SR	AG	AL	CN	HA	AD	SD	CD	MDD
Stress reaction (SR)	-	0.36; <.0001	0.60; <.0001	-0.33; <.0001	0.01; ns	0.19; <.0001	0.18; <.0001	0.13; <.0001	0.37; <.0001
Aggression (AG)	-	-	0.54; <.0001	-0.40; <.0001	-0.30; <.0001	0.18; <.0001	0.20; <.0001	0.16; <.0001	0.07; <.003
Alienation (AL)	-	-	-	-0.32; <.0001	-0.15; <.0001	0.19; <.0001	0.22; <.0001	0.20; <.0001	0.23; <.0001
Control (CN)	-	-	-	-	0.28; <.0001	-0.19; <.0001	-0.23; <.0001	-0.15; <.0001	-0.15; <.0001
Harm avoidance (HA)	-	-	-	-	-	-0.14; <.0001	-0.11; 0.0002	-0.07; 0.01	0.02; ns
Lifetime alcohol dependence (AD)	-	-	-	-	-	-	0.46; <.0001	0.28; <.0001	0.22; <.0001
Lifetime substance dependence (SD)	-	-	-	-	-	-	-	0.24; <.0001	0.19; <.0001
Lifetime conduct disorder (CD)	-	-	-	-	-	-	-	-	0.16; <.0001
Lifetime major depressive disorder (MDD)	-	-	-	-	-	-	-	-	-

Note. The first row for each variable shows the Pearson correlation, and the second row shows the associated *p* value.

tobacco dependence as the independent variables (*n*=623). Ever-smokers with lifetime tobacco dependence were significantly higher on stress reaction (*B*=4.56, 95% *CI*=2.87–6.24, *p*<.0001) than were those without lifetime tobacco dependence. Differences were not significant on the other four personality traits. When we controlled for the four lifetime psychiatric disorders, the effect of lifetime tobacco dependence on stress reaction was reduced but significant (*B*=2.78, 95% *CI*=1.12–4.41, *p*=.0008).

Discussion

Consistent with previous research, current smokers had higher levels of behavioral undercontrol (control and harm avoidance) and negative emotionality (stress reaction, alienation, and aggression) and higher rates of lifetime psychopathology (major depression, alcohol dependence, substance dependence, and conduct disorder) compared with former smokers and never-smokers. Former smokers exhibited rates of psychopathology that were generally midway between those for current smokers and never-smokers. The personality profiles of former smokers and never-smokers rarely differed significantly from one another, whereas former and current smokers differed significantly in a number of analyses. The smoking–personality relationship was generally consistent across those with and without lifetime psychiatric disorders, and analyses did not suggest that the smoking–personality link was moderated by psychiatric history. Thus, smoking is related to variation in personality in both the absence and the presence of lifetime psychopathology.

We also evaluated the extent to which the association between personality and smoking was accounted for by lifetime psychiatric disorders. The differences between current smokers and never-smokers in alienation, aggression, stress reaction, and harm avoidance were robust when we controlled for psychiatric history, with the largest differences on alienation (with an adjusted difference of almost 5 *T*-score units, a medium effect size). With the exception of control, which did not differ significantly between current smokers and never-smokers when we controlled for psychiatric history, the present results suggest that personality traits have unique, though modest, associations with current smoking versus never-smoking that are above and beyond the influence of lifetime psychiatric comorbidity.

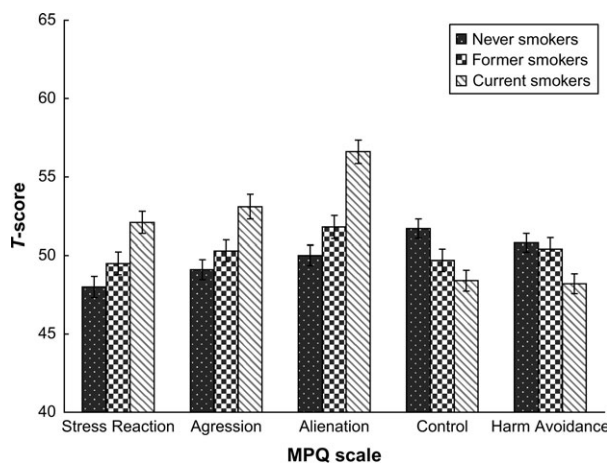


Figure 1. Personality scores for never-smokers, former smokers, and current smokers, adjusting for gender and race/ethnicity in the full sample.

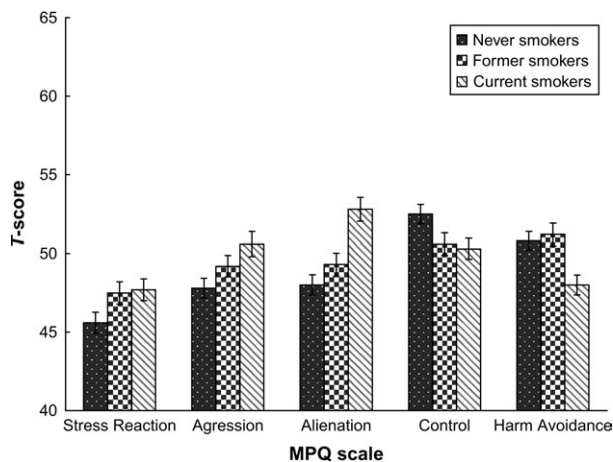


Figure 2. Personality scores for never-smokers, former smokers, and current smokers, adjusting for gender and race/ethnicity and including only those participants with no history of psychiatric disorder (i.e., alcohol dependence, substance dependence, conduct disorder, or depression).

In the comparisons of current and former smokers, differences in stress reaction and aggression were not significant when we controlled for psychiatric history. Thus, once we accounted for the fact that current smokers have considerably higher rates of lifetime psychopathology than do former smokers, stress reaction and aggression did not appear to relate specifically to the propensity to continue smoking. By contrast, differences between current and former smokers on alienation and harm avoidance remained significant when we controlled for psychiatric history. Differences in alienation were most robust, with an adjusted effect size of more than 4 *T*-score units. The relationship between alienation and persistence of smoking was consistent with studies showing that higher trait hostility (a closely related construct) predicts persistence of smoking (Brummett et al., 2002; Lipkus, Barefoot, Williams, & Siegler, 1994) and a lower likelihood of maintaining abstinence following smoking cessation treatment (Kahler, Spillane, Leventhal, 2009; Kahler, Strong, Niaura, & Brown, 2004). We speculate that alienated individuals, who view themselves as victimized and un-

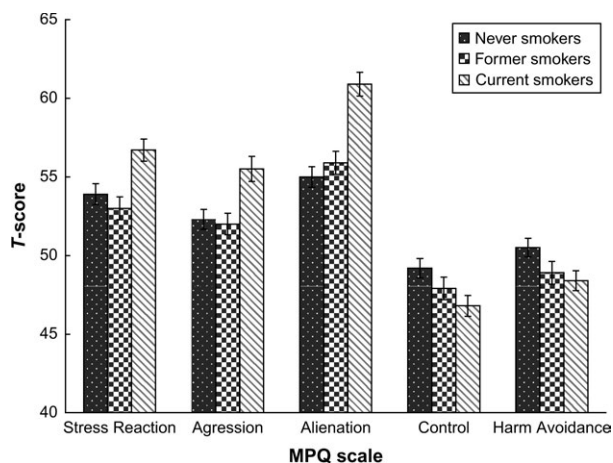


Figure 3. Personality scores for never-smokers, former smokers, and current smokers, adjusting for gender and race/ethnicity and including only those participants with a history of psychiatric disorder (i.e., alcohol dependence, substance dependence, conduct disorder, or depression).

lucky, are less apt to sustain changes in health-promoting behaviors because they view their behavior and health as outside of their personal control, consistent with a health beliefs model. The fact that current and former smokers differed on harm avoidance even after we controlled for lifetime psychiatric disorders suggests that those who continue to smoke are less risk averse than are those who have quit, consistent with recent evidence that the closely related trait of sensation seeking is associated with poor outcome in smoking treatment (Kahler, Spillane, Metrik, Leventhal, & Monti, in press).

Overall, we found few differences in the personality profiles of former smokers and never-smokers. Although former smokers scored significantly higher on alienation and control (effect sizes of ca. 2 *T*-score units), these differences were not significant when we controlled for psychiatric disorders. Terracciano and Costa (2004) found that, compared with never-smokers, former smokers scored lower on conscientiousness and higher on neuroticism. That investigation did not account for the effect of psychiatric disorders. The present study extends these findings by indicating that relatively small differences in personality between former smokers and never-smokers may be due in part to differences in lifetime psychiatric conditions.

When lifetime smokers were grouped by whether they had ever met criteria for tobacco dependence, we found no significant differences in personality profiles, with the exception of stress reaction, which was higher among those with a history of dependence, an effect that was robust when we controlled for lifetime psychiatric history, despite the relatively strong association between stress reaction and major depression ($r = .37$). This result is consistent with the findings of Breslau et al. (1993), who showed that measures of negative emotionality were associated more strongly with tobacco dependence than with nondependent smoking, an effect that was robust to controlling for psychiatric history. Negative emotionality may serve as a common risk factor for both major depression and smoking (Breslau, Kilbey, & Andreski, 1994). The present study indicates that the tendency to be easily upset, nervous, and prone to worry and guilt is the most relevant facet of negative emotionality for tobacco dependence vulnerability. It also suggests that differences between former and current smokers in alienation and harm avoidance are not due to those traits being associated with a greater risk for lifetime tobacco dependence.

Limitations

This study had several limitations. First, several relevant psychiatric conditions were not assessed (e.g., anxiety disorders and psychotic disorders). Second, the primary comparisons were based on categorical definitions of smoking status and tobacco dependence. Such approaches ease communication of results but necessarily constrain variability by creating homogeneous classes. Also, we analyzed personality traits as separate continuous variables and did not create personality subtypes or test interactions between scales and disorders. Although subtype and interactional investigations have value (Terracciano & Costa, 2004; Vollrath & Torgersen, 2008), the number of interactions and subtypes that could be created using five personality traits and four psychiatric disorders rendered such an approach unwieldy for the present purposes.

The age range in the sample was limited to 34–44 years. The relative homogeneity of ages at the time of the interview was useful in that it minimized effects of age on personality. Furthermore, participants were likely to have passed through the ages during

which risk for cigarette smoking and the onset of psychiatric disorders is most elevated. At the same time, we cannot rule out the possibility that certain associations we found might be different in other age cohorts. Individuals completing the MPQ were more likely than those not completing the MPQ to be female, to be White, to be former smokers or never-smokers, and to have a history of major depressive disorder. Although our analyses controlled for variables related to MPQ completion, each of these variables had differing associations with personality traits, and we cannot know whether personality traits were predictive of who completed the MPQ. Thus, we cannot speculate with any confidence how results may have been influenced by nonresponse. Finally, this study was correlational and cross-sectional. The temporal and causal nature of interrelationships among personality, psychiatric comorbidity, and smoking cannot be addressed by the present study. Future longitudinal studies that assess personality prior to the onset of smoking and psychiatric conditions are needed.

Conclusions

This study provided a unique examination of smoking history, major lifetime psychiatric disorders, and personality traits in a relatively large community cohort. Results highlight that personality traits associated with smoking are relevant regardless whether these traits are expressed within the range of the continuum, in which psychopathology is typically not expressed, or in the range that relates to elevated psychiatric comorbidity. Furthermore, a number of traits differ by lifetime smoking status even when controlling for the fact that smokers tend to experience much higher lifetime rates of major internalizing and externalizing disorders. In particular, given the evidence of unique and consistent influences of alienation and harm avoidance on current versus former smoking, future investigation of the mechanisms linking these traits to persistence of smoking appears warranted. Also, these traits may be relevant to the development of smoking cessation treatments because they may influence smoking cessation success and may be targets for tailored interventions.

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Declaration of Interests

None declared.

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