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Adolescent Attributes and Young Adult Smoking Cessation Behavior

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Abstract

This study collected data five times between 1983–2002 from 400 participants who originally came from upstate New York. These participants completed structured interviews as did their mothers three times. LISREL analysis generally supported the hypothesized model. The results indicated that having parents who smoked and having low educational aspirations and expectations were associated with being unconventional, which, in turn, was related to having low emotional control and reporting more internalizing behaviors. Internalizing behaviors were directly associated with a lower likelihood of smoking cessation, as was parental smoking. Research and clinical implications are discussed and the limitations noted.

Keywords

Adolescent personal attributes; parental smoking; smoking cessation

INTRODUCTION

Cigarette smoking is the leading preventable cause of death in the United States (Centers for Disease Control and Prevention, 2009). To address this public health problem, researchers need to identify predictors of successful smoking cessation with the goal of developing interventions that help individuals quit smoking. Thus, the present study addresses the associations of parental smoking during their children's early adolescence with several early and mid-adolescent personal attributes. These adolescent personal attributes are associated with smoking cessation when the adult children are in their late twenties and thirties and are described below.

According to Social Attachment Theory, bonds to socializing institutions such as the family and school, are related to conventionality (Collins & Ellickson, 2004). Moreover, Albert Bandura's Social Learning theory hypothesizes that individual cognitions and behavior originate in the observation of others (Bandura, 1986). Given these bonds, adolescents who see their parents smoke are more likely to continue smoking and have difficulty stopping (Collins & Ellickson, 2004; Macy, Seo, Chassin, Presson, & Sherman, 2007). Hence, we hypothesize that children whose parents smoked cigarettes are more likely to continue smoking

and have greater difficulty quitting when they are adults, i.e., a direct pathway from parental smoking during their offspring's adolescence to cessation when the children are adults.

A second pathway from parental smoking to their children's smoking cessation in adulthood is indirect, via some of the children's personal attributes (i.e., early adolescent educational aspirations and expectations and unconventionality, and later adolescent ego integration and internalizing behaviors). Thus, this analysis extends the literature by tracing in one study, two major pathways between parental smoking and smoking cessation.

As noted above, part of parental smoking's effect on cessation will be mediated by educational aspirations and expectations (Yolton, Dietrich, Auinger, Lanphear, & Horning, 2005). Educational aspirations and expectations may be a marker variable for either existing or future orientations to societal norms. Academic orientation and conformity, conceptually the inverse of unconventionality, have been found to be related in early adolescence (McGee & Newcomb, 1992). This study extends these findings by proposing that the path from educational aspirations to cessation will be via unconventionality and other personal attributes.

Unconventionality presents a relatively new area of focus in the field of smoking cessation (Collins & Ellickson, 2004). Research has found that aspects of unconventionality are associated, primarily cross-sectionally, with less smoking cessation (Brook, Ning, & Brook, 2006; Marcus, Pahl, Ning, & Brook, 2007). Research supports paths from parents' smoking to their adolescents' psychological adjustment and to cessation (Chassin, Presson, Pitts, & Sherman, 2000).

Two important components of unconventionality are impulsivity and irresponsibility. These dimensions imply a relative lack of behavioral control and of attention to the consequences of behavior, which may involve taking risks (Donovan, Jessor, & Costa, 1991). Ego integration reflects the individual's ability to control his/her emotions and their experience of satisfaction with their emotional or cognitive processes. Smokers with lower self-control have greater difficulty quitting (Kennet, Morris, & Bangs, 2006), while smokers with higher levels of self control have more success in smoking cessation programs (Digiusto & Bird, 1995) and are less likely to be nicotine dependent (Brook, Brook, & Zhang, 2008). While these findings support the positive association of higher levels of ego integration and smoking cessation, we are unaware of other studies assessing the interrelationship of ego integration with additional personal attributes in the longitudinal prediction of cessation. To our knowledge, this is the first study that examines the relationship between unconventionality and ego-integration as related to smoking cessation.

Some investigators have noted that depression and anxiety, two components of internalizing behavior, contribute to difficulties with smoking cessation (Acton, Kunz, Wilson, & Hall, 2005). Of relevance is the self-medication theory which postulates that individuals use substances to allay feelings of internal distress and thus have difficulty terminating substance use (Khantzian & Albanese, 2008). Other authors report little or no difference in quit rates between individuals with and without depressive symptoms or major depressive disorder (Escobedo, Reddy, & Giovino, 1998; Johnson & Breslau, 2006). Variations in the length of the time span between the measurement of independent and dependent variables may be a factor in these inconclusive findings.

Some studies are supportive of a relationship between earlier unconventionality and subsequent internalizing behaviors in youths. Lahey and his colleagues (Lahey, Loeber, Burke, Rathouz, & McBurnett, 2002) found that an indicator of unconventionality (i.e., conduct disorder) was related to a significant aspect of internalizing behavior (i.e., depressive symptoms). Moffit and her associates (Moffit, Caspi, Rutter, & Silva, 2001) have reported that their New Zealand data shows that among females conduct disorder precedes depression. Based on this research, this

study proposes that one of the paths from early adolescent unconventionality to young adult smoking cessation will be via later adolescent internalizing behaviors. Finally, this study assesses a path between ego integration and smoking cessation via internalizing behaviors, as well as a direct path from ego integration to smoking cessation.

This study extends previous research in the following ways: (1) the 19-year span from early adolescence to adulthood is longer than that assessed by other pertinent research to date; (2) this study incorporates the association between unconventionality and ego integration, as they relate to smoking cessation; and (3) while studies have examined the individual associations of the variables to quitting, this analysis contributes by testing a model of the longitudinal interrelationship of the variables as predictors of quitting.

Previous research, based on Family Interactional Theory (FIT), assessed a model composed of direct and indirect paths from the domain of parental behavior and family relationships to a domain of their children's later personal attributes to a dependent variable involving offspring problem behavior (Brook, Brook, Gordon, Whiteman, & Cohen, 1990). The current study tests a specific example of this general model. It assesses the direct path from an aspect of the family domain, parental smoking, to their children's smoking cessation in adulthood. In addition, it examines the indirect path from parental smoking to several adolescent personal attributes (i.e., unconventionality, educational aspirations and expectations, ego integration and internalizing behaviors) as predictors of the children's subsequent cessation. See Figure 1 for most of the specific relationships hypothesized between the earlier (T2) and later adolescent (T3) personal attributes in the indirect path from parent smoking to their children's smoking cessation in adulthood.

METHODS

Participants and Procedure

The data for the participants in this study came from a residentially based, random sample residing in one of two upstate New York counties who had been assessed for drug use first in 1983. The sample was based on an earlier study using maternal interviews in 1975 at Time 1 (T1). The original maternal/youth study was designed to assess problem behavior among youngsters. The Time 2 (T2) 1983 sample (N=756) is the base from which the current sample was drawn. The follow-up interviews, which were administered by extensively trained and supervised interviewers, were conducted with the youths to assess demographic factors, tobacco use, and psychosocial variables. In 1983, T2, and in 1985–1986, Time 3 (T3), maternal interviews were also conducted. Table 1 illustrates the sample size and ages at each wave of data collection.

The socioeconomic status of the families in this study generally represented that of families in the northeastern United States in 1980. At the initial data collection, the participants represented the sampled region, with high proportions of those surveyed being Roman Catholic (54%) and White (91%). Study procedures were approved by the Institutional Review Boards at the Mount Sinai School of Medicine, New York Medical College, and the New York University School of Medicine. Written informed consent was obtained after the interview procedures were fully explained. Additional information regarding the study methods is available from previous reports (Brook et al., 1990). A NIH Certificate of Confidentiality was obtained for all interviews.

The 400 participants (53.5% female) for the current study were a subset of the Time 6 (T6) sample. These 400 participants were all of those who reported smoking at least five years in their late adolescence and/or twenties (The detailed smoking criteria are described in the Measures Section below). T-tests indicated that there were no significant differences ($p>0.05$)

between those who participated at T6 and those who did not with respect to the participants' legal and illegal drug use (i.e., tobacco, alcohol, marijuana, and other illicit drug use) at each of the points [T2- Time 5 (T5)] prior to T6. Therefore, the smoking cessation analyses for the current study were not biased due to attrition.

Measures

Adolescent Attributes—We hypothesized two T2 latent variables: a) Unconventionality (Cronbach's alpha = 0.82), the latent variable, consisted of three manifest variables, irresponsibility [6 items; e.g., "If I get too much change in a store, I do not always give it back." (Gough, 1957)], impulsivity [6 items; e.g., "I often act on the spur of the moment without stopping to think." (Gough, 1957)], and rebellion [8 items; e.g., "When rules and regulations get in the way, I sometimes ignore them." (Smith & Fogg, 1979)]; and b) Educational Aspirations and Expectations, the latent variable, consisted of two manifest variables, educational aspirations [i.e., "How far do you hope you will go in school?" (Original)] and educational expectations [i.e., "How far do you think you will go in school?" (Original)].

We hypothesized a T3 latent variable of Internalizing Behaviors (Cronbach's alpha = 0.78). This consisted of two manifest variables: a) depression [5 items; e.g., "Over the last few years, how much were you bothered by feeling low in energy or slowed down?" (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974)]; and b) anxiety [4 items; e.g., "Over the last few years, how much were you bothered by feeling fearful?" (Derogatis et al., 1974)]. We also measured a T3 manifest variable, Ego Integration [7 items; Cronbach's alpha = 0.60; e.g., "I am never satisfied with anything I do." (Brook et al., 1990)].

Parental Smoking—We hypothesized a T2 latent variable of parental smoking. This consisted of two continuous measures which were used to determine maternal and paternal smoking status. Each of these were 1-item scales, and the questions were asked of the mother. The items were: "How many cigarettes do you smoke a day?" The answer choices were: (1) *None*; (2) *Used to smoke but stopped*; (3) *Less than half a pack a day*; (4) *Half a pack to one pack a day*; and (5) *More than one pack a day*. The mother was also asked: "How many cigarettes does the child's father (or father substitute) smoke a day?" The answer choices were the same as above. The mean score for maternal smoking was 2.39, while the mean score for paternal smoking was 2.66.

Smoking Cessation between T5 and T6—At T6, the participants were asked about the frequency of using tobacco during the past five years. Those who refrained from smoking in at least the last five years, but had reported smoking in the five years between T3–T4 and/or between T4–T5 were considered to have stopped smoking. A score of 1 was then assigned to participants meeting this cessation criterion; a score of 0 was assigned otherwise. We included 400 T3–T5 smokers in the analyses. Among them, 115 (28.8%) were identified as quitters between T5 and T6. The gender difference in cessation (26.3% for males; 30.8% for females) was not statistically significant ($\chi^2 = 0.98$; $p=0.32$). Age was also not significantly associated with cessation between T5 and T6 ($r=0.03$; $p=0.50$).

Data Analysis

Latent variable structural equation models were employed to examine the empirical credibility of the paths hypothesized in the Introduction and illustrated in Figure 1.

In order to account for the influences of the participants' age and gender, and their parents' educational level on the measurement and structural models, we used partial covariance matrices as the input matrices. These matrices were created by statistically partialing out the effects of these demographic factors on each of the original manifest variables. According to

Newcomb and Bentler (1988), this strategy allows us to statistically control for the effects of these variables without hypothesizing exactly where they influence the model. No data were missing for the measurement of smoking cessation between T5 and T6. We used the SAS MI procedure to deal with missing data on a variable by variable basis. The SAS MI procedure calculates the maximum likelihood estimates of the missing values (i.e., Full Information Maximum Likelihood on a variable by variable basis). The correlations among the variables derived from the covariance matrices are available from the authors. Maximum Likelihood estimates of the model coefficients, as discussed below, were obtained using LISREL VIII (Jöreskog & Sörbon, 1996). To account for the non-normal distribution of the model variables, as recommended by Hu, Bentler, and Kano (1992), we used the Satorra-Bentler (Satorra & Bentler, 1988) scaled statistics as the test statistic for model evaluation. In addition, we assumed that measurement errors were not correlated. We chose several fit indices to assess the fit of the models: a) the LISREL Goodness of Fit Index (GFI); b) Bentler's Comparative Fit Index (CFI); and c) the Root Mean Square Error of Approximation (RMSEA). For the GFI and CFI, values between 0.90 and 1.0 indicate a good fit (Kelloway, 1998). For the RMSEA, values below 0.10 indicate a good fit (Kelloway, 1998). A total effects analysis was performed on each predictor of cessation between T5 and T6. The total effects of a latent construct consist of the sum of the direct and indirect effects on the dependent variable. The *t*-statistics of the standardized total effects analyses were obtained.

RESULTS

Using LISREL VIII, we tested the measurement and structural models, controlling for the participants' age and gender, and their parents' educational level. All factor loadings were significant ($p < 0.01$). Findings show that the indicator variables were satisfactory measures of the latent constructs. The Satorra-Bentler chi square for the entire model was 59.01 with 38 degrees of freedom. The following fit indices were obtained: a) GFI=0.97; b) RMSEA=0.037; and c) Bentler's CFI=0.98. These results reflect a satisfactory model fit. For the structural model, standardized parameter estimates, as well as the associated *t*-statistics for the sample, are presented in Figure 1.

As noted in Figure 1, the data are generally consistent with the hypothesized model. Specifically, we found that parental smoking during their children's early adolescence was directly and negatively associated with their children's cessation in adulthood ($t = -3.18$). In addition, there was an indirect path between parental smoking and their children's cessation. The indirect path shows that parental smoking was negatively related to the participants' educational aspirations and expectations ($t = -3.02$), which in turn, were negatively associated with their unconventionality ($t = -2.29$).

Unconventionality was negatively related to ego integration ($t = -8.26$) and positively to internalizing behaviors ($t = 2.10$) in mid-adolescence. Ego integration was negatively associated with internalizing behaviors ($t = -7.33$). Internalizing behaviors, in turn, were negatively associated with smoking cessation in the period from the late twenties to the early thirties ($t = -2.30$). We also found that: 1) parental smoking was positively associated with the participants' unconventionality ($t = 2.41$); and 2) that ego integration was not directly associated with smoking cessation ($t = 0.05$).

An examination of the total effects (a combination of the direct and indirect effects) of each latent variable estimated in the analysis of quitting aids in the interpretation of the structural coefficients. Table 2 presents the standardized total effects of the proposed latent variables on smoking cessation. The *t* values of the total effects of parental smoking, unconventionality, ego integration, and internalizing behavior on smoking cessation were statistically significant ($p < 0.05$).

DISCUSSION

The findings of this longitudinal analysis support key features of our hypothesized developmental model. To our knowledge, this is the first community-based investigation to study the interrelationship of parents' smoking behavior and adolescent personality attributes as predictors of smoking cessation. Our model included major dimensions related to quitting such as parental smoking, unconventional behavior, and internalizing behavior. Our study spans several developmental periods from early adolescence to late adolescence to the late 20's and early 30's.

There is some evidence that adolescents whose parents continue to smoke are less likely to quit themselves (Bricker, Rajan, Andersen, & Peterson, 2005; Farkas, Distefan, Choi, Gilpin, & Pierce, 1999). In line with these findings, our research indicates that parental influences (maternal and paternal models of smoking) decreased the odds of quitting in the late twenties and early thirties. These findings are consonant with those aspects of social learning theory that focus on imitation of the behavior of important models in the individual's life (Bandura, 1986). Future research with adults should include a family history of smoking, as well as of successful quitting by family members.

There is further evidence of parental smoking's effect on quitting. Our total effect analysis indicates that parental smoking has the strongest relationship to quitting of the five dimensions incorporated in our developmental model. This relatively strong effect may be due to parental smoking having both direct and indirect pathways to cessation. Parent smoking is related to quitting through four dispositional factors: a) educational aspirations and expectations; b) unconventional behavior; c) ego integration; and d) internalizing behavior. Our findings add to the literature by indicating that internalizing behavior in mid-adolescence makes a dual contribution to subsequent difficulties with smoking cessation. First, it has a direct relation with quitting. Second, internalizing behavior mediates the impact of other adolescent personal attributes: a) low educational aspirations and expectations; b) unconventional behavior; and c) low ego integration. Given this study's lengthy time span between the measurement of internalizing behavior and cessation, our data extends earlier studies that suggest that internalizing behaviors make cessation less likely over the short term (Acton et al., 2005). Moreover, this investigation highlights the manner in which internalizing behavior may be related to earlier educational aspirations and expectations and unconventional behavior.

There are several models that have been postulated to explain our finding that internalizing behavior is inversely related to smoking cessation. It may be that adolescents with internalizing behavior who become smokers use smoking as a way of coping with their inner problems (Breslau, Kilbey, & Andreski, 1991). According to Parrott (1999), there is a relation between less negative affect and attempts to quit. In addition, Kassel and his colleagues (Kassel, Stroud, & Paronis, 2003) have described the physiological mechanisms that relate smoking to reduced negative affect. Furthermore, as noted in the Introduction, individuals who are impulsive and display irresponsible behavior, two components of unconventional behavior, are less likely to focus on the negative consequences of smoking. Ultimately, such individuals may experience internal distress, which contributes to their difficulties with cessation (Brook, Brook, Richter, & Whiteman, 2003).

Other investigators have indicated that personal attributes reflecting unconventional behavior in adolescents predict continuing to smoke later in life (Burt, Dinh, Peterson, & Sarason, 2000; Moffit et al., 2001; White, Pandina, & Chen, 2002). As noted above, such individuals are less likely to quit smoking. Our findings add to the literature by suggesting that characteristics reflecting unconventional behavior in adolescents are indirectly related to a lower likelihood of smoking cessation in adulthood. Specifically, unconventional behavior is

associated with internalizing behavior, which, in turn, is related to less quitting later. While little is known about the mechanism by which unconventional behavior and internalizing behaviors are linked as deterrents to smoking cessation, the inverse relationship between antisocial behavior and smoking cessation supports this association (Lahey et al., 2002; Moffitt et al., 2001).

However, our research suggests a sequence in which unconventional behavior, ego integration and internalizing behavior are related to quitting between the late twenties and early thirties. Two dimensions of unconventional behavior, rebelliousness and irresponsibility are related to aspects of ego integration (low self control, a lesser likelihood to foresee the risks and consequences of maladaptive behavior) which, in turn, contribute to feelings of depression and anxiety. However, in the context of this study's independent variables, aspects of ego integration do not have a direct relationship to smoking cessation. Our analyses also revealed that academic aspirations and expectations in adolescents are indirectly related to having success in quitting smoking in adulthood.

Despite the significant findings of this research, the study does have some limitations. First, the present study found that 37.7% of smokers stopped smoking between T5 and T6. However, due to the strong addictive nature of cigarettes, some of these participants may resume smoking in the future (Ginsberg, Hall, Reus, & Munoz, 1995). Thus, follow-up study is necessary with an even longer time span to assess sustained cessation over time. Second, we did not take into consideration personal lifestyle changes, such as pregnancy and parenthood, which may coincide with or possibly influence cessation, whether temporary or long term. However, it is noteworthy that this study found no gender differences in cessation during the reproductive years. Third, the sample was predominantly White. Consequently, generalization of the findings to other ethnic groups may be problematic.

Despite the limitations, the study has a number of strengths. Results are based on a large sample of individuals representative of the Northeast. Our analyses of some adolescent personal attributes associated with adult smoking cessation controlled for a number of potentially confounding factors (i.e., gender, age, and parental educational level). This is the first community-based study to investigate the interrelationship of parental smoking and personal attributes as they relate to smoking cessation between the late twenties and early thirties.

In sum, this research represents an important step toward creating an understanding of how parental smoking, unconventional behavior and internalizing behaviors develop during adolescence and of the relationship of these factors to smoking cessation. From a more general viewpoint, the study points out the complexity of relationships among exogenous conditions such as familial factors (parental smoking), and socializing influences (educational aspirations and expectations and unconventional behavior), and two important endogenous or intrapersonal factors (ego integration and internalizing behavior) as they relate to smoking cessation. The pattern of direct and indirect mediating relations, as formulated in our model, clarifies the nature of these relationships. Our longitudinal model suggests that to the extent that changes can be made in parental smoking and in early adolescent socializing influences this may alleviate later intrapersonal stresses and enable cessation treatment interventions to be more effective.

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Figure 1.

Obtained Model: Standardized Pathways (t -statistic) to Cessation of Cigarette Smoking at the mean age of 32 (N=400).

Note: 1. GFI=.97; RMSEA=.037; CFI=.98.

2. Gender, age, parental educational level, and marital status at T5 were statistically controlled.

3. Participants' mean age at Time 2 (T2)=13.8, at Time 3 (T3)=16.1, at Time 5 (T5)=27.0 and at Time 6 (T6)=32.0.

Table 1

Ages of Total Youth Sample at T2–T6.

	T2 1983 (N = 756)	T3 1985–86 (N=759)	T4 1991–93 (N=750)	T5 1997 (N=749)	T6 2002 (N=673)
Mean Age	13.8 years	16.1 years	22 years	27 years	32 years
SD	2.6 years	2.7 years	2.7 years	2.8 years	2.8 years
Age Range	9–19 years	11–23 years	17–28 years	22–33 years	27–38 years

Note. The study sample (N=400) was drawn from T6 sample.

Table 2

Standardized Total Effect (*t*-statistic) of Parental Smoking, Unconventionality, Educational Aspirations and Expectations, Ego Integration, and Internalizing Behaviors, all in Adolescence, on Cessation of Cigarette Smoking at the mean age of 32 (N=400).

Latent Variables	Cessation of Cigarette Smoking (T5–T6)
Parental smoking (T2)	-.25 (-3.32) **
Unconventionality (T2)	-.05 (-2.15) *
Educational Aspirations and Expectations (T2)	.01 (1.59)
Ego Integration (T3)	.06 (2.32) *
Internalizing Behaviors (T3)	-.13 (-2.30) *

* $p < 0.05$;

** $p < 0.01$;

T2=Time 2; T3=Time 3; T5=Time 5; T6=Time 6;

Age, gender, parental educational level, and marital status at T5 were statistically controlled.

R^2 for cessation of cigarette smoking=0.08.