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Psychosocial Predictors of Nicotine Dependence in African American and Puerto Rican Adults: A Longitudinal Study

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Abstract

This study examined the psychosocial predictors of nicotine dependence in African Americans and Puerto Ricans. A longitudinal, prospective study design was employed. Data on five psychosocial domains was obtained from a four-wave study of tobacco use and smoking behavior; data was analyzed using logistic regression. Participants (N=475) included adult African Americans and Puerto Ricans initially recruited from urban public schools in New York City and interviewed when they were mean age 14 years, and then again when they were mean ages 19, 24, and 26. Structured interviews were administered at four points in time over a period of 12 years. Nicotine dependence was measured using a DSM-IV adapted version of the Kessler UM-CIDI nicotine dependence measure. Logistic regression analyses showed that factors in each of five psychosocial domains (personality, drug use behavior, family, peer, and environment) significantly predicted nicotine dependence. The pattern of results was similar for both African American and Puerto Rican samples. Protective factors that mitigated against nicotine dependence included achievement, ego-integration, and a positive school climate. The findings indicate that a variety of risk factors contribute to the diagnosis of nicotine dependence. When examining the causes of nicotine dependence, it is important to investigate an array of biopsychosocial and environmental factors.

Introduction

Studies have examined smoking prevalence in various ethnic groups in the U.S., and in general, they have found that Whites have the highest rates of smoking, followed by Hispanics and African Americans (Centers for Disease Control and Prevention, 2002; Griesler, Kandel, & Davies, 2002). Unfortunately, few longitudinal studies exist that examine the predictors of nicotine dependence beginning in adolescence and extending to adulthood, and we know of none that specifically examine adolescent psychosocial predictors of nicotine dependence in adult African Americans and Puerto Ricans. Examining these predictors within specific ethnic groups is important, as research shows that smoking may have differential health effects in minority populations. For example, even though smoking rates in African Americans are generally lower than those found in White samples, African Americans have higher rates of nicotine dependence (Payne & Diefenbach, 2003), suffer disproportionately higher rates of heart disease and stroke, and have a 50% increased risk of getting lung cancer compared with Whites (Centers for Disease Control and Prevention, 1998).

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The present research study is the fourth in a series of studies examining the relationships between personality, illegal drug use, family, peer, and environmental factors and tobacco use in a sample of African American and/or Puerto Rican subjects. The first paper in this series examined the association of early adolescent personality, family, peer, and smoking risk factors with smoking behavior five years later in Puerto Rican late adolescents when their mean age was 19 (Brook, Pahl, Balka, & Fei, 2004). The findings from that study showed a direct association between the psychosocial domains and smoking frequency. The second and third studies examined trajectories of smoking in African Americans and Puerto Ricans from adolescence (mean age 14) to young adulthood (mean age 26), and identified four types of smoking behavior groups; non-smoking, maturing-out smokers, late-starting smokers, and early-starting continuous smokers (Brook, Ning, & Brook, 2006). The first of the trajectory studies examined personality risk factors associated with smoking, and found that substance use, externalizing behaviors, and internalizing behaviors at mean age 14 significantly predicted later membership in the early-starting continuous smoking group. The second trajectory study examined peer and parental influences on smoking group membership, and found that peer smoking at mean age 14 had the strongest relationship with membership in the early-starting continuous group, followed by parental smoking, gender and ethnicity.

The primary goal of the current study is to examine the relationship of earlier risk factors in several psychosocial domains to nicotine dependence in the late 20's. Previous research has shown that cigarette smoking is multi-determined and the factors related to tobacco use vary by smoking trajectory (Brook, Ning, et al., 2006; Brook, Pahl, & Ning, 2006; Chassin, Presson, Pitts, & Sheran, 2000). This study specifically focuses on nicotine dependence, which represents the highest possible smoking stage, addiction. This is the first longitudinal study of inner-city African American and Puerto Ricans to assess risk and protective factors from five important domains expected to have a relationship with nicotine dependence: personality, illegal drug use, family, peer, and environmental factors.

Illegal Drug Use Domain

Studies have shown that two of the strongest predictors of increased smoking rates are illicit substance use and problems with illicit drugs (Brook, Ning, et al., 2006; Brook, Balka, & Whiteman, 1999; Orlando, Tucker, Ellickson, & Klein, 2004). We hypothesize that adolescent and young adult marijuana and cocaine use will be associated with nicotine dependence later in adulthood.

Personality Attributes Domain

Externalizing behaviors which include risk-taking and disinhibited behavior have been shown to be associated with increased rates of both cigarette use and illegal substance use (Brook et al., 2004; Burt, Dinh, Peterson, & Sarason, 2000; Koval, Pederson, Mills, McGrady, & Carvajal, 2000). Internalizing behaviors involving depression have been shown to be predictive of increased rates of tobacco consumption in both adolescents and adults (Glassman et al., 1990; Son, Markovitz, Winders, & Smith, 1997). The relationship between internalizing behavior and smoking is in accord with the self-medication hypothesis; namely, that smoking relieves a painful affective state (Khantzian, 1997). Another theory states that self-control can serve as a buffer for tobacco dependence (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Breslau, Kilbey, & Andreski, 1993; Brownell, Marlatt, Lichtenstein, & Wilson, 1986). Breslau, Kilbey, and Andreski (1994) found that individuals diagnosed with nicotine dependence had over a 3-fold increase in the risk of having a co-morbid major depressive disorder. Unfortunately the latter study was cross-sectional and so cannot shed light on the directionality of this relationship. Finally, factors that represent achievement, such as educational attainment, have been shown to be protective against

substance use, including smoking (Brook et al., 2004; Orlando et al., 2004; Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000; Lawrance & Robinson, 1986). In the present study we have included the intrapersonal factors described above as independent variables.

Family, Peer, and Environmental Domains

According to family interactional theory (Brook, Brook, Gordon, Whiteman, & Cohen, 1990), being raised in a supportive, cohesive environment leads to conventionality and reduced risk-taking behavior, which, in turn, is associated with less likelihood of nicotine dependence. Conversely, growing up in families that have had members arrested by the police has been found to be predictive of a number of unconventional and risk-taking behaviors, including smoking (Brook et al., 2004).

A number of studies have shown that having parents or siblings who smoke or use illegal drugs in the family increases one's risk of regular smoking (Alexander et al., 1983; Brook et al., 2004; Chassin, Clark, Presson, Sherman, & McGrew, 1986; Denton & Kampfe, 1994; Kierker, Avenevoli, Merikangas, Flaherty, & Stolar, 2001; Eckhardt, Woodruff, & Elder, 1994; Fagan, Brook, Rubenstein, & Zhang, 2005; Flay et al., 1994; Jackson & Henriksen, 1997; Nyari, Heredi, & Parker, 2005; Ohannessian et al., 2004). Although modeling is often cited as the reason for the observed link between smoking among family members, genetic effects may also be at play (Boomsma, Koopmans, Van Doornen, & Orlebeke, 1994; Maes et al., 1999). In addition, having friends who smoke or use illegal drugs greatly increases the likelihood of regular smoking in adolescence, continuing through to adulthood (Chassin et al., 2000; Flay, d'Avernas, Best, Kersell, & Ryan, 1983; Griffin, Botvin, Scheier, Doyle, & Williams, 2003; Orlando et al., 2004; Palmer, 1970; Robinson, Klesges, Zbikowski, & Glaser, 1997).

Environmental risk factors such as being a victim of violence, perceived neighborhood risks, and adverse school environments predict smoking behavior and regular smoking (Brook et al., 1999; Ellickson, Perlman, & Klein, 2003; Johnson & Hoffman, 2000; Novak & Clayton, 2001; U.S. Department of Health and Human Services, 1998). Thus we have included measures of family and peer smoking and illegal drug use, and perceived ecological risk factors.

While there are ethnic differences in the prevalence of smoking behavior, the overwhelming evidence suggests that there are no ethnic differences in the predictors of nicotine dependence. A number of investigators have found no ethnic differences in the smoking (but see Sussman et al. 1987; and Chassin et al. 1984a). Similarly, as regards parent and peer smoking, Griesler et al. (2002) and Flay et al. (1994) noted that parent and peer smoking predicted smoking across ethnic groups. The relationship between personality attributes (e.g., depression and delinquency) and tobacco use has been found to be similar in different ethnic group (Griesler et al. 2002; Chassin et al. 1984b). For example, school achievement predicts smoking similarly in different ethnic groups (Choi et al., 1997; Newcomb et al. 1989; USDHHS, 1998). Some investigators have reported no ethnic differences in parental closeness and smoking (Koepke et al., 1990).

Researchers have noted a major gap in the literature, with the absence of studies on psychosocial correlates and predictors of nicotine dependence (Avenevoli & Merikangas, 2003). In the current study we extend our previous work and the work of others in this area by examining four waves of data covering the period from adolescence (mean age 14) to young adulthood (mean age 26) in a community sample of African Americans and Puerto Ricans. Further, we focus specifically on nicotine dependence at age 26, and examine the influence of a wide range of factors in five major psychosocial domains. We hypothesize

that there are three mechanisms that will be operative for risk factors related to nicotine dependence. Such mechanisms include: 1) history of drug problems, such as marijuana use; 2) dispositional attributes of the individual, such as deviance; and 3) behavioral modeling (e.g., peer smoking). We will explore whether there are ethnic differences in the factors related to nicotine dependence. However, previous research (e.g., Greisler et al., 2002) and our own research (Brook, chapters) did not find ethnic differences in the psychosocial risk factors related to nicotine dependence.

Method

Participants

The sample for this study was drawn from a longitudinal study of African American and Puerto Rican young adults that began in 1990. At that time (T1) the participants were in the 7th, 8th, 9th, or 10th grades (mean age 14), and attended schools serving the East Harlem area of New York City. The participants were then re-interviewed in 1994–1997 (T2; mean age 19), in 2000–2001 (T3; mean age 24), and again in 2002–2003 (T4; mean age 26).

For the current study we focused our recruitment efforts on respondents who reported prior tobacco use. The participants who reported current tobacco use at mean age 24 were recruited into the study. We then selected a stratified random sample (by gender and ethnicity) of non-tobacco users, making sure we had sufficient numbers of both males and females, and equal numbers of African Americans and Puerto Ricans. Our over-sampling of tobacco users was designed to maximize power for analyses examining tobacco use and related issues. For budgetary reasons, we selected 475 subjects out of a sample of 650 T3 participants to be interviewed at T4. Only 2% of the subjects approached refused to participate. We could not locate 14% of the sample. In addition, we compared the subjects who had participated in previous waves (including T1) but did not participate at T4 with those who were interviewed at T4, and no appreciable differences were found on our measure of tobacco use or the psychosocial variables. In addition, there were no ethnic differences between those who participated at T4 and those a) who refused to participate (2%) and b) whom we could not locate (14%). When data was randomly missing, we used the full information maximum likelihood approach (FIML). Twelve respondents were excluded from the analyses because of missing data.

The final Time 4 sample of 463 participants was 52% male, 48% female, and had an average age of 26.07 (SD=1.45). The sample was composed of 235 (51%) African-American and 228 (49%) Puerto Rican respondents. The median educational level was 1 year of education post high school, 17.5% were employed in semi-skilled jobs (i.e., a bus driver), 11% in skilled jobs (i.e., a mechanic), 31% in clerical positions, 14% had professional level jobs, and 26.5% were unemployed at the time of the interview. In addition, 17.5% of the sample was married at the time of the interview, and 4% were divorced. Finally, current smoking was reported by 40.2% of the sample.

Procedure

Time 1 interviews were conducted in New York City high school classrooms using personal tape players to present the questionnaire. At that time the participants were allowed to choose the language of presentation, either English or Spanish. Subsequently, participants were interviewed at home or via telephone, and all interviews were conducted in English. The Institutional Review Boards of both the New York University School of Medicine (our current institutional affiliation) and the Mount Sinai School of Medicine (our prior institutional affiliation) approved the study's procedures for all waves of data collection.

The questionnaire used at Time 1 took approximately 45 minutes to complete, and collected data on the participant's personality, behavior including substance use, family, peer group, neighborhood environment, and demographic factors. The questionnaires used subsequently addressed many of the same issues, but the interviews were longer, taking about 1½ hours to complete. Time 2 interviews were conducted individually and in private at the participant's home, using trained interviewers. At Time 3, 85% of the interviews were conducted at home using trained interviewers, while the remaining 15% were done over the telephone. At Time 4, 33 participants (7%) were interviewed by telephone while the remaining 93% were interviewed in person. There were no significant differences between the subjects who were given in-person interviews and those given phone interviews on the psychosocial factors or on the measure of nicotine dependence. Whenever possible, in-person interviewers were matched for gender and ethnicity with the respondents, and in no cases did a male interviewer ever interview a female respondent.

Measures

The interviews administered to the participants included measures assessing 1) the adolescents' personality, attitudinal, and behavioral attributes, 2) aspects of family relations as well as parental behaviors such as smoking, 3) aspects of the peer group including smoking behavior, 4) environmental factors including the school environment, and 5) demographic factors. The interviews included measures that have been shown to have predictive validity in multiple studies conducted in the U.S. (Brook, Brook, Rubenstone, Zhang, Singer, & Duke, 2003; Brook, Brook, & Whiteman, 2000; Brook, Ning et al., 2006; Fagan et al., 2005) and in samples in other countries (Brook, Brook, De La Rosa, Whiteman, Johnson, & Montoya, 2001; Brook, Brook, Pahl, & Montoya, 2002; Brook, Brook, Rosen, & Montoya, 2002). Measures collected in these settings have shown consistent relationships with both smoking, drug use, and psychopathology.

The psychosocial predictors were drawn from five domains for this study; personality, illegal substance use, family, peer, and environment. Table 1 presents the scales, the Cronbach's alpha for each multi-item scale, and a sample item for each measure (See Table 1).

This study examined the influences of these predictors over the course of development of nicotine dependence to adulthood. Since all of these measures were collected at multiple times during successive interviews, we were able to form aggregate measures over time for each psychosocial measure of interest. Composite scores were formed by summing the values of the measures at each time point (T1–T3) to form a single measure for the majority of scales. For some measures (i.e., maternal illegal drug use and paternal illegal drug use) that were available only at Times 2 and 3, the composite score consisted of the sum of the values at T2 and T3. The rationale for the use of a composite measure is based on the following: 1) The measures of internal consistency across times are high (see Cronbach alphas); and 2) An individual score combined over several time periods (T1–T3) may present a more valid score than a measure obtained only at one point in time.

Tobacco dependence was assessed at Time 4 by use of the UM-CIDI nicotine dependence measure (Kessler, Personal communication 1/12/01). We adapted this measure to make it consistent with the DSM-IV criteria for nicotine dependence. As in the DSM-IV, a positive diagnosis was obtained when a minimum of three of seven criteria in the appropriate categories were endorsed by the participant. The seven criteria for nicotine dependence include: 1) physical tolerance; 2) signs of withdrawal when the subject refrains from smoking; 3) smoking in larger amounts and/or over a longer period than intended; 4) unsuccessful attempts to cut down or control the amount of smoking; 5) a large amount of time spent smoking (e.g., chain-smoking); 6) giving up or reducing social, occupational, or

recreational activities due to smoking; 7) continuing smoking despite knowing it has caused mental or physical health problems. A total of 146 respondents (31.5%) received a nicotine dependence diagnosis in the year prior to their Time 4 interviews. Chi-square tests showed no differences in the rate of past year nicotine dependence between males and females, or between ethnic groups.

Analysis

We conducted a series of multiple logistic regression analyses, examining each variable with control on age, gender, ethnicity, and the remaining variables within the domain. This was done in order to assess the association between the composite psychosocial measures that were assessed during adolescence (from the domains of personality, illegal drug use, family, peer, and the environment) and past year nicotine dependence in young adulthood. Prior to the analysis, each aggregate measure was standardized to allow for a direct comparison between the odds ratios. Odds ratios and 95% confidence intervals were then computed for each of the standardized composite measures investigated. These analyses controlled for gender, age, and ethnicity. We also performed a supplementary set of analyses that compared the African American and Puerto Rican samples to determine whether the relationship between the predictors and adult nicotine dependence varied between the two ethnic groups.

Results

The results from the logistic regression analyses can be seen in Table 2. As these findings show, factors from all of the domains are positively related to a diagnosis of nicotine dependence in the expected direction. Further, no differences were found in the pattern of predictors when comparing the African American and Puerto Rican samples.

All of the personality and illegal drug use factors were significantly related to a positive diagnosis for nicotine dependence. The use of illegal drugs through late adolescence and early adulthood was found to be highly related to an increased likelihood of nicotine dependence by age 26. In fact, problems with drugs showed the most powerful relationship with nicotine dependence of all of the factors considered. Also, the protective personality factors (e.g., achievement) were found to be significantly related to a reduced likelihood of nicotine dependence in adulthood.

All of the factors in the family domain were also related to nicotine dependence. Smoking and illicit drug use by household members during adolescence were associated with an increased risk of nicotine dependence in adulthood. Also, conflict in the household with one's parents, and being from a family that has had members arrested, were associated with an increased risk for nicotine dependence.

Finally, all of the peer and environmental factors were significantly related to nicotine dependence in adulthood with the exception of the amount of time spent with one's peers. Having peers who smoked or used illegal drugs was related to nicotine dependence for both the African American and Puerto Rican samples. In addition, the environmental factors we examined were significantly related to nicotine dependence, although the magnitude of those relationships were reduced in comparison with many of the other predictors considered. We also examined the interaction of ethnicity with the independent variables, using logistic regression analysis. The dependent variable was nicotine dependence. Only one of the interactions was significant.

Discussion

This study extends the literature in several ways. To begin with, this is the first longitudinal study to focus on the psychosocial predictors of nicotine dependence in a sample of African American and Puerto Rican adults studied from early adolescence. Nicotine dependence, which is characterized by physical tolerance, signs of withdrawal, smoking in larger amounts and/or over a longer period than intended, and so on, has more serious adverse effects than nicotine use. Our own previous research, as well as that of others, has mainly focused on initiation and use. Our findings that the psychosocial risk factors for nicotine use are also predictive of nicotine dependence highlights their importance for interventions directed at nicotine dependence. Second, the five domains of psychosocial risk factors studied and the twelve-year age range of the subjects from 14 to 26 represent a more extensive set of predictors and a longer period of time than is seen in the literature. Third, this study adds to previous work with this sample by specifically examining nicotine dependence using DSM-IV criteria, extending the previous findings that examined only smoking frequency or stage of smoking.

As the results show, the psychosocial predictors of nicotine dependence were not appreciably different for the African American and the Puerto Rican samples. The overwhelming majority of risk factors in adolescence in the domains of illicit drug use, personality, family, peer, and the environment were significantly and similarly related to later nicotine dependence in adulthood for both ethnic groups. Our ethnic findings extend the results of a study of initiation and persistence of adolescent cigarette smoking (i.e., Greisler et al, 2002) to the study of nicotine dependence. In both ethnic groups, nicotine dependence appears to be sensitive to a wide array of personal, familial, peer, and ecological influences. This is the first time adult nicotine dependence, has been linked to psychosocial factors in adolescence and young adulthood.

As hypothesized, risk factors in the domain of illicit drug use predicted the greatest increase in the odds of a diagnosis of nicotine dependence. This finding was consistent for both African Americans and Puerto Ricans. Although the frequency of cocaine use from age 14 to 24 was only moderately related to adult nicotine dependence, marijuana use over that period predicted a two to three-fold increase in the odds of the occurrence of nicotine dependence, and self-reported problems with drugs predicted more than a three-fold increase in the odds of obtaining a diagnosis of nicotine dependence at age 26. These findings are consistent with 1) problem behavior theory (Jessor & Jessor, 1973), which posits a clustering of problem behaviors; 2) literature showing the relationship between drug use and regular smoking; and 3) studies showing the relationship between drug use disorders and nicotine dependence. (e.g., Breslau et al., 1994; Brook, Ning et al., 2006; Orlando et al., 2004).

In the personality domain, all of the predictors over the course of development (age 14 through 24) were related to nicotine dependence at mean age 26. As previous research has shown, externalizing behaviors (e.g., deviance) are related to an increased risk of smoking initiation (Masse & Tremblay, 1997; McMahon, 1999), which may set the stage for increased smoking and an eventual diagnosis of nicotine dependence.

The findings suggesting that depression predicts nicotine dependence are in accord with Khantzian's (1997) hypothesis that individuals use substances to relieve painful affective states. Eventually, as both smoking and depression continue, quitting becomes more difficult as depressed individuals may feel they cannot withstand the pain of withdrawal. Of course there may be a reciprocal relationship between nicotine dependence and depression as noted by Breslau et al. (1993). Finally, a common genetic risk factor might exist that predisposes

an individual to both depression and nicotine dependence Kendler, Neale, MacLean, Eaves, and Kessler (1993). Previous studies with this Puerto Rican sample in adolescence have reported a relationship between academic achievement and reduced smoking risk, (e.g., Brook et al., 1994) and the current study extends this research by including an African American sample and examining a time period that extends into adulthood.

As hypothesized, a number of family dimensions predicted nicotine dependence; namely, maternal and paternal illegal drug use, conflict with the mother or father during development, parental and sibling smoking, and deviant and illegal behavior in the family environment. These findings may be due in part to genetic factors. Further, it is likely that this study's findings regarding parental and sibling smoking are due in part to smokers in the family acting as behavioral models, thereby increasing the likelihood of nicotine dependence (Mayhew, Flay, & Mott). As hypothesized, conflict with the mother or father during development significantly increased the odds of having a diagnosis of nicotine dependence at age 26.

Smoking in the peer group was the second strongest predictor of nicotine dependence next to having problems due to drug use (O.R. = 2.68). This adds to previous findings regarding peer risk factors for smoking behavior by focusing on nicotine dependence (Brook et al., 2002; Brook, Pahl et al., 2005; Flay et al., 1983; Palmer, 1970; Robinson et al., 1997).

In the environmental domain, an adverse school environment, having to actively avoid dangers on the street, and being a victim of violence were all related to a significantly increased risk for nicotine dependence. Becoming a victim of the risks present in the local environment appears to be related to increased stress. Nicotine dependence may be one means of coping with the stress or chronic anxiety resulting from environmental risks (Vermeiren, Schwab-Stone, Deboutte, Leckman, & Ruchkin, 2003).

Several limitations must be kept in mind when interpreting the results of this study. First, we have not included some important cultural values such as ethnic identification. Future research should include a broader assessment of the cultural values in order to study in depth the complex relationships among cultural values and nicotine dependence. Second, there are limitations to the generalizability of the present findings as our sample only included African American and Puerto Rican subjects. In future work, studies should include individuals who belong to other ethnic groups as well as rural populations.

These findings have implications for researchers building prevention or treatment intervention programs designed to help those with nicotine dependence quit smoking. The findings suggest that programs that serve to reduce illicit drug use, which is often co-morbid with nicotine dependence, might also aid in smoking reduction. In addition, treatment interventions to lessen co-occurring externalizing behavior and internalizing disorders should have an impact on nicotine dependence. A reduction of risk factors present in the family, peer group, or local neighborhood may result in a reduction of nicotine dependence. Community programs designed to improve neighborhood safety may effectively serve in this role. Translational research studying the effectiveness of a reduction in these risk factors is a necessary next step. Overall, the results indicate that the factors related to nicotine dependence are similar for African Americans and Puerto Ricans. Consequently, similar intervention programs can be employed with both groups. Nevertheless, it would still be important to implement such programs so that they are culturally relevant and linguistically appropriate.

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Table 1**Personality, Illegal Drug Use, Family, Peer, and Environmental Scales**

Measure	Cronbach's alpha	# of Items	Sample Item
PERSONALITY ATTRIBUTES DOMAIN			
Tolerance of Deviance	.78	19	You like to live dangerously. (Jessor, Donovan, & Costa, 1991)
Achievement	.78	25	What is your grade average this year? (If not currently in school, then answer about the last year you were in school.) (Brook et al., 1990)
Rebelliousness	.70	9	You enjoy seeing how much you can get away with. (Smith & Fogg, 1979)
Ego Integration	.64	9	You feel like losing your temper at people (reversed). (Brook et al., 1990)
Depression	.80	14	You sometimes feel hopeless about the future. (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974)
Self Deviance	.88	33	How often have you gotten into trouble with the police for something you did? (Johnston, Bachman, & O'Malley, 1997)
Educational Level	--	1	What year of school are you in? (If not currently in school, what is the last grade you completed?) (Brook et al., 1990)
ILLEGAL DRUG USE DOMAIN			
Marijuana Use	--	1	How often have you used marijuana in the past year? (Brook et al., 1990)
Cocaine Use	--	1	How often have you used cocaine in the past year? (Brook et al., 1990)
Drug Problems	--	1	If you have ever used illegal drugs, has using drugs caused any problems for you? (Brook et al., 1990)
FAMILY			
Parental Smoking	--	1	How often did either parent use cigarettes while you were growing up? (Brook et al., 1990)
Sibling Smoking	--	1	How many of your siblings smoke cigarettes? (Brook et al., 1990)
Maternal Illegal Drug Use	--	2	How often did your mother use illegal drugs other than marijuana? (Brook et al., 1990)
Father Illegal Drug Use	--	2	How often did your father use illegal drugs other than marijuana? (Brook et al., 1990)
Sibling Illegal Drug Offering	--	1	How often have your siblings offered you illegal drugs? (Brook et al., 1990)
Conflictual Relations with Mother	.77	9	Sometimes you break your mother's rules. (Schaefer & Finkelstein, 1975)
Conflictual Relations with Father	.78	9	Sometimes you break your father's rules. (Schaefer & Finkelstein, 1975)
Family Members Arrested by Police	.65	9	Has your father, mother, or any siblings ever been arrested, indicted or spent time in jail? (J. Endicott, November 1997)
PEER DOMAIN			
Peer Smoking	--	1	How many of your friends smoke cigarettes on a regular basis? (Brook et al., 1990)
Time Spent with Peers	.65	10	How often do you hang out with other kids (your friends)? (Brook et al., 1990)
Peer Deviance	.81	9	How many of your friends have gotten in trouble with the police or the law for something they did? (Johnston et al., 1997)
Peer Illegal Drug Use	<i>a</i>	2	How many of your friends have ever used marijuana? (Brook et al., 1990)
Peer Illegal Drug Offering	--	1	How often has one of your friends offered you illegal drugs? (Brook et al., 1990)
ENVIRONMENTAL DOMAIN			
School Environment	.74	8	In your school students try to learn as much as they can. (Brook et al., 1990)
Street Culture	.65	12	How often do you avoid going places alone? (Rodriguez, 1989)
Victimization	.77	5	In your neighborhood, how safe do you feel from being seriously hurt or killed? (Rodriguez, 1989)

^aThese measures are summations of separate events.

Table 2

Odds Ratios and 95% Confidence Intervals of T1 – T3 Combined Psychosocial Measures Predicting T4 Past Year Nicotine Dependence for African Americans and Puerto Ricans. (N=463)

Standardized Measures Obtained at T1 – T3	Odds Ratios and 95% Confidence Intervals
ILLEGAL DRUG USE DOMAIN	
Marijuana Use	2.51 *** (2.00, 3.14)
Cocaine Use	1.52 *** (1.21, 1.91)
Drug Problems	3.26 *** (2.51, 4.23)
PERSONALITY ATTRIBUTES DOMAIN	
Tolerance of Deviance	1.81 *** (1.46, 2.25)
Rebelliousness	1.88 *** (1.52, 2.34)
Self Deviance	1.87 *** (1.49, 2.35)
Ego Integration	0.73 ** (0.59, 0.89)
Depression	1.51 *** (1.23, 1.86)
Achievement	0.48 *** (0.38, 0.61)
Educational Level ^a	0.58 *** (0.46, 0.71)
FAMILY DOMAIN	
Parental Smoking	1.32 ** (1.07, 1.63)
Sibling Smoking	1.50 *** (1.22, 1.83)
Maternal Illegal Drug Use ^b	1.27 * (1.05, 1.54)
Paternal Illegal Drug Use ^b	1.38 *** (1.14, 1.67)
Sibling Illegal Drug Offering	1.51 *** (1.24, 1.83)
Conflictual Relations with Mother	1.47 *** (1.20, 1.80)
Conflictual Relations with Father	1.42 ** (1.16, 1.75)
Family Members Arrested by the Police	1.48 *** (1.21, 1.80)
PEER DOMAIN	
Peer Smoking	2.68 *** (2.09, 3.43)
Peer Time Spent	1.15 ^{n.s.} (0.93, 1.42)
Peer Deviance	1.84 *** (1.47, 2.30)
Peer Illegal Drug Use	1.84 *** (1.49, 2.28)
Peer Illegal Drug Offering	2.36 *** (1.87, 2.97)
ENVIRONMENTAL DOMAIN	
Positive School Environment	0.78 * (0.64, 0.95)
Actively Avoiding Dangers on the Street	0.74 ** (0.60, 0.92)
Victimization	1.27 * (1.03, 1.56)

*
p<.05;

**
p<.01;

p<.001

These analyses control for age, gender, and ethnicity.

^a Measure taken from T3 only (highest educational level achieved).

^b Measure only available at T2 and T3.