

ting report equal pro and con views. For quitters, con views were higher than pro views. These relative pro and con views also predicted subsequent change in smoking (Velicer et al. 1985).

Since the 1960s, the health-belief model (Kirscht 1983; Rosenstock 1974; Swinehart and Kirscht 1966) has been a popular approach to understanding expectancy-value concepts applied to smoking cessation. According to this model, attempting to stop smoking is a function of three factors: beliefs about the health consequences of smoking and perceived susceptibility to the disease consequences, perceptions of available actions that can reduce one's risk, and perceptions of the costs and benefits of accomplishing these actions (Kirscht and Rosenstock 1979). Johnston (1985) and his colleagues (Bachman, Johnston, O'Malley, and Humphrey 1988), for example, have shown that changes in perceived risk have accounted for a considerable reduction in adolescent marijuana use—particularly regular use. They suggest that effects of such beliefs may be more limited in the case of cigarettes because of the addictive properties of nicotine. As described in the next section, some recent models have addressed individuals' belief in their ability to change behaviors, or self-efficacy (Bandura 1977; Eiser 1983; Eiser and Sutton 1977; Sutton and Eiser 1984).

Self-Efficacy and Smoking

Bandura (1977, 1982) defines self-efficacy as an individual's belief in his or her ability to perform a specific behavior and proposes that efficacy beliefs represent a final common pathway mediating behavior change. Information from past behavior, modeling, affective states, and instruction combine to produce a performance expectation, which then predicts future behavior. This behavior would, in turn, influence subsequent efficacy; behavior and efficacy are reciprocally related (Bandura 1982).

The belief in one's ability to stop smoking has been implicated in the health-belief model and in Eiser's (1983) analysis of decisionmaking about stopping smoking. Self-efficacy theory, then, can be viewed as a historical descendant of the health-belief model and recently has had a major impact on models of smoking cessation. It is a major construct in Marlatt's (1985) influential relapse prevention model, which has spawned several intervention studies (e.g., Brown et al. 1984; Curry et al., in press). In Marlatt's model, self-efficacy is the key variable in the stage of maintenance (or relapse). It helps determine how well the individual will deal with high-risk situations or urges and is, in turn, influenced by successful or unsuccessful coping (Marlatt 1985).

Consistent with Marlatt's (1985) model, significant results with self-efficacy primarily pertain to client ratings after intervention, and thus predict smoking during followup periods. When all clients in treatment are considered, posttreatment self-efficacy ratings correlate strongly with short-term maintenance (Condiotte and Lichtenstein 1981; Coelho 1984; McIntyre-Kingsolver, Lichtenstein, Mermelstein 1983). For the most part, efficacy scores seem to correlate with outcome most highly when the followup interval is shorter (e.g., 3 months) and diminish over time (Coelho 1984; McIntyre-Kingsolver, Lichtenstein, Mermelstein 1983).

In order to view efficacy as a determinant of maintenance of cessation, it is necessary to demonstrate that it influences the latter independent of performance (level of

smoking) at the time efficacy is assessed. Results using partial correlations suggest that efficacy scores do provide limited information above and beyond that of current smoking behavior (Baer, Holt, Lichtenstein 1986). A second approach is to correlate self-efficacy measured postintervention with subsequent followup status only for those clients who initially quit. Studies using this paradigm have found significant but modest correlation with 3-month followup (McIntyre-Kingsolver, Lichtenstein, Mermelstein 1983; Coelho 1984). Self-efficacy also can be assessed during the maintenance phase, in order to predict longer term followup. Two studies have examined these relationships and both found significant prospective relationships (DiClemente 1981; Baer, Holt, Lichtenstein 1986). While intervention studies have usually found pretreatment efficacy unrelated to outcome, one study of unaided quitters found that baseline efficacy correlated with continuous abstinence at 1 year (Gritz, Carr, Marcus, in press). Another intervention study found that participants' attribution of stopping to their own skill and effort, gathered 3 months after stopping, was correlated with abstinence at 6-month followup (Fisher, Levenkron et al. 1982). National survey data reviewed by Shiffman (1986) suggest that lack of confidence in the ability to stop deters many smokers from attempting cessation.

Outcome Expectations

From a stage perspective, outcome expectations (perceived consequences of smoking or stopping) are more likely to be related to the decision to stop smoking or the initiation of quit attempts than to success in the stopping process. The effects of brief advice from a physician offer indirect support for the role of outcome expectations (Russell et al. 1979). Patients receiving brief advice to stop smoking were more likely to stop relative to control subjects. The physicians' advice probably enhanced the salience of the perceived positive consequences of stopping or the negative consequences of continuing to smoke and thus prompted the decision to attempt to stop. Negative consequences of smoking are potentiated by dramatic illness such as myocardial infarction, which is often the occasion for cessation efforts; however, relapse is often considerable (e.g., Baile et al. 1982), although less than with nondiseased smokers (Ockene et al. 1987). Cognitions concerning the health risks of smoking and the positive benefits of stopping remain very important from a public health perspective (see Chapter 4) and the health-belief model may be useful for guiding interventions aimed at smokers in the precontemplation or contemplation stages of change.

The role of disease in smoking cessation is substantial but not well understood. Certain environmental changes following a serious illness may aid cessation and/or the information and fear arousal provided by serious illness may motivate serious quit attempts, but continued maintenance is problematic (Ockene et al. 1985; Perkins 1988). Approximately one-quarter to one-half of survivors of myocardial infarctions are abstinent from smoking at extended followups (Ockene et al. 1985; Perkins 1988; Rigotti and Tesar 1985). While rates of cessation are impressive in some studies of cardiac and other patients, results of smoking cessation interventions produce inconsistent intervention effects (Perkins 1988; US DHHS 1986b). Research needs to evaluate the

impact of diseases and of dimensions of diseases including chronic and acute events, severity, and symptom mitigation following cessation, all of which vary across different diseases.

Information about negative effects on the fetus may trigger cessation among pregnant women, perhaps by potentiating a more general awareness of smoking's dangers. Pregnancy does prompt some cessation or reduction relative to the "natural" population; however, relapse after delivery is high (US DHHS 1980b). Prevalence of smoking among pregnant women and historical shifts are documented in the first part of this Chapter.

Personal Characteristics and Social Context

Personal Characteristics

Less educated smokers who do stop tend to have higher rates of relapse and shorter periods of abstinence than do more educated persons. Stopping smoking is more common among those smokers with greater personal skills or socioeconomic resources (US DHHS 1982). Prospective studies indicate that education level, income, and skills in self-management or personal coping are significantly related to success in self-initiated efforts to stop (Blair et al. 1980; Gritz, Carr, Marcus, in press; Perri, Richards, Schultheis 1977). In a multivariate logistic regression analysis of 1985 NHIS data, blacks were significantly less likely than whites to quit smoking, regardless of SES or demographic factors (Novotny et al. 1988). Currently there are several research projects funded by NCI aimed at better understanding SES and ethnic differences in smoking that may eventually provide information to explain these differences.

The sections on the initiation of smoking and regular smoking discussed the roles of several personality variables such as extraversion and neuroticism. While associations between extraversion and smoking have been replicated over the years (Eysenck 1980), it and other broad personality variables have not shown strong effects in smoking cessation (Lichtenstein 1982). Some evidence indicates that persons high in extraversion and low in neuroticism are more able to stop smoking (US DHEW 1979a). Internal-external locus of control has been hypothesized to be related to cessation (internals more successful) but the evidence is inconclusive (US DHEW 1979a). Research on personal characteristics is now focusing on more situation-specific or interactional variables such as self-efficacy, stress, and social support (Cohen et al. 1988; Condiotte and Lichtenstein 1981; Shiffman 1982).

Stress has been shown to affect initiation of smoking and smoking rate, as well as relapse following smoking cessation (US DHHS 1988). It appears to be a factor especially influencing women's cessation (Abrams et al. 1987; Sorensen and Pechacek 1987), as well as their initiation of smoking (Mitic, McGuire, Neumann 1985). High levels of anxiety (Schwartz and Dubitzky 1968) and self-reported tendencies to smoke to relieve negative affect (Pomerleau, Adkins, and Pertschuk 1978) have been associated with reduced success in stopping. The link of smoking to stress and research demonstrating the role of social support in buffering stress (Cohen and Syme 1985)

suggest that women's cessation efforts may benefit from interpersonal support more than those of men (Fisher, Bishop 1986; Gritz 1982).

Gender differences in cessation have been a major focus in recent years (US DHHS 1980b). Sex differences in onset and prevalence and historical shifts in these differences are well documented in the first section of this Chapter. These differences and shifts have prompted a search for physiological (e.g., Silverstein, Feld, Kozlowski 1980) and especially psychosocial variables (US DHHS 1980b) that might account for them. No compelling factors have yet emerged to account for the historical shifts although changes in social acceptability and the women's rights movement seem likely candidates (US DHHS 1980b). It has also been suggested, on the basis of survey data, that women have lower rates of quitting smoking than do men (Remington et al. 1985). This interpretation has been criticized for failing to adjust male quit rates to reflect the proportion of men who switch to other tobacco products (Jarvis 1984).

Women's concern about weight gain associated with smoking cessation has received much recent attention (US DHEW 1980b; US DHHS 1988). The likelihood of women gaining weight following smoking cessation and the role of weight gain in precipitating relapse deserve further investigation (US DHHS 1988) as does the hypothesis that women prefer and are more successful in cessation programs that provide social support (e.g., from a group or counselor) (Fisher and Bishop 1986; Gritz 1982). Studies of sex differences in cigarette cessation programs yield equivocal results, and the issue of gender differences in cessation remains unresolved (US DHHS 1988).

Social Context Influences

Although findings published as early as 1971 indicated the importance of peer smoking in adult smoking and cessation (Eisinger 1971; Graham and Gibson 1971), these factors did not receive the attention they were given in discussions of smoking among adolescents. This difference reflected, perhaps, popular notions that adolescents are especially influenced by social forces such as peer pressure but that adults are more tied to psychological and physiological needs (US DHHS 1988). The popularity of self-management procedures (Fisher 1986) was manifest in smoking cessation programs of the 1970s that stressed the individual's control over smoking by manipulating its triggers or antecedents. Unfortunately, research directed at such procedures failed to yield appreciable improvements in program impacts (Lichtenstein 1982). This led to a search for important variables that had not been well researched. The 1980 and 1982 Surgeon General's Reports (US DHHS 1980b, 1982) identified social support as possibly important in mediating cessation among adults. A number of recent papers have sought to explore empirically the effects of social support on smoking cessation (e.g., Copotelli and Orleans 1985; Fisher, Lowe et al. 1982; Mermelstein, Lichtenstein, McIntyre 1983; Morgan, Ashenberg, Fisher 1988).

As recently reviewed by Lichtenstein, Glasgow, and Abrams (1986), social support measures have been repeatedly correlated with abstinence, but the addition of social support components to standard behavioral cessation programs has not yielded incremental gains on outcome. For instance, an emphasis on group cohesion to enhance social support led to initial but not long-term advantages over a control group receiv-

ing standard intervention (Etringer, Gregory, Lando 1984). Similarly, efforts to mobilize spouse support have been disappointing (McIntyre-Kingsolver, Lichtenstein, Mermelstein 1986).

An understanding of the lack of a relationship between intervention strategies that promote interpersonal support and long-term smoking cessation may be advanced by considering the nature of support and its functions in different stages of smoking cessation (Cohen et al. 1988). Interpersonal emotional support seems especially related to maintained abstinence in the first several months after cessation (Coppotelli and Orleans 1985; Mermelstein, Lichtenstein, McIntyre 1983; Morgan, Ashenberg, Fisher 1988; Ockene et al. 1982a). On the other hand, long-term abstinence of a year or more may be more closely tied to the number of smoking friends and relatives in the social network (Eisinger 1971; Graham and Gibson 1971; Mermelstein et al. 1986; Cohen et al. 1988; Smith 1988).

The parallel between the importance of social network smoking status for long-term abstinence and for development of smoking in adolescence is noteworthy. Just as the adolescent progressing toward regular use will tend to have friends who also are smokers, so the long-term abstainer may benefit from friends who also are nonusers. At the stages of the transition to regular smoking and of long-term maintenance of cessation, the importance of peers' behavior, either smoking or nonsmoking, seems greatest. It may be more effective to intervene to change norms and smoking behavior of networks than to teach supportive strategies to a few significant others.

One way to have an effect on smoking by changing norms and the smoking of social networks is through the workplace, and worksite programs are attracting considerable attention (See Chapters 6 and 7). Worksites differ in smoking prevalence and cessation rates as well as in norms for supporting cessation attempts (Sorensen and Pechacek 1986; Sorensen, Pechacek, Pallonen 1986). Programs aimed at worksite norms and general support for nonsmoking have reported substantial quit rates, even among smokers who did not join cessation clinics. Employees' ratings of management support for such programs were associated with cessation attempts and with ratings of social support for nonsmoking (Fisher, Bishop et al. 1988b; Fisher, Bishop et al. 1988c).

Summary

Cross-sectional data reviewed earlier in this Chapter demonstrate that smokers with lower levels of education are less likely to stop. Stopping smoking seems more common among smokers who have greater personal and socioeconomic resources. Educational level, income, and skills in self-management or personal coping are related to success in self-initiated efforts to quit. *Less educated smokers who stop tend to have higher rates of relapse and shorter periods of abstinence than more educated persons.* Conditioned responses to smoking cues and alternative coping skills are important in maintenance and avoidance of relapse.

The relationship of cognitive and decisionmaking determinants to smoking cessation has received increasing attention over the past 25 years. Cognitions about outcome expectations—the pros and cons of smoking and quitting—relate primarily to decisions

to attempt cessation; efficacy cognitions about perceived ability to manage temptations or urges are related primarily to maintenance or relapse. Prospective studies indicate that the presence of acute disease, which is likely to affect cognitions about the pros and cons of smoking, is related to cessation. Consistent with an overall increasing appreciation of the importance of nicotine in all stages of smoking, more dependent smokers are less likely to succeed in quitting. Interpersonal support helps smokers in the early stages of quitting, but current evidence indicates that a low density of smokers in the social network is decisive for long-term abstinence.

Summary of Changes in Knowledge About Determinants of Smoking Behavior

There has been a dramatic increase in research on the determinants of smoking over the past 25 years. In 1964, there were few studies; by 1979 the number had expanded to a few hundred studies; now there are probably thousands. This increase in research reflects both specific Federal initiatives to support smoking research and larger trends toward recognizing the important relationship of behavioral factors to disease and the effect of preventative strategies in reducing morbidity and mortality.

Several historical trends are predominant in considering all three major stages together—development, regular smoking, and cessation. A strong consensus has evolved on the critical role of nicotine in smoking. The pharmacologic effects of nicotine and the role of conditioning are now understood as integrated processes that combine to produce the addictive nature of cigarette smoking. Cigarette smoking is now recognized to develop over a series of stages with multiple and different determinants at each stage (Figure 8; Table 35). The interaction of determinants (e.g., conditioning and the pharmacologic effects of nicotine with social influences) has become more clearly articulated. Recognition of these stages and their multiple interacting causes currently guides the development of intervention and educational programs.

Smoking onset is associated with social influences, educational and economic disadvantage, alcohol and other drug use, and antisocial behavior.

Our increased knowledge of pharmacologic and psychosocial determinants has facilitated the development of interventions—behavioral or combined behavioral and pharmacologic—to aid cessation of regular smoking. Continued increases in our understanding of the stages of cessation combined with better validated interventions of various levels of intensity or cost will help to offer smokers more choices to meet their needs. There continues to be a gap in our knowledge of how to target intervention programs for the educationally and economically disadvantaged.

As described in the next two chapters, the knowledge gained about the determinants of smoking has guided interventions and campaigns to reduce the prevalence of smoking in adults from 40 percent in 1965 to 29 percent in 1987. It has led to promising prevention and cessation programs, which use existing community channels—media, worksites, schools, physicians' offices, and hospitals—to deliver low-cost but effective interventions (Chapter 6).

CONCLUSIONS

Part I. Changes in Smoking Behavior

1. Prevalence of cigarette smoking has declined substantially among men, slightly among women, and hardly at all among those without a high school diploma. From 1965–87, the prevalence of smoking among men 20 years of age and older decreased from 50.2 to 31.7 percent. Among women, the prevalence of smoking decreased from 31.9 to 26.8 percent. Smoking prevalence among whites fell steadily. Among blacks, the prevalence of smoking changed very little between 1965 and 1974; subsequently, prevalence declined at a rate similar to that of whites during the same period. Smoking prevalence has consistently been higher among blue-collar workers than among white-collar workers.
2. Annual per capita (18 years of age and older) sales of manufactured cigarettes decreased from 4,345 cigarettes in 1963 to 3,196 in 1987, a 26-percent reduction. Total cigarette sales increased gradually to 640 billion cigarettes in 1981 and then fell to 574 billion in 1987.
3. In 1965, 29.6 percent of adults who had ever smoked cigarettes had quit. This proportion (quit ratio) increased to 44.8 percent in 1987. The rate of increase in the quit ratio from 1965–85 was similar for men and women. The rate of change in quitting activity in recent years is similar for whites and blacks. From 1965–85, the quit ratio increased more rapidly among college graduates than among adults without a high school diploma.
4. Of all adults who smoked at any time during the year 1985–86, 70 percent had made at least one serious attempt to quit during their lifetime and one-third stopped smoking for at least 1 day during that year.
5. The age of initiation of smoking has declined over time, particularly among females. Among smokers born since 1935, more than four-fifths started smoking before the age of 21.
6. Trends in prevalence of cigarette smoking among those aged 20 to 24 years are an indicator of trends in initiation. By this measure, initiation has declined between 1965 and 1987 from 47.8 to 29.5 percent. Initiation has fallen four times more rapidly among males than among females. The rate of decline has been similar among whites and blacks. Initiation has decreased three times more rapidly among those with 13 or more years of education than among those with less education.
7. The prevalence of daily cigarette smoking among high school seniors decreased from 29 percent in 1976 to 21 percent in 1980, after which prevalence leveled off at 18 to 21 percent. Prevalence among females has consistently exceeded that among males since 1977. Prevalence was lower for students with plans to pursue higher education than for those without such plans. The difference in prevalence by educational plans widened throughout this period; in 1987, smoking rates were 14 percent and 30 percent in these two groups, respectively.
8. The best sociodemographic predictor of smoking patterns appears to be level of educational attainment. Marked differences in smoking prevalence, quitting, and

initiation have occurred and have increased over time between more and less educated people.

9. The domestic market share of filtered cigarettes increased from 1 percent in 1952 to 94 percent in 1986. The market share of low-tar cigarettes (15 mg or less) increased from 2 percent in 1967 to 56 percent in 1981, after which this proportion fell slightly and then stabilized at 51 to 53 percent. The market share of longer cigarettes (94 to 121 mm) increased from 9 percent in 1967 to 40 percent in 1986.
10. Between 1964 and 1986, use of smokeless tobacco (snuff and chewing tobacco) declined among men and women 21 years of age and older. However, among males aged 17 to 19, snuff use increased fifteenfold and use of chewing tobacco increased more than fourfold from 1970–86.
11. Differences in prevalence of cigarette smoking and smokeless tobacco use between young males and young females suggest that the prevalence of any tobacco use is similar in these two groups.
12. From 1964–86, the prevalence of pipe and cigar smoking declined by 80 percent among men.

Part II. Changes in Knowledge About Determinants of Smoking Behavior

1. Smoking was viewed as a habit in 1964 and is now understood to be an addiction influenced by a wide range of interacting factors, including pharmacologic effects of nicotine; conditioning of those effects to numerous activities, emotions, and settings; socioeconomic factors; personal factors such as coping resources; and social influence factors.
2. Since 1964, there has been a gradual evolution of understanding of the progression of smoking behavior through the broad stages of development, regular use, and cessation. Each of these stages is differentially affected by multiple and interacting determinants.
3. Views of determinants of smoking are affected by the predominating theoretical and methodological perspectives. In smoking, the earlier focus on broad, dispositional variables (e.g., extraversion) has given way to an emphasis on situation-specific and interactional variables; a focus on a search for a single cause has given way to a focus on multiple and interacting causes.

Appendix

Questions Regarding Smoking Status and Quitting from the 1986 AUTS

Smoking status (current, former, never) is decided from responses to the following two questions:

“Have you ever smoked at least 100 cigarettes in your life?”

“Do you smoke cigarettes now?”

Current smokers were then asked:

“Have you ever made a serious attempt to stop smoking cigarettes entirely?”

“Thinking of your last serious attempt to quit, how long did you stay off cigarettes?”

“How long ago did that attempt to quit begin?”

Current smokers who reported that they had never made a serious attempt were asked:

“Have you ever thought about quitting?”

“Would you try to quit if there was an easy way to do so?”

Questions Regarding Smokeless Tobacco Use

1986 AUTS

Ever use:

“Have you ever used (snuff and chewing tobacco asked separately) on a fairly regular basis?”

Current use:

“Do you use (snuff, chewing tobacco) now?”

1964, 1966, 1970, and 1975 AUTS

Ever use:

“Have you ever used snuff at all regularly?”

“Have you ever chewed tobacco regularly?”

Current use:

“Do you now use (snuff, chewing tobacco)?”

1985 NIDA National Household Survey on Drug Abuse

Ever and current use:

“On the average, in the past 12 months, how often, if ever, have you used chewing tobacco or snuff or other smokeless tobacco?” Responses included “never,” “almost daily,” “less than daily,” and “not in past year.”

1985 CPS

Current other tobacco use:

“Does (name) presently use any other form of tobacco, such as snuff or chewing tobacco?”

Current smokeless tobacco use:

“What other form(s) of tobacco does (name) presently use?” The categories “snuff,” “chewing tobacco,” “cigars,” “pipe tobacco,” or “other” were coded in response to this followup question.

1986, 1987, and 1988 BRFSS

Ever use:

“Have you ever used or tried any smokeless tobacco products such as chewing tobacco or snuff?”

Current use:

“Do you currently use any smokeless tobacco products such as chewing tobacco or snuff?”

1987 NHIS

Ever Use:

“Have you ever used chewing tobacco, such as Redman, Levi Garrett, or Beechnut?” “Have you ever used snuff, such as Skoal, Skoal Bandits, or Copenhagen?” In addition, those who answered “yes” to the above questions were asked, “Have you used chewing tobacco at least 20 times?”

Current use:

“Do you use (chewing tobacco, snuff) now?”

1970 NHIS

Current use:

“Do you use any other form of tobacco?” Respondents could answer yes or no to “snuff,” “chewing tobacco,” or “other.”

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