

COGNITIVE AND SOCIAL INFLUENCE FACTORS IN ADOLESCENT SMOKING CESSATION

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Abstract—Using a longitudinal design, the current study investigated the roles of smoking-related beliefs, and parent and peer psychosocial factors as antecedents and consequences of adolescent smoking cessation. Results indicated that adolescents who would later quit smoking were different from those who continued to smoke even prior to the transition. For younger subjects, cessation was related mainly to parental influences (e.g., parental support and attitudes towards smoking). Older adolescents responded primarily to peer influences in choosing to quit. While psychosocial factors served as antecedents to cessation, results also indicated that the process of quitting itself led to changes in the adolescents' social environment that further reinforced smoking cessation (e.g., fewer friends who smoked, less positive peer attitudes towards smoking). Thus, the process of smoking cessation among adolescents may be bidirectional, with psychosocial factors influencing the decision to quit and, in turn, being influenced by such a decision.

Adolescent cigarette smoking behavior has received a great deal of research attention. The adolescent years have been seen as the developmental stage in which smoking habits are formed (Evans, Henderson, Hill, & Raines, 1979). Because of the need for effective primary prevention programs, most of the research focus has been on attempting to understand the factors that are responsible for adolescent smoking initiation (Chassin, Presson, Sherman, Corty, & Olshavsky, in press). These studies have examined the role of smoking-related knowledge and beliefs as well as peer and parent influences on smoking acquisition (Chassin, Presson, Bensenberg, Corty, Olshavsky, & Sherman, 1981; Chassin et al., in press; Flay, d'Avernas, Best, Kersell, & Ryan, 1983). However, while we are currently learning a good deal about the smoking acquisition process in adolescents, little is known about adolescents who have already begun to smoke or about the factors that are associated with their decisions to quit smoking. Even if primary prevention remains the most effective antismoking strategy, interventions must be developed for adolescents who already smoke cigarettes. These interventions must be based on a thorough understanding of the dynamics of adolescent smoking cessation. While some work has been done on self-change of smoking behavior among adults (Prochaska & DiClemente, 1983), little is known about adolescents who quit smoking. The current study focuses on those adolescents and has two major goals: to identify psychosocial antecedents of smoking cessation and to examine the possible consequences of cessation.

A limitation in previous research on adolescent smoking has been the use of cross-

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sectional methodologies. Comparisons of adolescent regular smokers with adolescent "ex-smokers" can be misleading because any differences between the groups could represent either the causes or the effects of smoking cessation (Chassin et al., in press). To avoid this problem, the current study employed a longitudinal design, measuring smoking-related beliefs as well as parent and peer variables and smoking behavior at two occasions of measurement, approximately one year apart. This design was used to achieve two goals. First, by examining differences at the initial time of measurement between those who later became quitters and those who continued to smoke, the study sought to identify prospectively the psychosocial factors associated with later smoking cessation. Second, by measuring the psychosocial variables at two times of measurement, changes over time could be assessed, both for continuing smokers and for those who quit. Differences between quitters and continuing smokers that occur only at the second time of measurement may reflect the results rather than the causes of smoking cessation.¹

METHOD

Subjects

Subjects were 178 public school students from a midwestern county school system. Demographic figures show that the community under investigation was predominantly white (96%), and was 17% rural, 57% suburban, and 26% urban. The influence of a large university population is reflected in the educational status of parents, 75% having completed high school and 38% having attained a bachelor's or higher degree.

Subjects were selected from a larger pool of students who were participating in a longitudinal study of adolescent cigarette smoking. All those who reported themselves to smoke at least one cigarette per month at the first time of measurement (1981) and who were present at the one-year follow-up were included in the current study.² Of these subjects, 77% reported smoking at least one cigarette per week.

Subjects were divided into continuing smoker and ex-smoker categories based on their reported smoking status at Time 2 of measurement one year later. Thirty-three of the 178 (18.5%) initial smokers had quit smoking at the one-year follow-up.

Subjects were further divided into middle school and high school subsamples based on their grade level at the first time of measurement. The middle school subsample (grades 6, 7, and 8) had 20 quitters and 50 continuing smokers. The high school subsample (grades 9, 10, and 11) had 13 quitters and 95 continuing smokers. There were no sex differences between quitters and continuing smokers in either subsample (chi square comparisons, $p > .30$ in both cases).

Procedure

Questionnaires were administered during a regular class period by members of a research team who were unconnected with the school system. Subjects were assured that their answers would be kept confidential. They were surveyed at two times of measurement, approximately one year apart (1981 and 1982).

¹Of course, the changes observed at Time 2 may actually have occurred before the smoking transition but after the first time of measurement. If so, then additional antecedents of smoking cessation would have been identified if a shorter time interval had been used between measurements.

²To test for possible attrition bias, smokers who were not tested at Time 2 ("dropouts") were contrasted with those who were tested at both years ("stayers") using *t* test comparisons. There were no significant differences between the two groups on any of the current psychosocial variables, suggesting that there was no attrition bias.

The procedure for the two administrations was identical. All subjects were given bogus pipeline instructions prior to completing the questionnaires (cf. Evans, Hansen, & Mittlemark, 1977). In this procedure, subjects were given envelopes containing strips of paper. They were told to lick the paper, seal it in the envelope, and write their questionnaire code on the envelope. Subjects were told that since smoking leaves nicotine in the body for a long period of time, chemical analysis of their saliva could accurately detect the number of cigarettes that they smoked.

Operationalization of variables

All variables were part of a larger questionnaire used to study adolescent cigarette smoking. The variables were operationalized as follows.

Parent and peer smoking models. Parental smoking was assessed by two items: "My mother (father) smokes cigarettes." Peer smoking was assessed by a single item: "How many of your five closest friends smoke cigarettes?"

Parent and peer attitudes towards smoking. Subjects' perceptions of their parents' and peers' attitudes towards their smoking behavior were measured by two items: "My friends think that I should smoke cigarettes." and "My parents think that I should smoke cigarettes." Responses were given on a 5-point scale ranging from "strongly agree" to "strongly disagree." Higher values indicate greater acceptance of the adolescent's smoking behavior in the eyes of parents or peers.

Perceived supportiveness and strictness of parents and peers. These items were taken from Schlegel and DiTecco's (1978) empirically shortened version of the Jessor and Jessor (1977) questionnaire. The perceived supportiveness of parents and peers were assessed with four items (e.g., "When you need help with some problems you're having, do your parents try to understand and give you the help you need?" and "Do your friends show interest in your ideas and feelings?"). Perceived parent and peer strictness were assessed by four items each, (e.g., "Compared to other parents, how strict would you say your parents are with you?"). Responses to these items were given on 5-point scales with higher values indicating greater perceived supportiveness and greater perceived strictness.

Motivation to comply with parents and peers. Motivation to comply with parents and peers were assessed with two items: "Most of the time when my friends (parents) want me to do something, I go along with it." Responses were made on a 5-point scale, with higher values indicating greater motivation to comply.

Health beliefs. Health beliefs were assessed by six items designed to be relevant to the smoking habits of adolescents (e.g., "If you are young and healthy, cigarette smoking is not dangerous."). The health score represented a subject's mean response on the items' 5-point Likert scales, with higher scores indicating a view of smoking as more dangerous to health.

Perceived control of smoking. Perceived control of smoking was assessed by ten items (e.g., "If a smoker wants to, it is easy to quit smoking cigarettes."). The control score was a subject's mean response on the items' 5-point Likert scales, with higher scores indicating a view of smoking as less easily controllable.

RESULTS

Subjects' responses were analyzed in a 2 (smoking group, quitters vs. continuing smokers) by 2 (age, middle school vs. high school) by 2 (time of measurement) MANOVA, with time of measurement as a within-subjects factor. Dependent variables (at each time of measurement) were peer and parent smoking models, peer and parent attitudes towards the adolescents' smoking, perceived peer and parent supportiveness and strictness, motivation to comply with peers and parents, health beliefs about smoking, and perceived control of smoking. There were significant main effects of smoking group, $F(12,137) = 1.91, p < .05$; of age, $F(12,137) = 1.81, p < .05$; and of time of measurement, $F(12,137) = 28.4, p < .001$. There was also a significant interaction between smoking group and time of measurement, $F(12,137) = 2.39, p < .008$, suggesting that adolescents who quit smoking showed different changes over the one year period than did those who continued to smoke. To examine these effects, each of the twelve dependent measures was analyzed in a 2 (smoking group, quitters vs. continuing smokers) by 2 (age, middle school vs. high school) by 2 (time of measurement) mixed model ANOVA. Subjects' mean scores on each dependent measure at each time of measurement are presented in Table 1.

Peer and parent models

Subjects who had been initial smokers but who had quit smoking by Time 2 reported having fewer smoking friends than did continuing smokers (main effect of smoking group, $F(1,171) = 20.3, p < .0001$). This difference between quitters and continuing smokers was present even at Time 1 (before the transition in smoking status), although it was significant only for older subjects, $t(104) = 2.43, p < .02$. There was also a significant change over time with subjects reporting fewer smoking friends at Time 2 than at Time 1, $F(1,171) = 11.3, p < .001$. However, these main effects were qualified by a significant smoking group by time interaction, $F(1,171) = 11.0, p < .001$. Subjects who quit smoking showed a bigger drop in smoking friends than did continuing smokers (drop of 1.0 for quitters vs. .06 for continuing smokers).

There were no significant effects of age, time of measurement, or smoking group on the reported number of smoking parents.

Peer and parent attitudes towards the adolescents' smoking

Subjects generally reported their friends as more negative towards their smoking at Time 2 than at Time 1 (means of $-.47$ and $-.71$ respectively, main effect of time, $F(1,165) = 8.00, p < .005$). However, there was also a marginally significant interaction of smoking group, age, and time of measurement, $F(1,165) = 3.6, p < .06$. While all groups of subjects reported their friends as becoming increasingly negative with time, the biggest change in peer attitude was reported by younger subjects who quit smoking. This change was larger than that for the other groups taken as a whole, Scheffe's S test, $F'(7,165) = 2.37, p < .03$ (see Table 1).

Parental attitudes towards the adolescents' smoking showed only a marginally significant interaction between smoking group and age, $F(1,166) = 4.08, p < .09$. While quitters tended to report their parents as more negative to their smoking than did continuing smokers, the differences between quitters and continuing smokers were greater for younger subjects than for older subjects. This was true at Time 1 of measurement, before any transition in smoking status, Scheffe's S test, $F'(3,166) = 2.59, p < .06$.

Perceived supportiveness of parents and peers

Perceived parental supportiveness showed a marginally significant interaction between smoking group and age, $F(1,168) = 3.08, p < .08$. While quitters tended to

Table 1. Mean scores* on dependent measures at time 1 and time 2.

	Time 1		Time 2	
	Quitters	Continuers	Quitters	Continuers
<i>6th-8th Graders</i>				
Number of smoking parents	1.25	1.28	1.25	1.30
Number of smoking friends	3.58	3.68	2.58	3.88
Parental attitudes	-1.50	-1.28	-1.50	-.94
Peer attitudes	-.22	-.37	-.94	-.48
Parental support	3.88	3.21	3.50	3.07
Peer support	3.18	3.35	3.06	3.21
Parental strictness	3.11	3.12	3.26	3.36
Peer strictness	2.64	3.03	2.72	2.88
Motivation to comply with parents	.57	.73	.84	.75
Motivation to comply with friends	.44	.77	.22	.50
Health beliefs ^a	3.28	3.20	3.74	3.30
Perceived control of smoking ^a	2.83	2.81	2.90	2.89
<i>9th-11th Graders</i>				
Number of smoking parents	1.00	1.02	1.00	1.00
Number of smoking friends	3.00	3.91	2.00	3.70
Parental attitudes	-1.46	-1.40	-1.08	-1.36
Peer attitudes	-.69	-.54	-.77	-.77
Parental support	3.50	3.55	3.54	3.60
Peer support	3.35	3.63	3.46	3.78
Parental strictness	2.73	3.23	2.92	3.04
Peer strictness	2.96	3.11	2.77	3.11
Motivation to comply with parents	.85	.62	.54	.39
Motivation to comply with friends	.77	.34	.23	.27
Health beliefs ^a	3.64	3.59	3.76	3.71
Perceived control of smoking ^a	3.03	2.91	3.25	3.07

*Note: Weighted means.

^aHigher scores indicate greater perceived health dangers of smoking and less perceived control over smoking.

perceive higher levels of parental support than did continuing smokers, this difference between quitters and continuing smokers existed only for younger subjects. Moreover, among the younger subjects, those who would later quit smoking had higher levels of parental support than their peers who continued to smoke, even at Time 1 of measurement, $t(64) = -2.17, p < .04$.

There were no significant effects of age, smoking group, or time of measurement on perceived peer supportiveness.

Perceived strictness of peers and parents

Perceived peer strictness showed a marginal effect of smoking group, $F(1,169) = 3.20, p < .08$. Adolescents who continued to smoke reported their friends as having stricter standards for good behavior than did those who quit smoking. There were no significant effects for perceived parental strictness.

Motivation to comply with peers and parents

Motivation to comply with peers showed a significant main effect of time of measurement, $F(1,169) = 5.58, p < .02$, with subjects decreasing in motivation to com-

ply with their friends (means of .50 and .32 respectively). There was also a marginally significant interaction between smoking group and age, $F(1,169) = 2.63, p < .10$. For younger subjects, those who quit smoking had lower motivation to comply with peers than did continuing smokers (means of .34 and .64, respectively). For older subjects, those who quit smoking had higher motivation to comply with peers than did continuing smokers (means of .50 and .31, respectively). This interaction between age and smoking group was also significant at Time 1 of measurement, even before the transition in smoking status had occurred, $F(1,169) = 3.53, p < .05$ (see Table 1).

There were no significant effects of age, smoking group, or time of measurement on motivation to comply with parents.

Beliefs about smoking: Health beliefs and perceived control

Subjects' beliefs about the health consequences of smoking became more negative with time (means of 3.45 and 3.60, $F(1,172) = 6.58, p < .01$), and older subjects saw smoking as more dangerous to health than did younger subjects, $F(1,172) = 5.52, p < .02$. The same pattern was found for beliefs about the controllability of smoking. Older subjects saw smoking as less controllable than did younger subjects, $F(1,171) = 5.10, p < .03$ and subjects reported a decline in perceived control of smoking over time (means of 2.88 and 3.01 with higher scores indicating less perceived control, $F(1,171) = 4.05, p < .05$).

DISCUSSION

The current study had two major goals: to identify the psychosocial antecedents of adolescent smoking cessation, and to examine changes over time in these psychosocial variables that might represent consequences of such cessation.

The first purpose of the current study was to identify prospectively the factors associated with adolescents' subsequent decisions to quit smoking. The findings showed that, in some ways, adolescents who would later go on to quit smoking were different from their peers who continued to smoke even before any transition in smoking status had occurred. Moreover, these differences showed significant interactions with age suggesting that the antecedents of smoking cessation were somewhat different for younger than older adolescents.

For the younger subjects, the pattern of findings suggested that smoking cessation was related to parental influences. Younger subjects who later quit smoking had parents who were more negative about their smoking and who provided them with higher levels of general emotional support. Moreover, young future quitters had less motivation to comply with their peers than did continuing smokers. Thus, among younger adolescents, smoking cessation may be more related to parental influences than to peer influences. However, for older adolescents, parental factors did not significantly distinguish future quitters from continuing smokers. Rather, future quitters had fewer friends who smoked at Time 1 and reported more motivation to comply with those friends than did continuing smokers. Thus, among older adolescents, those who quit smoking may be responding to influences from their friends. The fact that parent factors were antecedents of quitting among younger adolescents while peer factors were antecedents of quitting among older subjects is consistent with the notion that peer influences become increasingly important during the course of adolescence (Berndt, 1979; Bronfenbrenner, 1970).

Perhaps most disappointing from the point of view of health education programs was the fact that adolescents' beliefs about smoking were unrelated to their later smoking cessation. Subjects who did and did not go on to quit smoking did not significantly

differ initially either in their health beliefs about smoking or in their perceptions of control over smoking behavior. Earlier research (Laoye et al., 1972) also found that adolescents' knowledge of the Surgeon General's warning concerning cigarettes was unrelated to their decisions to quit smoking. Thus, in the natural environment, these sorts of smoking-related beliefs may be unrelated to adolescent smoking cessation. In contrast, however, Prochaska and DiClemente (1983) found that smoking-related cognitions did play a role in the early stages of adults' decisions to quit smoking. Either adolescent smoking cessation is unique from adults' cessation in this regard or perhaps more fine-grained analyses of adolescent smoking cessation might find a particular stage at which smoking-related beliefs are influential.

While smoking-related beliefs were unrelated to subsequent changes in adolescents' smoking behavior, the current data did show some natural movement in these beliefs in an "anti-smoking" direction. Older subjects saw smoking as more dangerous to health and less controllable than did younger subjects. These cross-sectional age differences were also reflected in longitudinal changes over the one year period between measurements. Subjects viewed smoking as less healthy and less controllable in 1982 than in 1981. Whether this trend represents some kind of developmental maturation, the effects of accumulated experience with smoking, or the effects of some historical change between 1981 and 1982 cannot be determined. Moreover, since subjects in the current sample were all regular smokers in 1981, it is not clear that this increase in "anti-smoking" beliefs would be found in the adolescent population in general. Thus, the current data suggest that while adolescent smokers become more negative in their beliefs about smoking, these antismoking beliefs are unrelated to their smoking cessation.

In addition to the general trend with increasing age and over time toward more "antismoking" beliefs, the data suggest that the process of smoking cessation itself may be accompanied by an acceleration of "antismoking" influences. The second goal of the current study was to use the longitudinal design to examine the possible consequences of smoking cessation. In many ways, quitters and continuing smokers were more different at Time 2 (after they had quit smoking) than at Time 1. For example, while all subjects declined in smoking friends, those who had quit smoking showed the biggest drops. Similarly, while all subjects reported their friends as becoming more negative about their smoking, younger subjects who had quit smoking reported the greatest change in peer attitudes. These findings suggest that while psychosocial factors may be antecedents of quitting, the process of quitting itself may involve changes within adolescents' social environments that further reinforce smoking cessation. For example, when adolescents quit smoking, their friends may also quit or they may seek out new non-smoking friends. Similarly, once adolescents quit smoking, a process of cognitive dissonance reduction may occur. Adolescents who quit smoking may change their perceptions of their social environments in a way that justifies their decision to quit. Thus, the process of smoking cessation is likely to be bidirectional. Psychosocial factors may be antecedents to cessation and influence the decision to quit. In addition, the process of smoking cessation itself may change adolescents' actual and perceived social environments in ways that further reinforce their smoking cessation and that make them even more different from their peers who continue to smoke.

The current findings have several important implications for the design of smoking cessation programs for adolescents. The findings suggest that social environment factors in the form of peer and parental influences are more important for adolescent smoking cessation than are specific beliefs about the health risks and controllability of

smoking. Thus, programs that attempt to change social influences might be particularly useful. In addition, younger adolescents' cessation would appear to be more amenable to programs that focus on parental influence while older adolescents may be better influenced through peer-based strategies.

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