may influence and affect their behavior. These factors include the availability of cigarettes in the community, the acceptability of smoking, peer and parental smoking, and adolescents' perceptions of the environment.

Factors That Influence Tobacco Acceptability and Availability

Factors that increase the acceptability and availability of cigarette use at a societal or community level serve also to influence adolescent smoking behavior. Acceptability and availability are affected, in part, by the tobacco industry through advertising and other promotional activities; this topic is discussed thoroughly in Chapter 5. Acceptability of tobacco use may also be accomplished through persuasive, multiple, attractive role models who smoke on television programs or in movies (Bandura 1977). Acceptability is further reinforced by community norms and policies that make tobacco products relatively accessible for adolescents—for example, through sales to underage buyers and unrestricted access to cigarette vending machines (see "Restrictions on Minors' Access to Tobacco" in Chapter 6). The National Adolescent Student Health Survey (American School Health Association et al. 1989) found that 79 percent of 8th graders and 92 percent of 10th graders considered it to be "very easy" or "fairly easy" to get cigarettes. Likewise, in the 1991 Monitoring the Future Project study (Johnston, O'Malley, Bachman 1992) 73 percent of 8th graders and 88 percent of 10th graders reported that it would be "fairly easy" or "very easy" to get cigarettes. In a study of adolescents in southern California, Sussman et al. (1987) found that both genders and all racial/ethnic groups except Asians tended to believe that they could obtain cigarettes with little difficulty. Findings from a national sample of teenaged (12–17 years old) smokers confirm these perceptions and suggest that 1.5 million of an estimated 2.6 million underage smokers buy their own cigarettes (Centers for Disease Control [CDC] 1992). Of those who buy their own cigarettes, 84 percent purchase them from a small store, 50 percent from a large store, and 14 percent from a vending machine, either often or sometimes (CDC 1992). These reports have been substantiated by observational studies of cigarette buying by young teenagers (see "Studies of Young People's Access to Tobacco" in Chapter 6). Several studies have found that the general availability of cigarettes predicts the onset of smoking (Bauman et al. 1984; Semmer, Cleary, et al. 1987).

Factors that increase acceptability and availability support a social milieu in which cigarette smoking may appear socially functional. On the other hand, a social milieu can decrease the risk of adolescent smoking—if, for example, communities choose to restrict exposure to tobacco-promoting images or restrict access to tobacco products (see Chapter 6 for further discussion of such restrictions). Currently, as more communities and states adopt a variety of restrictive policies and programs, evaluation research is needed to examine the effectiveness of these strategies for reducing onset of tobacco use.

Interpersonal Factors

Interpersonal factors in the initiation of smoking involve opportunities for adolescents to perceive, through modeling by adults and peers who smoke, apparent advantages of smoking. These role models (particularly peers) also provide the situations (e.g., parties, staying overnight) in which cigarettes are first tried by adolescents (Lawrance and Rubinson 1986). Interpersonal factors have also been labeled "social learning variables" (Bandura 1977; Flay 1993) because the social functions or meanings of smoking are learned in the context of social interactions. The research on interpersonal factors has carefully explored the roles of parents, siblings, friends, and peers in the process of initiation.

Parental Smoking

The research on the influence of parents' smoking behavior on their children's cigarette use has included multiple studies of the relative risk of initiation if one or both parents smoke. Bauman et al. (1990) found a consistent relationship between parental and adolescent smoking in a cross-sectional study of 12- through 14-year-olds in 10 urban areas in the southeastern United States. Compared with adolescents whose parents had never smoked, those whose parents currently smoked were almost twice as likely to smoke; those whose parents had once smoked were three times as likely to smoke. A similar influence of parental smoking was noted by Chassin et al. (1986) for females in a longitudinal study of 12- through 18-year-olds from the midwestern United States. In Sussman et al. (1987), a longitudinal study of 11- through 14-year-olds in southern California, parental smoking was predictive of a child's smoking for whites but not for Hispanics, blacks, or Asians. This finding matches that of Hunter et al. (1987) in a longitudinal study of 8- through 17-year-olds in the southern United States, in which parental behavior was predictive of children's smoking initiation for whites but not for blacks.

By contrast, parental smoking behavior was a poor predictor of smoking initiation in several other studies, including the longitudinal study McCaul et al. (1982) conducted among 11- through 14-year-old whites living in the north-central United States. No relationship was found in the Botvin et al. (1992) cross-sectional study of

608 inner-city blacks aged 11 through 13 or in the longitudinal study of 2,209 primarily white 11- through 17-year-olds in Minnesota (Mittelmark et al. 1987). In Quine and Stephenson's (1990) cross-sectional study of over 2,000 Australians aged 10 through 12, parental smoking was not associated with children's smoking but was related to children's intentions to smoke when older.

Conrad, Flay, and Hill (1992) summarized the findings of 27 prospective studies on the onset of smoking that have been published since 1980 (see Table 3). In 15 of the studies, parental smoking factors were investigated. The researchers concluded that parental smoking was predictive in seven studies, predictive only for females in two studies, and not predictive in six others. Chassin et al. (1984) suggested that parental smoking may influence the preparatory or initial trying stages, as well as the stability of smoking patterns from adolescence to adulthood (Chassin et al. 1991), but parental smoking appeared to be less influential during the transition to regular smoking.

Sibling Smoking

Over the past two decades, extensive research on the influence of sibling smoking indicates a primarily positive relationship between an older sibling's smoking and a younger (adolescent) sibling's beginning to smoke. In a 10-year longitudinal study of 6,311 adolescents (initially 11 through 13 years old), sibling smoking was found to be one of four factors that was predictive of increased risk of initiating regular smoking and predictive of smoking prevalence after 10 years (Swan, Creeser, Murray 1990). In the McNeill et al. (1988) longitudinal research with 2,159 British 11- through 13-year-olds, having a sibling who smoked appeared to increase the odds of smoking initiation by a factor of 1.69. Botvin et al. (1992) reported that sibling smoking was one of five variables that accounted for 29 percent of the variance in smoking in their cross-sectional study of 522 inner-city blacks aged 11 through 13. O'Connell et al. (1981) found sibling smoking to be among the first three factors associated with weekly

Table 3. Predictors of smoking onset in 27 prospective studies

Prediction of smoking onset	Number of supportive findings	Number of unsupportive findings	Percent support
Socioeconomic status	16	5	76
Environmental factors			
Family smoking	18	8	69
Family approval	6	8	43
Other adult influences	5	3	63
Peer use and approval	27	5	84
Normative estimates	4	1	80
Offers/availability	7	1	88
Family bonding	9	6	60
Peer bonding	11	4	73
School influences	20	5	80
Religious influences	0	1	0
Behavioral factors			
Skills	3	0	100
Other behaviors	12	2	86
Personal factors			
Knowledge/beliefs	16	9	64
Attitudes	8	3	73
Personality factors	23	7	77
Intentions to smoke	8	1	89

Source: Adapted from Conrad, Flay, and Hill (1992).

smoking among 6,224 students aged 10 through 12 in New South Wales, Australia. Mittelmark et al. (1987) found that experimenting with cigarettes was associated with sibling smoking only for females and 11- through 13-year-old students. This finding was similar to the Chassin et al. (1984) research that found sibling smoking more influential in the early stages of cigarette use than in the later stages.

Gender and race differences in the effect of sibling smoking have also been noted. Hunter et al. (1987) found sibling smoking predictive for white males, a sister's smoking predictive for white females, and a brother's smoking predictive for black males and females. Brunswick and Messeri (1983) found sibling smoking influential only for males. In the Muscatine Study (Krohn, Naughton, Lauer 1987), the maintenance (not initiation) of smoking was associated with a brother's smoking. Finally, in Conrad, Flay, and Hill's (1992) review of 27 prospective studies, four of the five studies that examined this factor indicated that sibling smoking was associated with onset.

Peer Smoking and Peer Behaviors

One of the areas of widest investigation in the antecedents of cigarette smoking concerns peer smoking and related peer behaviors. Peers may be defined as persons of about the same age who feel a social identification with one another. The influence of peers has been posited as the single most important factor in determining when and how cigarettes are first tried. Flay et al. (1983) suggest that smoking may primarily represent an effort to achieve social acceptance from peers and that it may particularly be an experimental "adult" activity that is shared with the peer group. Leventhal and Keeshan (1993) suggest that adolescents are not only influenced by, but also influence and construct, their peer groups. These researchers propose that small groups of adolescents "construct shared social environments in which they perceive themselves and other(s) as having mutual cognitive, emotional, and valuative reactions. . . . the intersubjectivity created by sharing generates a sense of wellness. This sense of mutuality enhances the attractiveness of the group and may lead to incorporation of the self-image of the others into the image of one's own self" (p. 269).

Multiple cross-sectional and longitudinal studies worldwide substantiate the relationship between smoking onset and peers' (or friends') smoking (Shean 1991; O'Connell et al. 1981; Ogawa et al. 1988). In their research, Bauman et al. (1990) found that smoking most often occurred in the presence of best friends. Sixty percent of 11- through 17-year-olds reported that they had first smoked, and 72 percent reported that they had most recently smoked, with close friends (Hahn et al. 1990). Among 12- through 14-year-olds, those whose best friend smoked were four times more likely to be smokers than those whose best friend did not smoke. Best friend's smoking predicted both smoking experimentation and prevalence among urban San Diego adolescents from a variety of ethnic groups (Elder, Molgaard, Gresham 1988) and among white and black 8- through 17-year-olds in Louisiana (Hunter, Vizelberg, Berenson 1991). Best friend's cigarette use was predictive of the first try at smoking, whereas having a majority of friends who smoke was predictive of the second cigarette (Leventhal, Fleming, Glynn 1988).

In the Conrad, Flay, and Hill (1992) review of the recent prospective research, friends' smoking was predictive of some phase of smoking in all but one (Newcomb, McCarthy, Bentler 1989) of 16 studies. A positive association of peer smoking with onset of smoking in 88 percent of these more rigorous, longitudinal studies suggests a clear link between peers' smoking and cigarette use. This link may be mediated by personal factors, such as self-efficacy (or self-confidence), and appears to be most potent in the earlier stages of smoking (Pomerleau 1979; Pederson and Lefcoe 1986; Chassin, Presson, Sherman 1990).

Social Bonding

The interpersonal environment has also been characterized by the degree of social bonding, or attachment, between the adolescent and important others or institutions.

The findings on family bonding variables in smoking onset, particularly attachment to mothers or fathers, have been inconsistent; those related to peer bonding, including the number of friends, level of social life, participation in antisocial activities, and having a boyfriend or girlfriend, were all found to be predictive of onset (Conrad, Flay, Hill 1992). Bonding with peers who smoke appears to increase the risk of smoking, perhaps because such bonding takes precedence over attachments to the family.

Perceived Environmental Factors

The perceived environment includes the smoking-related norms, social support, expectations, reactions, and barriers that adolescents sense in their environment. The perceived environment may be a more proximal influence on smoking initiation than the actual environment (Jessor and Jessor 1977). For example, 12-year-olds who believe that "lots of people" their age smoke may

be more inclined to begin smoking to fit in than if they were aware that only 5 to 7 percent of their peers actually smoke.

Norms

Norms may be defined as what an individual in a particular group perceives she or he ought to do and what is perceived as acceptable behavior for a given age group, gender, or other subgroup. Gerber and Newman's (1989) research on smoking-related norms details adolescents' perceptions of the percentage of all adults, peers, and classmates they think are smokers. These investigators found that experimental adolescent smokers who increased their smoking levels over the course of the one-year study period perceived more smoking among their classmates than did those who had decreased their smoking in the same time period. Similarly, Leventhal, Fleming, and Glynn (1988) report that youth who participated in their studies greatly overestimated the proportion of peers and adults who smoke. The adolescents believed that 66 percent of their peers and 90 percent of adults were smokers, thus overestimating smoking prevalence by at least a factor of three.

Collins et al. (1987) examined the predictive influence of norms in a longitudinal study of 3,295 students aged 11 and 12 in 56 junior high schools in Los Angeles. Like Chassin et al. (Chassin et al. 1984; Chassin, Presson, Sherman 1990), they found that adolescents who made relatively high estimates of regular smoking prevalence were more likely to try smoking, to become smokers, or to increase the amount they smoked over 1 and 1.5 years of the study. Sussman et al. (1993) discussed further aspects of normative influence and implications for the content of prevention programs. Previous smoking and peer smoking were the main predictors of overestimates in the Collins et al. (1987) study. In Shean's (1991) research in Australia, beliefs about the number of adolescents and adults who smoke predicted smoking in young adulthood eight years later. In part, these normative expectations may be a function of these beginning smokers' actual exposure to a disproportionate number of smokers, including adults and peers.

Social Support for Smoking

Social support includes perceived approval or disapproval of adolescent cigarette smoking by parents, siblings, peers, and important others, such as teachers or employers. One way that social support is manifested is through peer-group pressure, either through support or discouragement of smoking.

Peer pressure is not always negative; it has been used successfully in many prevention programs (Klepp, Halper, Perry 1986). Still, in the study by Hahn et al. (1990), the urging of one or more acquaintances—most likely peers or close friends—prompted over half the instances of adolescents' trying a cigarette for the first time. In the Chassin et al. (1986) study, females who saw their friends as more supportive than critical about their smoking were more likely than those who saw their friends as less supportive to become regular smokers one year later. Similarly, many adolescent smokers in another study reported, "My friends like me because I smoke" (Hunter et al. 1987). In the same study, smokers were less likely than nonsmokers to report, "My parents don't want me to smoke." Peer approval of smoking was an important predictor for smoking onset among whites and Hispanics, whereas adult approval was an important predictor for Hispanics and Asians among 874 southern California 11- through 13-year-olds (Sussman et al. 1987).

Social support also includes the general support or approval the adolescent receives from others. This kind of support appears to play a role in predicting onset (see "Trends in Knowledge and Attitudes About Smoking" in Chapter 3). Chassin et al. (1986) found that those adolescents who reported that their parents were generally supportive of them were less likely to begin smoking or to become regular smokers than were those who perceived that their parents were not generally supportive of them. However, those who reported that their friends were supportive of them were more likely to become smokers than were those who did not report such support. Similarly, males who reported that they lived in families in which they had limited involvement in family decisions were more likely to become smokers than males from families where high involvement in family decisions was reported (Mittelmark et al. 1987). Adolescents who reported regularly caring for themselves after school were at increased risk of smoking (Richardson et al. 1989). Finally, adolescents who believed that parents, siblings, friends, and teachers would not care if they smoked were at higher risk of initiating smoking after 2.5 years than were those who believed that others would care if they smoked (McNeill et al. 1988). Lack of concern by parents appears to increase risk, particularly for males (Swan, Creeser, Murray 1990). General parental support of the adolescent and concern about the adolescent's smoking appears to decrease risk.

Parental Reaction to Smoking

Parental reaction to use and perceived parental strictness have also been associated with onset. Hansen et al. (1987) examined the influence of perceived parental reactions to cigarette smoking (as well as alcohol and marijuana use) among 293 Los Angeles 10- through 12-year-olds. Parental anger toward the

adolescent's smoking or approval of the adolescent's refusing to smoke, together with two other drug-related variables, indirectly predicted low levels of use. Chassin et al. (1986) evaluated perceptions of parental strictness; their findings support the need for interventions tailored to different age groups of adolescents. Among the youngest subjects (10 through 12 years old), those who perceived that their parents were more strict than other parents were actually more likely to begin smoking over a one-year interval. Among the oldest subjects (14 through 16 years old), however, those who perceived that they had stricter parents were less likely to begin to smoke. Those aged 12 through 14 years were not affected by parental strictness. Other researchers have further noted that extremes of parental strictness, from inadequate restraint to overcontrol, are associated with problem behaviors (Pandina and Schuele 1983).

Adult Discrepancy

Shean (1991) developed the concept of adult discrepancy—the discrepancy between the "adult" behaviors in which an adolescent wants to participate at age 14 (such as going to a nightclub) and what was actually done by his or her parents when they were age 14. Those adolescents with high discrepancy were more likely to be smokers as young adults than those with low discrepancy, which may suggest that adolescents with high discrepancy tend to make the transition to an adulthood not modeled by parents. The adult discrepancy factor, in addition to peer, sibling, and parental smoking, intentions to smoke, and effects of cigarette advertisements, predicted young adult smoking over an eight-year interval. This study points to the strong effect of the social environment on the onset and maintenance of adolescent smoking.

Behavioral Factors in the Initiation of Smoking

Behavioral factors involve patterns of behaviors that are directly related to cigarette use, such as academic achievement, health-compromising and health-enhancing behaviors, and smoking-related skills. These associated behavior patterns may increase the risk of smoking by providing opportunities to view smoking as functional or appropriate.

Academic Achievement

The onset of smoking has been shown repeatedly to be related to poor academic achievement (see Table 6 in Chapter 3). Relevant indicators of students' achievement include scholastic performance (grades), high school graduation, truancy rates, and future professional or educational aspirations. Borland and Rudolph (1975) examined the relative predictability of scholastic performance, parental smoking, and socioeconomic status among 1,814 high school students in Pennsylvania. The strongest correlate to smoking was scholastic performance; those with the highest grades were found to smoke less than those with the lowest grades. This finding is consistent with Brunswick and Messeri's (1984) research among young, urban black adolescents in Harlem, New York, as well as the Sussman et al. (1987) research with Hispanic and Asian adolescents in southern California. Students who disliked school and feared school failure were more likely to begin smoking in early adolescence than those who liked school and had expectations of school success (Ahlgren et al. 1982). In two well-designed studies, adolescents who had limited expectations of academic achievement increased their smoking levels over time (Gerber and Newman 1989; Chassin, Presson, Sherman 1990). Still, among inner-city black seventh-grade students, Botvin et al. (1992) found that academic achievement was not a significant predictor of current smoking or intentions to smoke.

Conrad, Flay, and Hill (1992) found that 80 percent of the prospective studies on the onset of smoking indicated a positive relationship between low academic achievement (and other school-related factors) and smoking onset. In a longitudinal study of 739 junior high students (66 percent white, 15 percent black, 10 percent Hispanic) in Los Angeles, the research team of Newcomb, McCarthy, and Bentler (1989) concluded that an adolescent's "academic lifestyle orientation" (measured by grades, educational aspirations, personal and profession plans, and expectations) was the central organizing influence on teenage smoking behavior, teenage emotional well-being, social relationships with smokers, and adult smoking behavior. This centrality emerged even when emotional well-being, self-efficacy, personal ambition, and friends' smoking behavior were considered.

Other Adolescent Behaviors

The association between smoking and other adolescent behaviors has been examined as an extension of Jessor and Jessor's (1977) concept of the covariation of problem behaviors, including both unconventional behaviors (such as alcohol and drug use) and conventional behaviors (such as academic achievement and church attendance). Cigarette use among adolescents has been studied as "problem" behavior; that is, studies have examined its association with alcohol and drug use, risk-taking behaviors, proneness to deviance, early antisocial behavior, and group membership, as well as its association with constructive or health-enhancing behaviors. Some adolescents see problem behaviors as a way to

achieve—and signal to others—the precocious transition to independence and autonomy.

The association of cigarette smoking and illegal drug use suggests that cigarettes may be an entry-level or gateway drug in a sequence of progressive drug use (see "Smoking as a Risk Factor for Other Drug Use" in Chapter 2 and "Smoking and Other Drug Use" in Chapter 3). The suggestion here is not that smoking causes illegal drug use, but that those who use illegal drugs have most likely smoked cigarettes previously. In the following studies, smoking is considered a gateway drug, since the decision to smoke appears to facilitate the decision to use other drugs.

Scheier and Newcomb (1991) studied 717 junior high school students in northern California. They concluded that early cigarette use predicted illegal drug use during the two-year study period. This finding complements the work of Fleming et al. (1989) and Newcomb and Bentler (1986), who emphasized the crucial role of cigarette smoking in the progression to marijuana and hard drug use, even without the mediating impact of alcohol use. Those authors concluded that these substances are reciprocally influential over time, with increased use of cigarettes associated with increased use of illegal drugs. By young adulthood, a clear correlation seems to exist between cigarette smoking and illegal drug use. For example, in Brunswick and Messeri's (1983) 6- to 8-year prospective study of 536 blacks aged 11 through 13 in Harlem, New York, at follow-up (aged 18 through 23), 56 percent of males and 59 percent of females who had used illegal drugs smoked cigarettes, whereas 24 percent of males and 35 percent of females who had not used illegal drugs smoked cigarettes.

Risk Taking, Rebelliousness, and Deviant Behaviors

Risk taking, rebelliousness, and deviant behaviors are generally those behaviors that are considered unconventional, antisocial, or alienated from traditional institutions. The research literature has repeatedly characterized adolescent drug use as one manifestation of rebelliousness and deviance (Jessor and Jessor 1977; Chassin, Presson, Sherman 1989). By testing Jessor and Jessor's (1977) model, Chassin et al. (1984) found that proneness to deviance significantly predicted smoking onset in a longitudinal study of secondary students, although not for those who had already experimented with cigarettes. In a subsequent study of high school students, Chassin, Presson, and Sherman (1989) found that in some instances, deviance was associated with independence and personal control; whether psychologically constructive or not, however, deviance was a significant predictor of cigarette smoking. A risk-taking orientation (that is, an inclination toward excitement and chance taking) was similarly associated with trying a cigarette for the first or second time (Leventhal, Fleming, Glynn 1988). Risk taking was also a significant predictor of smoking initiation in the Collins et al. (1987) study of 11- and 12-year-olds in Los Angeles. In the Sussman et al. (1987) study of southern California adolescents, risk taking predicted smoking among blacks, but the association was not significant for whites, Hispanics, or Asians. Conrad, Flay, and Hill's (1992) review of prospective research on smoking initiation cited five studies that associated rebelliousness, risk taking, and proneness to deviance with smoking onset (see "Cigarette Smoking and Other Health-Related Behaviors" in Chapter 3).

Peer Groups

During the past two decades, the relative importance of adolescent bonding with peers has increased, while the importance of bonding with parents has declined (Perry, Kelder, Komro 1993). This shift has allowed more time, opportunity, and social support for dysfunctional behaviors, such as cigarette use. Adolescent females who spent most of their free time with their families, for example, were less likely to begin smoking than those who spent little free time with their families (Brunswick and Messeri 1984). As Flay (1993) notes, "youth alienated from conventional culture have more opportunities than others to observe substance use and its positive functions. . . . They are also more likely to overestimate the proportion of their peers who use these substances—because they are likely to be associating with groups who actually do use . . . . [and] deviant cultures reinforce these youth when they do use, for example, by acceptance into groups" (p. 369).

Leventhal et al. (1991) observe that parents, teachers, and other adults seldom discuss with youth the intense biological and social changes that occur in adolescence: "When such a dialogue is absent . . . the peer group becomes the predominant influence integrating and shaping the adolescents' vague yet pressing internal states" (p. 586).

Participation in Athletics and Other Health-Enhancing Behaviors

Health-enhancing behaviors, such as sports involvement, might moderate a high-risk environment (Rantakallio 1983). Swan, Creeser, and Murray (1990) found that girls were significantly less likely to begin smoking if they were involved in an organized sport, but were significantly more likely to begin smoking if they participated in organized social activities. Involvement in sports did not appear to affect boys' rate of smoking

onset in this study. McCaul et al. (1982) found no association between boys' smoking and participation in extracurricular activities. Among urban black females in Brunswick and Messeri's (1984) study, those who reported minimal concern about their health and those who reported a larger appetite were more likely to begin smoking; in contrast, black males who had the greatest number of health-related activities and were of normal body weight were more likely to begin smoking than other black males (Brunswick and Messeri 1983). Sussman et al. (1993) found that among youth at the highest risk of smoking, those who did not smoke reported that they valued their health. Finally, in Kelder's (1992) longitudinal study of secondary school students in the north-central United States, cigarette smoking was found to be related to poor food choices and less exercise after the eighth grade; the correlation between these behaviors was stronger with increasing age.

Behavioral Skills

The final set of behavioral factors comprises the behavioral skills that are necessary to begin smoking, those that are necessary to resist influences to smoke, and those that are necessary to cope with other social situations that might indirectly encourage cigarette use. Hahn et al. (1990) found that 42 percent of smoking experimenters had asked for their first cigarette. In the Sussman et al. (1987) study in southern California, difficulty in refusing offers to smoke predicted onset for all four ethnic groups, particularly for whites and blacks, for whom it was the strongest predictive factor found in the study. This difficulty in refusing an offered cigarette appears to be strongly influenced by the offering friend's attitudes and behaviors (e.g., being persistent or critical if refused), particularly for high-risk adolescents (Salomon et al. 1984; Lawrance and Rubinson 1986; Reardon, Sussman, Flay 1989). Conrad, Flay, and Hill (1992) reviewed three prospective studies and found that refusal or resistance skills against smoking were associated with lower rates of onset.

Generally, cigarette use can be viewed as a coping mechanism—a skilled response designed to close the gap between an adolescent's current position and goals (Leventhal et al. 1991). Smoking serves as a coping response if it brings the adolescent closer to a valued goal, such as acceptance in a peer group. Smoking may also serve as a coping response to stress or distress (Wills and Shiffman 1985; Castro et al. 1987). These studies suggest that youth need more general social skills, such as being able to cope with various kinds of stress or social pressures, to help them manage the many developmental demands of adolescence (Franzkowiak 1987). A more comprehensive concept of skills that has been used in prevention efforts is discussed in Chapter 6 (see "Instilling Skills for Resisting Social Influences to Smoke" and "Exemplary Programs for Resisting Social Influences").

Personal Factors in the Initiation of Smoking

Personal factors are those that are inherent in the individual; they include cognitive processes, values, personality constructs, and psychological well-being. These factors can be considered the personal filters through which sociodemographic and environmental factors pass as they influence behavior. Personal risk factors also explain differences in behavior among individuals exposed to the same or similar environments. The personal factors that have been examined in the research literature include levels of knowledge about the health consequences of smoking, the functions or meanings of cigarette use among adolescents, the subjective expected utility (SEU) of smoking, self-esteem, self-image, self-efficacy in refusing offers of cigarettes, personality variables, and emotional well-being.

Knowledge of Long-Term Health Consequences

Knowledge of the long-term health consequences of smoking has not been a strong predictor of adolescent onset (Collins et al. 1987; Krohn, Naughton, Lauer 1987; Sussman et al. 1987; Conrad, Flay, Hill 1992; Royal College of Physicians of London 1992), perhaps because virtually all U.S. adolescents—smokers and nonsmokers alike—are aware of the long-term health effects of smoking and because many adolescents feel inherently invulnerable in their characteristically short-term view (Gerber and Newman 1989). Belief that smoking has short-term effects on health appears to be a more powerful influence than knowledge of long-term health effects (Krohn, Naughton, Lauer 1987; McNeill et al. 1988). Similarly, belief in personally relevant negative social consequences of smoking has been associated with a decline in smoking prevalence among secondary school students (Chassin et al. 1987). Botvin et al. (1992) found that lack of concern about the harmful effects of smoking was associated with intentions to smoke among young, inner-city black adolescents. Similarly, dismissing or minimizing the health consequences of smoking has been associated with both initiation of cigarette use and adult smoking levels (Mittelmark et al. 1987; Swan, Creeser, Murray 1990). Krohn, Naughton, and Lauer (1987) found that smoking behavior predicted beliefs about the health effects of smoking more than beliefs predicted future cigarette use. Knowledge of the health consequences of smoking may or may not deter some adolescents from beginning to smoke; beginning to smoke appears to accentuate adolescents' denial of the health consequences.

Functional Meanings of Adolescent Smoking

The question of why adolescents begin to smoke has led to multiple examinations of the meanings of cigarette use, the utility of smoking, and the functions that smoking serves in an adolescent's life (Leventhal and Cleary 1980; Perry, Murray, Klepp 1987). Examining smoking from the perspective of the adolescent is a departure from viewing the onset of smoking exclusively as a response to the social environment or as capricious, arbitrary behavior. Since knowledge of the harmful consequences of cigarettes does not appear to deter onset, researchers are examining the social reasons and purposes of smoking.

Adolescents who begin to smoke perceive a more functional purpose of smoking than those who are nonsmokers (Gerber and Newman 1989). Adolescent smokers are more likely to view smoking as a way to act mature, be accepted by a peer group, have fun, cope with personal problems and boredom, or be rebellious (Perry, Murray, Klepp 1987). Cigarette smoking has also been shown to be a coping behavior for adolescents who are dealing with disruptive and stressful family events (Castro et al. 1987). Hunter et al. (1987) found that adolescent smokers were significantly more likely than nonsmokers to believe that smoking has psychological and physiological benefits. They were also less likely to believe that others smoked for negative reasons, such as to "show off."

In the research of Hahn et al. (1990), regular smokers were asked why they first had tried cigarettes and why they had most recently smoked. Sixty percent reported that curiosity was the reason for their first try, 13 percent said that they wanted to fit in with a group, and 10 percent reported that they were pressured into it. For most recent use, 27 percent reported that they smoked for pleasure, 20 percent out of dependence, 17 percent because they were curious, and 10 percent to fit in with the group. These findings are consistent with Chassin et al. (1984), who suggest that positive attitudes toward smoking, such as the idea that smoking is fun or pleasurable, are a better predictor of the transition to regular smoking than they are for first experimentation. In general, these investigators found that positive attitudes toward smoking may increase as a function of age. Botvin, Botvin, and Baker (1983) found that independent of the smoking status of friends, students in the eighth grade (13- and 14-year-olds) were more likely to have a positive social image of smoking than students in the seventh grade (11- and 12-year-olds).

Subjective Expected Utility

Bauman et al. (1984) have examined the SEU of smoking for adolescents in a longitudinal study in North Carolina. SEU is defined as the extent to which an individual expects the overall consequences of a behavior, such as smoking, to be positive or negative. Fishbein (1980) found that behavioral intentions to smoke were related to whether more positive or negative consequences were expected from smoking. SEU was found to be predictive of the onset of smoking over a one-year interval and of increased smoking levels among baseline smokers (Bauman et al. 1984). In a second study, SEU was found to be mediated by the adolescent's perception of personal control; current smokers with the highest scores for internal locus of control (that is, the belief that they have control over what occurs to them) were more likely to have been influenced by SEU (Bauman and Fisher 1985). Therefore, regular smoking appears more likely to be motivated by internal processes than are initiation and trying, which may primarily be products of exposure to a high-risk social environment.

Self-Esteem

The process of individuation and identity formation is inherent to adolescence. The adolescent's sense of self evolves as she or he interacts with parents, school, and peers and considers options for the future. Self-esteem, or an individual's qualitative self-evaluation, emerges from these contexts (Young and Werch 1990). In several studies, the onset of smoking has been associated with lower self-esteem. Young and Werch (1990) found that young nonsmokers and those with no intention of smoking in the future had higher self-esteem relative to family, school, and peers than frequent users or those who intended to use in the future. Ahlgren et al. (1982) found that low self-esteem within family or school contexts was associated with initiation and continuance of smoking. Self-esteem concerning school predicted intentions to smoke among young, inner-city black adolescents (Botvin et al. 1992) but did not predict actual smoking. Stacy et al. (1992) found that general low self-esteem directly predicted smoking onset in a multiracial, southern California sample yet did not significantly mediate friends' social influences. In their review of prospective research, Conrad, Flay, and Hill (1992) conclude, "Self-esteem received fairly consistent support [as a predictor of initiation] from the reviewed longitudinal studies. This is better than we would have expected from our reading of previous cross-sectional studies" (p. 20).

Self-Image

Some adolescents may smoke cigarettes to enhance their low self-esteem by improving their external image—that is, by appearing mature or "cool." Smoking onset was seen as a way to improve self-image among

whites, blacks, and Hispanics in southern California (Sussman et al. 1987). Role models who smoke are frequently seen to have socially desirable attributes—they seem tough, sociable, and sexually attractive (Chassin, Presson, Sherman 1990). Adolescents who believe that smoking bestows these attributes may see smoking as a powerful mechanism for self-enhancement. These young people may experiment with smoking to try to adopt a perceived positive social image and thereby improve the way others, particularly peers, view them (Chassin, Presson, Sherman 1990; Leventhal et al. 1991). If peers respond favorably to this strategy, these new young smokers may continue to smoke, since the behavior has proved functional for them in creating an acceptable self-image.

Self-Efficacy

An individual's efficacy (or confidence) in performing specified skills and behaviors is a significant mediator of peer influences to smoke (Bandura 1986). Ellickson and Hays (1990–91) found that low self-efficacy, as measured on a scale of having little or much confidence in resisting offers of drugs, was associated with drug use, including smoking. DeVries, Kok, and Dijkstra (1990) found that self-efficacy in resisting offers to smoke was the best predictor of smoking among adolescents in the Netherlands over a one-year interval. Similarly, Lawrance and Rubinson (1986) found that young adolescents' perceptions of their ability to resist cigarette smoking corresponded to their self-reported smoking. Finally, Stacy et al. (1992) found in their cross-sectional study of high school students not only that low self-efficacy in resisting social influence was a significant predictor of smoking, but also that high self-efficacy was the only significant mediator of friends' social influences on smoking. Therefore, self-efficacy, a personal factor, appears to act as a buffer that protects adolescents from potent peer influences to smoke (Conrad, Flay, Hill 1992).

Personality Factors

The research on personal factors has also examined many personality factors for their association with onset, in part to assess whether underlying emotional or psychological problems predict adolescent smoking. Personality characteristics that are related to deficiencies in self-control, such as impulsiveness and sensation-seeking tendencies, are important and were discussed earlier in this chapter in connection with behavioral factors.

Psychological Well-Being

Several studies have associated cigarette smoking and symptoms of depression among adolescents. Covey and Tam (1990) showed an independent relation of depressive mood, friends' smoking behavior, and living in a single-parent home with cigarette smoking among 205 urban 11th-grade males and females. Depression scores correlated with the number of cigarettes smoked. Malkin and Allen (1980) found a significant association between smoking and depression among males in a study of 229 rural 8th- and 11th-grade students, a finding that was replicated for both genders by Kaplan et al. (1984).

Stein, Newcomb, and Bentler (unpublished data) found that cigarette use was positively associated with being extroverted and negatively associated with having symptoms of depression among junior high school students in Los Angeles. Cigarette use, however, significantly predicted symptoms of depression in these young people four and eight years later (Newcomb, McCarthy, Bentler 1989). These findings may reflect the addictive quality of tobacco use beyond the earliest experimental states and the relationship between smoking and depression, since depression is a personality factor that usually persists over time. Smoking might be a short-term, self-medicating response to symptoms associated with depression. In the long-term, however, this effect would diminish; as tolerance to nicotine increases, the possible antidepressant effects of smoking (such as alertness, euphoria, and calm) dissipate (Newcomb, McCarthey, Bentler 1989). Similarly, Leventhal, Fleming, and Glynn (1988) found that reported feelings of helplessness were associated with more rapid movement to a second and third experiment with smoking; however, these feelings were not related to the initial experimentation. The association of smoking and suicide attempts, another clearly serious symptom of depression, is presented in Chapter 3 (see "Cigarette Smoking and Other Health-Related Behaviors").

Flay (1993) suggests that symptoms of depression may be a response to distress associated with stress and poor family bonding. He points out that stress and distress have been associated with drug use, including tobacco use (Wills and Shiffman 1985). The research of Kellam, Ensminger, and Simon (1980) suggests that this cycle may begin early in life. In their study of first-graders (aged five through seven) in Chicago, they found that males rated by observers as aggressive or as alternately shy and aggressive had the highest rate of drug use, including cigarette use, 10 years later; no long-term psychological predictors were found for females. In another study (Brunswick and Messeri 1984), adolescent males were more likely to begin smoking if they were pessimistic about the likelihood of the world becoming any better or if they held low expectations for their own future; for adolescent females, a shortened time perspective (i.e., a

limited ability to conceptualize their future) was the most important psychogenic predictor of initiation.

Adolescent Smoking Behavior as a Risk Factor for Subsequent Smoking

Intentions to Smoke

Since intentions are viewed as proximal to performance, the research on smoking behavior as a predictive factor of smoking includes behavioral intentions to smoke. In several studies, intentions to smoke have been associated with both the onset and continuation of smoking. Sussman et al. (1987) found in their longitudinal study in southern California that the intention to start smoking was one of only three factors that predicted onset among all ethnic groups. McNeill et al. (1988) found that future intentions to smoke increased the odds of starting to smoke by a factor of 2.44 and was the strongest predictor of change in smoking status after current behavior (having tried smoking) and gender were entered into the analysis. In the Chassin et al. (1984) longitudinal study, behavioral intentions were "significant predictors of future smoking transition in all subgroups, accounting for between 1.9 percent and 10.2 percent of the variance in transition. . . . In fact, behavioral intentions were typically the most important single predictor of future transition" (p. 237).

Intentions to smoke appear to be a particularly strong predictor of future smoking for those who have already tried smoking. Shean (1991) found that intentions to smoke a "next cigarette" among 14-year-old Western Australians predicted smoking eight years later. Conrad, Flay, and Hill (1992) found that in eight of nine prospective studies of young adolescents, the intention to smoke was significantly associated with onset. Because of the strength of this association, several researchers have used intentions to smoke as an outcome measure in their studies, especially in populations (such as preadolescents) where smoking prevalence is low relative to adolescents' intentions to smoke. Intentions to begin smoking seem a much more reliable predictor of future behavior than do intentions to quit smoking (see "Adult Implications of Adolescent Smoking" in Chapter 3).

Present Smoking Status

Any cigarette use places an adolescent at higher risk for subsequent use and for further progression through the stages of smoking behavior. Conrad, Flay, and Hill (1992) document seven prospective studies in which prior experience with, or exposure to, smoking predicted tobacco use. McNeill et al. (1988) found that the act of having tried smoking was the most predictive factor in initiation and that it more than quadrupled their study participants' odds of taking up smoking. Collins et al. (1987) found that prior smoking behavior was the most important predictor of future smoking over a 2.5-year interval. Even though the physiological effects of the first tries are mostly adverse (unpleasant taste, coughing, headache, nausea, dizziness) (Hahn et al. 1990), those who persist report increasingly positive reactions (pleasant taste, euphoria, alertness, relaxation, curbing of appetite) and develop tolerance (experience fewer unpleasant sensations) (Flay 1993). Stein, Newcomb, and Bentler (unpublished data) reported a more established pattern of cigarette use among young adults than among adolescents. In their study, the standardized regression coefficient of prior smoking for smoking behavior between Year 1 and Year 5 (youth in junior high and high school age groups) was 0.43, yet from Year 9 to Year 13 (young adulthood) it was 0.82. The authors suggest that in early adolescence, some cigarette triers never fully develop a pattern of smoking, but by late adolescence, the addictive properties of cigarette use figure prominently in behavior formation. These findings underscore the need for antismoking efforts to focus on preventing initial tries, on discouraging transitions to more regular smoking, and on encouraging early cessation (Leventhal, Fleming, Glynn 1988; Kelder 1992).

Summary of Psychosocial Risk Factors for Cigarette Smoking

Some clear convergence of research findings emerges from this review, a summary of which is highlighted in Table 1. Table 3 provides a second summary of supportive and unsupportive findings from the Conrad, Flay, and Hill (1992) review of 27 prospective studies; for the most part, this summary table is consistent with Table 1. Among the sociodemographic factors, age is the risk factor consistently linked with onset in early adolescence; ages 11 through 15 (seventh through ninth grades) are the peak age group for first trial and experimentation. Cigarette smoking clearly has social meanings that are attractive to many young and vulnerable identity-seeking adolescents. This age factor is even more pronounced when linked with SES, another important sociodemographic risk factor for smoking onset. Alternative health-enhancing avenues for independence and identity may be less readily available to adolescents from lower SES families, especially those adolescents who live in a single-parent home. Limited by fewer opportunities for healthy development and parental supervision, lower-SES youth are generally at greater risk to begin smoking. The gender difference, another major factor, is no longer evident, although the meanings of

cigarette use and the pathways to regular use may vary by gender. Finally, differences by ethnic group do not appear to show a consistent pattern across communities, particularly when income level and cigarette availability are considered. The review of sociodemographic factors thus concludes that a young adolescent from a low-SES family is at highest risk to begin smoking.

Proximal environmental factors, such as the influence of peers, friends, and siblings, play a powerful role in the initiation of adolescent smoking. Smoking initiation appears to be a component of peer associations and peer bonding in adolescence, as peer groups establish shared behaviors to differentiate themselves from other adolescents and from adults. Adolescents usually try their first cigarettes with their peers; peer groups may subsequently provide expectations, reinforcement, and opportunities for continuation. The influence of peers seems to be particularly potent in the stages of smoking that precede regular use; in later stages, personal and pharmacological factors appear to predominate.

Data on the influence of parental smoking are not as compelling as those on peer influence; only about half of the prospective studies show a clear predictive relationship. The influence of parental smoking appears to be strongest for whites and females, particularly in the early stages of smoking onset. This review suggests that parental influence might include other important factors, such as parents' approval or disapproval of smoking, their involvement in free-time supervision, their manner and extent of communication on health-related matters, or their promotion or nonpromotion of academic achievement for their children. Lastly, young people are exposed not only to role models but also to the consequences of the behavior of these role models; having a parent who smokes might even serve to deter an adolescent from smoking if the parent is struggling with cessation or displays the health consequences of tobacco use.

How adolescents perceive their social environment also influences their smoking behavior. Adolescents overestimate the number of young people and adults who smoke, and those with the highest estimates are more likely to become smokers. In addition, young people are more likely to smoke if they feel that their peers approve of smoking, and particularly if adults do not seem to disapprove. In each of these cases, the perceived environment could accurately reflect the actual environment. Those who begin to smoke may actually be exposed to more role models who smoke, more peers who approve of smoking, and fewer adults who disapprove than those who never begin to smoke.

Families in which parents are considered to be generally concerned and supportive, or in which the children are involved in family decisions, are home environments in which adolescents are less at risk for smoking initiation. Parental strictness and parental approval or disapproval of smoking have indirectly and inconsistently predicted initiation and are therefore less influential on adolescent smoking behavior than the general family environment. The research on parental skills in coping with adolescent smoking is limited and warrants further investigation.

The behavioral factors examined were consistently associated with the initiation of cigarette smoking. Patterns of behavior that are associated with smoking include alcohol and drug use, risk-taking and rebellious actions, and involvement in peer groups in early adolescence. Patterns of behavior that are associated with less risk of smoking include academic achievement, involvement in sports (for females), healthy eating and physical activity patterns, and the ability to resist offers of cigarettes. Thus, encouraging and providing opportunities for health-enhancing activities and academic achievement might, by fulfilling some of the needs that smoking apparently meets for adolescents, prevent some young people from trying their first cigarette.

The personal factors—those most proximal to the individual and to the immediate decision to smoke a cigarette—reflect, in part, the adolescent's internalization of the social environment. An adolescent's knowledge of the health consequences of smoking is a poor predictor of subsequent cigarette use, although smoking risks that are personalized appear to be important. More significant predictors include the meanings, the perceived positive functions, and the expected utility of cigarette use. These aspects are linked to having a positive social image, bonding with peers, and being "mature"—all of which are particularly socially relevant for adolescents. Compared with nonsmoking adolescents, those who begin to smoke appear to have lower self-images and lower self-esteem; for them, smoking becomes a self-enhancement mechanism. Similarly, self-efficacy toward avoiding cigarettes seems particularly linked with the ability to resist cigarette offers from peers. Of the personality variables, symptoms of depression, helplessness, aggression, pessimism, and a limited ability to conceptualize the future were all found to be smoking-predictive in a small number of studies. The most predictive personal factors were those linked to the social environment, to peers, and to the meanings of cigarette smoking learned in youth.

Intentions to smoke and prior experimentation with cigarettes strongly predict subsequent smoking. The adverse physiological reactions to first tries at smoking wane with repetition, and tolerance levels to nicotine increase. Adolescents who smoke are more likely than nonsmokers to discount the negative health consequences of smoking, report positive functions of smoking, and

perceive that their peers are smokers. The shift from social to more personal reasons for smoking is associated with increasing nicotine dependence and addiction.

Several other factors that influence smoking initiation are not covered in this chapter. First, the combined influence of tobacco advertising and promotion represents a powerful environmental risk factor (see Chapter 5). Second, cultural or community-level research on the causes of smoking onset is decidedly limited. In particular, the effect of taxation, of restrictions to public smoking, of vending machine regulations, and of limiting access to tobacco for underage buyers needs to be addressed prospectively (Chapman and Bloch 1992; Sweanor et al. 1992; see Chapter 6). Third, even at the school level, smoking prevalence rates have been shown to be partly attributable to attendance at a particular school and to school smoking policies (Best et al. 1984; Semmer, Lippert, et al. 1987; Pentz et al. 1989; Santi et al. 1990–91; see "Smoking Restrictions in the School" in Chapter 6). Still, which aspects of schools contribute to smoking onset—whether their rules, consistency of rule enforcement, grade structure, or discipline procedures—need to be studied. These distal environmental factors partly determine the meaning for, and acceptability of, cigarette use at a community level, determine the ease or difficulty with which adolescents can obtain tobacco, and reinforce or inhibit the continuation of use into adulthood. Proximal factors are strong determinants of use once the meaning of smoking is established and access to cigarettes is possible. Therefore, the more distal risk factors might be considered the proper targets of intervention research efforts, which should test the potency of these factors and provide the clear community-level message that cigarette smoking among the young is unacceptable.

Initiation of Smokeless Tobacco Use

Compared with the research literature on smoking initiation, the knowledge base on smokeless tobacco initiation is modest. Far fewer longitudinal studies have been conducted. For the most part, research efforts on smokeless tobacco have been cross-sectional; a few have also been guided by behavioral theory. Nonetheless, a number of methodologically sound studies provide knowledge about the risk factors associated with the initiation of smokeless tobacco use. In parallel with the research on cigarette smoking among young people, sociodemographic, environmental, behavioral, and personal factors have all been explored as correlates of smokeless tobacco use. With only a few exceptions, the consistency of the findings with those found for cigarette smoking suggests that both smoking and the use of smokeless tobacco products share a common causality as well as similar functions and meanings for young people.

Sociodemographic Factors in the Initiation of Smokeless Tobacco Use

National survey data on the demographics of smokeless tobacco use are presented in detail in Chapter 3 (see "Recent Patterns of Smokeless Tobacco Use") and are only summarized here. These data clearly indicate that smokeless tobacco use among young people is particularly prevalent among non-Hispanic white males. The three youth surveys that assessed smokeless tobacco prevalence (that is, use during the month preceding the survey) also found that males were 10 to 15 times more likely than females to use smokeless tobacco. Although nationally representative data on American Indian and Alaskan Native youth are not available, community-level studies of these populations have reported high rates of weekly smokeless tobacco use among both males (43 percent) and females (34 percent), even at very young ages (Schinke et al. 1987, 1989; Bruerd 1990).

The Monitoring the Future Project survey, a national survey of high school seniors, indicated that 54 percent of males had used smokeless tobacco. Among those, 23 percent first used smokeless tobacco before or during the sixth grade, and over 53 percent first used it before or during the eighth grade (see "Grade When Smokeless Tobacco Use Begins" in Chapter 3). Data from a number of other recent surveys suggest that early adolescence is the peak age for first using smokeless tobacco (Schaefer et al. 1985; US Department of Health and Human Services [USDHHS] 1986; Ary, Lichtenstein, Severson 1987; Ary et al. 1989; Riley, Barenie, Myers 1989; Brownson et al. 1990; Riley et al. 1990, 1991).

Limited evidence suggests that the following sociodemographic factors may also be related to higher rates of smokeless tobacco use among youth: one or no parents in the household (Jones and Moberg 1988; Murray et al. 1988; see "Sociodemographic Risk Factors for

Smokeless Tobacco Use" in Chapter 3); lower parental education (Bauman, Koch, Lentz 1989; Botvin, Baker, Tortu 1989); blue-collar parental occupation (Burke et al. 1989; Elder, Molgaard, Gresham 1988; Novotny et al. 1989); and rural environment (Olds 1988; Botvin, Baker, Tortu 1989; Rouse 1989; Lisnerski et al. 1991; see "Sociodemographic Risk Factors for Smokeless Tobacco Use" in Chapter 3). As is reported in Chapter 3 (see "Current Use of Smokeless Tobacco"), prevalence varies among regions and is somewhat lower in the Northeast than in other regions.

Environmental Factors in the Initiation of Smokeless Tobacco Use

Factors That Influence Acceptability and Availability

Ease of access to smokeless tobacco appears to be an important factor in initiation, and young people seem to have little trouble obtaining smokeless tobacco (USDHHS 1992a, CDC 1993). In interviews conducted by the Office of Inspector General (USDHHS 1986), 90 percent of smokeless tobacco users in junior and senior high school reported that they purchased their own smokeless tobacco; 94 percent reported that although they were minors, it was either never or only rarely difficult for them to purchase smokeless tobacco. Convenience stores were the most frequent purchase site (55 percent); supermarkets and grocery stores accounted for an additional 33 percent of sales. Barovich et al. (1991) found that 50 percent of store personnel were willing to sell to minors. In another study (Leopardi et al. 1989), junior high school students reported that their leading sources of smokeless tobacco were friends (43 percent) and direct store purchase (30 percent); senior high school students' chief sources were direct purchase (62 percent) and friends (25 percent). In a recent study in Texas, minors successfully purchased smokeless tobacco in 59 percent of stores selling the product (CDC 1993).

Interpersonal Factors

Parental Use

As in the research on cigarette smoking, the evidence depicts either a modestly positive or no significant association between parental use of smokeless tobacco and adolescent use. The only prospective study that examined parental use found no link to onset or continued use of smokeless tobacco among youth (Ary, Lichtenstein, Severson 1987). However, several cross-sectional studies have reported significant relationships between concurrent use by parents and youth (Cohen et al. 1987; Hall and Dexter 1988; Colborn, Cummings, Michalek 1989; Glover et al. 1989; Brownson et al. 1990). Bauman, Koch, and Lentz (1989) found that an adolescent was more likely to use smokeless tobacco if the father did, although there was an interaction with the level of the father's education. Two cross-sectional studies found no significant association between concurrent use of smokeless tobacco by parents and adolescent offspring (Chassin et al. 1985; Ary, Lichtenstein, Severson 1987).

Sibling Use

The evidence from cross-sectional studies generally supports a relationship between a sibling's use of smokeless tobacco and an adolescent's use. However, one prospective study did not find significant sibling relationships (Ary, Lichtenstein, Severson 1987), and another study found no effect for "older family members" (Chassin et al. 1985). The sole longitudinal study did not find that sibling use was related to adolescent onset (Ary, Lichtenstein, Severson 1987).

Peer Use

Although a substantial amount of cross-sectional research has examined the use of smokeless tobacco by peers, only two longitudinal studies have been published. Every cross-sectional study found that peer use was significantly related to adolescent use (Cohen et al. 1987; Hall and Dexter 1988; Lucas and Christen 1988; Glover et al. 1989; Leopardi et al. 1989; Riley, Barenie, Myers 1989; Brownson et al. 1990; Hunter, Vizelberg, Berenson 1991). Peer use of smokeless tobacco was related to the onset of adolescent use at the 9-month follow-up in one longitudinal study (Ary et al. 1989) but not in another study (Ary 1989) at the 6- and 12-month follow-up times. However, peer use was found to be related to continued use among initial daily users of smokeless tobacco at 6-, 9-, and 12-month follow-ups (Ary, Lichtenstein, Severson 1987; Ary 1989).

Perceived Environmental Factors

Norms

Current evidence indicates that most adolescents who use smokeless tobacco perceive that this behavior is socially acceptable. The Office of Inspector General (USDHHS 1986) reported the following findings from a survey of male adolescents who used smokeless tobacco:

- 86 percent perceived that most or some students at their school approved of smokeless tobacco use.

- 98 percent said their best male friends either approved of, or were neutral toward, their smokeless tobacco use.
- 93 percent said their parents knew of their smokeless tobacco use.
- 68 percent said their fathers and 45 percent said their mothers approved of, or were neutral toward, their smokeless tobacco use.
- 91 percent said their brothers and 71 percent said their sisters either approved of, or were neutral toward, their smokeless tobacco use.
- 87 percent listed their home as a setting where they regularly used smokeless tobacco.
- 43 percent whose dentist knew of their use were not advised by that professional to quit.
- 51 percent said their coaches either approved of, or were neutral toward, their smokeless tobacco use.

These findings were replicated in the 1992 Office of the Inspector General study on Spit Tobacco and Youth (USDHHS 1992b). The adolescents in this study who used smokeless tobacco said that the greatest influences on their trying smokeless tobacco were peer pressure and other family members' use. The majority of these young users felt their parents would agree that their using smokeless tobacco was preferable to smoking cigarettes (USDHHS 1992b).

In another study, only 14 percent of smokeless tobacco users reported that their father disapproved of their smokeless tobacco use, whereas 60 percent said their mother disapproved (Marty, McDermott, Williams 1986). Williams et al. (1986) found that 55 percent of smokeless tobacco users indicated that their parents disapproved of their use. In a study by Ary et al. (1989), only 13 percent of daily smokeless tobacco users reported that their dentist had said anything to them about their use. Brubaker and Loftin (1987) found that smokeless tobacco users reported greater peer acceptance of, and less parental opposition to, their use than did nonusers.

Social Support

Chassin, Presson, and Sherman (1988) examined the relationship between family social support and current use of smokeless tobacco. Three cross-sectional analyses found no pattern of relationships between smokeless tobacco use and perceived parental expectations (for success or academic accomplishment), parental supportiveness, parental strictness, agreement between parents, parent–peer agreement, or the adolescent's reported motivation to comply with parents. Similarly, two sets of analyses examining one-year prediction of smokeless tobacco onset found no statistically significant effects for the same set of factors, although the statistical power to detect such effects was minimal because the sample contained few cases of smokeless tobacco onset.

Parental Reaction to Smokeless Tobacco Use

Parents appear to be more accepting of smokeless tobacco use than of cigarette smoking. About 40 percent of high school smokers reported that their parents knew about their smoking, whereas smokeless tobacco users reported that 71 percent of their parents knew of their use (Chassin et al. 1985). Similarly, young people who did not use tobacco reported that their parents and peers were more accepting of smokeless tobacco use than of smoking (Chassin et al. 1985; Ary et al. 1989). These findings suggest that adolescents may begin using smokeless tobacco partly because they perceive that it is less deviant than smoking or other drug use and therefore is more likely to be accepted by their peers and parents (Hahn et al. 1990).

Some research evidence indicates that the anticipated parental response to an adolescent's use of smokeless tobacco is related to that youth's likelihood of using smokeless tobacco. Riley, Barenie, and Myers (1989) found that high school students' anticipation of their parents' response was highly predictive of the first trial of smokeless tobacco and of the level of continued use. Brubaker and Loftin (1987) found that adolescents who did not currently use smokeless tobacco but who intended to become users reported that it would be unlikely that their parents would respond by taking away their privileges, reprimanding them, becoming angry, expressing disappointment, or prohibiting them from continued use. These youth also reported that it was likely that their parents would ignore their smokeless tobacco use.

Behavioral Factors in the Initiation of Smokeless Tobacco Use

Academic Achievement

For males, smokeless tobacco use was related to poor academic performance (Jones and Moberg 1988) and to a low grade point average (Brownson et al. 1990). The NIDA national household survey indicated that for males, the prevalence of daily use of smokeless tobacco was highest among school dropouts (13 percent) and lowest among college students (6 percent) (Rouse 1989).

Smoking as a Risk Factor for Smokeless Tobacco

Five longitudinal studies examined the prospective relationships between cigarette smoking and the onset or continued use of smokeless tobacco (Ary, Lichtenstein, Severson 1987; Dent et al. 1987; Murray et al. 1988; Ary 1989; Sussman et al. 1989). (The relationship between smokeless tobacco use and subsequent cigarette smoking is reviewed later in this chapter.) In a longitudinal study of eighth graders, Dent et al. (1987) reported that smoking status at baseline predicted the onset of smokeless tobacco use one year later. Twenty-nine percent of regular smokers at baseline—but only 6 percent of those who had never smoked—reported smokeless tobacco onset at follow-up. Ary, Lichtenstein, and Severson (1987) used discriminant analysis to identify predictors of the onset of smokeless tobacco use nine months after smoking onset among 7th, 9th, and 10th graders. The discriminant function accounted for 11 percent of the variance, and having tried smoking was an important predictor, correlating at 0.64 with the discriminant function. In a similar study using a separate sample of 7th, 9th, and 10th graders in Oregon, smoking did not significantly predict smokeless tobacco onset at 6-month or 12-month follow-ups (Ary 1989). Another longitudinal study found general support for the influence of smoking on seventh graders who had tried smokeless tobacco (Murray et al. 1988). Longitudinal analysis of one-year follow-up data from two other samples of seventh graders indicated that both males and females exhibited a fairly consistent relationship between the onset of smokeless tobacco use and pretest smoking (Sussman et al. 1989).

Three of the longitudinal studies cited above also examined the prospective relationship between cigarette smoking and continued use of smokeless tobacco among adolescents. Ary, Lichtenstein, and Severson (1987) found that baseline smoking did not predict frequency of later smokeless tobacco use at nine-month follow-up. In a separate study, Ary (1989) examined these relationships and found that frequency of smoking was related to continued daily smokeless tobacco use at 12-month follow-up but not at 6-month follow-up. A 24-month follow-up study of ninth graders also found general support for the influence of smoking on later use of smokeless tobacco (Murray et al. 1988). Although the findings from these three prospective studies are inconclusive, numerous studies report significant concurrent relationships between smoking and smokeless tobacco use. The degree of statistical power exhibited by these relationships varied widely, but every study found at least one significant association between smokeless tobacco use and smoking.

Other Adolescent Behaviors

Twelve studies fairly consistently indicated that smokeless tobacco use is related to concurrent use of alcohol and marijuana (Lichtenstein et al. 1984; Ary, Lichtenstein, Severson 1987; Burke et al. 1988, 1989; Jones and Moberg 1988; Murray et al. 1988; Ary 1989; Riley, Barenie, Myers 1989; Rouse 1989; Sussman et al. 1989; Riley et al. 1991; Stevens et al. 1991). One of these studies (Sussman et al. 1989) found that seventh- and eighth-grade females showed no relationship between having tried smokeless tobacco and concurrently using alcohol, but two of four samples with male subjects showed significant relationships. Only three studies examined the prospective relationships between smokeless tobacco use and the use of alcohol and marijuana. In one study, the onset of smokeless tobacco use among those who had not used at baseline was related to marijuana use but not to alcohol use (Ary, Lichtenstein, Severson 1987). In a separate study, initial use of alcohol or marijuana did not predict onset of smokeless tobacco use at 6-month follow-up, but initial alcohol use predicted smokeless tobacco use at 12-month follow-up (Ary 1989). In another 12-month longitudinal study, onset of smokeless tobacco use among those who at baseline had never used smokeless tobacco was predicted by initial alcohol use in one of two samples of seventh-grade females but not in two samples of males (Sussman et al. 1989). Taken together, there is some evidence that prior use of either alcohol or marijuana is related to subsequent onset of smokeless tobacco use and to continued use of smokeless tobacco among daily users.

Several studies suggest that adolescents who use smokeless tobacco are more likely to use multiple drugs than are adolescents who do not use smokeless tobacco. Ary, Lichtenstein, and Severson (1987) found that among male adolescents who reported use of smokeless tobacco, cigarettes, alcohol, or marijuana in the week preceding the survey, 43 percent (47 percent in Ary's separate study [1989]) indicated that they used more than one of these substances during that week. The percentage of daily users of smokeless tobacco who reported use of alcohol during the preceding week was particularly high (76 percent in Ary, Lichtenstein, and Severson's study [1987] and 74 percent in Ary's separate study [1989]). Among daily smokeless tobacco users, 83 percent in Ary, Lichtenstein, and Severson's study (1987) (80 percent in Ary's 1989 study) also reported using a drug other than alcohol, a fact suggesting that daily smokeless tobacco users are particularly likely to be multiple drug users.

Smokeless Tobacco Use as a Risk Factor for Smoking, Alcohol, and Other Drug Use

Although the known literature indicates that the use of cigarettes and other drugs is a risk factor for smokeless tobacco use, several studies also indicate that the converse is true; that is, smokeless tobacco use is a risk factor for the onset and maintenance of cigarette smoking and for the use of alcohol and marijuana (see "Smokeless Tobacco Use and Other Drug Use" in Chapter 3). Ary, Lichtenstein, and Severson (1987) examined the prospective relationship between smokeless tobacco use and the onset of the use of cigarettes, alcohol, and marijuana at nine-month follow-up. Smokeless tobacco users were found to be more likely than nonusers to begin using cigarettes (22 percent vs. 7 percent), alcohol (18 percent vs. 7 percent), and marijuana (37 percent vs. 18 percent). These findings were replicated in Ary's (1989) 12-month follow-up study of a separate sample. Smokeless tobacco users were significantly more likely than nonusers to report smoking cigarettes (6 percent vs. 0.5 percent), drinking alcohol (29 percent vs. 12 percent), and smoking marijuana (12 percent vs. 2 percent).

Similarly, smokeless tobacco users were more likely than nonusers to increase their use of other drugs. A greater proportion of smokeless tobacco users than of nonusers reported increased use (in the week preceding the survey) of cigarettes (18 percent vs. 8 percent), alcohol (34 percent vs. 20 percent), and marijuana (20 percent vs. 8 percent) (Ary, Lichtenstein, Severson 1987). The 1989 study replicated these findings for each substance: cigarettes (7 percent vs. 2 percent), alcohol (25 percent vs. 13 percent), and marijuana (15 percent vs. 2 percent) (Ary 1989).

Several studies provide additional evidence for the progression from smokeless tobacco to other drugs. In one, decreases in smokeless tobacco use were accompanied by increases in cigarette smoking (Hunter et al. 1986). In a different longitudinal study, smokeless tobacco users were more likely to report cigarette smoking at a two-year follow-up (67 percent) than were nonusers (14 percent) (Schinke et al. 1986). A study of undergraduates found that switching from smokeless tobacco to cigarettes was a more likely progression than the converse (Glover, Laflin, Edwards 1989).

Risk Taking and Rebelliousness

Although smoking is associated with rebelliousness and unconventionality, several studies have found no such association for smokeless tobacco use. A significant but modest relationship has been found between smokeless tobacco use and risk taking. In one of the few longitudinal studies of smokeless tobacco use, Dent et al. (1987) found that among eighth graders, current risk taking predicted the onset of smokeless tobacco use one year later. In another study, a significant relationship was reported between seventh-grade students' smokeless tobacco use and risk taking (Botvin, Baker, Tortu 1989). Studies with high school students found that risk taking was related to trying smokeless tobacco but not to the level of smokeless tobacco use (Riley, Barenie, Myers 1989; Riley et al. 1991). In two of eight replication samples in another study, risk taking was a significant correlate of trying smokeless tobacco (Sussman et al. 1989).

Participation in Athletics

Given the number of professional athletes who use smokeless tobacco, and given the associated advertising efforts by smokeless tobacco companies, youth who participate in athletics would seem likely to be at greater risk of using smokeless tobacco than nonparticipants. Current studies have mixed findings about this possible relationship. Although 28 percent of predominantly white Little League baseball players (aged 12 or less, N = 1,141) in southeast Texas believed that more than half of professional baseball players use smokeless tobacco, this belief was not strongly associated with use of smokeless tobacco among these youth (Evans, Raines, Getz 1992). Similar findings on a stratified random sample of rural and urban youth in grades one, three, five, and seven were reported in North Carolina (Lisnerski et al. 1991). In a one-year longitudinal study of seventh graders, sports participation did not predict onset of smokeless tobacco use in two samples of males and in one of two samples of females (Sussman et al. 1989); for the other sample of seventh-grade females, the relationship was positive but modest. Sussman et al. (1990) reported that self-identified "dirts" (i.e., "heavy metal" music enthusiasts and marijuana users) and "skaters" (i.e., skateboarders and surfers) were more likely to be currently using smokeless tobacco than were "jocks/athletes." Another study of high school students yielded inconclusive results (Riley, Barenie, Myers 1989). On the other hand, Ringwalt (1989) found that 11th- and 12th-grade athletes (students who played on school teams) were more likely than nonathletes to have used smokeless tobacco, to have used smokeless tobacco in the preceding 30 days, and to perceive fewer (if any) health risks for smokeless tobacco use. Jones and Moberg (1988) found that frequency of smokeless tobacco use was related to participation in team sports. Glover et al. (1989) found that smokeless tobacco use among U.S. college students was related to participation in organized sports. Taken together, the current evidence is inconclusive and warrants further investigation that might consider team rules regarding smokeless tobacco use, coaches' use of smokeless tobacco or attitude toward team members' use, and parents' degree of involvement in the team.

Personal Factors in the Initiation of Smokeless Tobacco Use

Knowledge of Long-Term Health Consequences

Because the long-term health consequences of smokeless tobacco use have not been as widely communicated as those of smoking, knowledge of these consequences is potentially an important predictive factor for smokeless tobacco use. Most youth appear to be aware that smokeless tobacco use can be harmful to health, but most smokeless tobacco users do not perceive their own risk to be great. In interviews with smokeless tobacco users, 80 percent of junior high school and 92 percent of senior high school users acknowledged that smokeless tobacco use can be harmful, but about 60 percent of the junior high users and 40 percent of the senior high users believed that there was no risk or only slight risk in regular smokeless tobacco use (USDHHS 1986). A study of 7th- through 10th-graders found that 31 percent of daily users of smokeless tobacco believed that there was very little health risk associated with this use (Ary, Lichtenstein, Severson 1987). Similarly, only 40 percent of 7th- through 12th-grade students in another sample perceived smokeless tobacco use as very harmful (Schaefer et al 1985). Marty, McDermott, and Williams (1986) reported that 35 percent of high school students who use smokeless tobacco believed that such use had little or no effect on their health.

Many youth appear to believe that smokeless tobacco use is much safer than cigarette use. Schaefer et al. (1985) found that 77 percent of smokeless tobacco users perceived smoking to be very harmful, whereas only 40 percent perceived smokeless tobacco use as very harmful. Another study reported that 86 percent of fifth- and sixth-grade smokeless tobacco users believed that smoking would hurt their health, but only 33 percent believed this of smokeless tobacco use (Schinke et al. 1986). Ary et al. (1989) found that when smokeless tobacco users were asked why they preferred smokeless tobacco to cigarettes, they most often gave "lower health risk" as the reason. Users of smokeless tobacco are more likely than nonusers to perceive that smokeless tobacco is a comparatively safe alternative to cigarette use (Chassin et al. 1985; McDermott and Marty 1986; Boyle 1989; Glover, Laflin, Edwards 1989; Brownson, DiLorenzo, Van Tuinen 1990; Brownson et al. 1990; Lisnerski et al. 1991).

A number of studies have examined the relationship between concurrent smokeless tobacco use and health knowledge and beliefs about smokeless tobacco, but none of these studies have examined the prospective relationship. Most of these studies show that youth with more health knowledge of, or greater beliefs in, the risks of smokeless tobacco use are indeed less likely to use smokeless tobacco. Three studies reported that having tried smokeless tobacco was related to lack of health knowledge and beliefs (Cohen et al. 1987; Riley, Barenie, Myers 1989; Riley et al. 1991); only one study that examined this possible link failed to find such a relationship, and that study involved very young subjects (first through seventh graders) (Lisnerski et al. 1991). Multiple studies have reported that health knowledge and beliefs were significantly related to various categories of smokeless tobacco use (Boyle 1989; Polcyn et al. 1991), current smokeless tobacco use (Chassin et al. 1985; Colborn, Cummings, Michalek 1989; Glover, Laflin, Edwards 1989; Marty, McDermott, Williams 1986), level or amount of smokeless tobacco use (Riley, Barenie, Myers 1989; Riley et al. 1991), or daily smokeless tobacco use (Ary, Lichtenstein, Severson 1987). In only two studies was no relationship found between health knowledge and beliefs and smokeless tobacco use (Brownson et al. 1990; Lisnerski et al. 1991).

Functional Meanings

In a study of seventh- and eighth-grade students, favorable personal attitudes toward smokeless tobacco use were significantly related to concurrent use of smokeless tobacco (Polcyn et al. 1991). In another study, 8th- through 11th-grade students' expectancy and beliefs about the positive attributes of smokeless tobacco use (e.g., tastes good, is relaxing, helps concentration) were related to current smokeless tobacco use (Colborn, Cummings, Michalek 1989). Negative attributes of smokeless tobacco use (i.e., gives bad breath, stains teeth) were negatively related to current smokeless tobacco use (Colborn, Cummings, Michalek 1989). No prospective studies were found.

Social Image

Other research suggests that smokeless tobacco use has a more positive social image than smoking (Chassin et al. 1985; Chassin and Presson 1988). One study of high school students found that students were more likely to have used smokeless tobacco during the past month and that nonusers were more likely to have intentions of using if the students' real and ideal self-concepts were similar to their perceived image of smokeless tobacco users (Chassin et al. 1985). This finding suggests that youth may take up smokeless tobacco as a method of attaining a valued social image. Positive social attributes expected from smokeless tobacco use (e.g., increases attractiveness, brings more friends, makes one become more "macho") were also shown to be significantly related to concurrent use of smokeless tobacco (Colborn, Cummings, Michalek 1989). No prospective research was found.

Personality Traits

Some studies have examined relationships between smokeless tobacco use and a number of personality traits. A positive association was found with anger (Jacobs et al. 1988), anxiety (Jacobs et al. 1988), assertiveness (Botvin, Baker, Tortu 1989), depression (Jones and Moberg 1988; Rouse 1989), and locus of control (Dignan et al. 1986). A negative association was found with anxiety, curiosity (Jacobs et al. 1988), and self-concept (Dignan et al. 1985).

Smokeless Tobacco Use as a Risk Factor for Continued Use

Intentions to Use Smokeless Tobacco

Consistent with data on youth smoking, the research indicates a strong relationship between concurrent smokeless tobacco use and intention to use in the future. Brubaker and Loftin (1987) found that reported intention to use smokeless tobacco in the week after the survey was strongly related to current smokeless tobacco use in a small sample of fifth- through eighth-grade males. Intention to use in the next two weeks was also related to current-use status (Gerber, Newman, Martin 1988). No studies were found, however, that examined the prospective relationship between intention to use smokeless tobacco and the initiation or continuation of use.

Current Use of Smokeless Tobacco

Ary, Lichtenstein, and Severson (1987) prospectively examined the predictors of frequency of smokeless tobacco use at a nine-month follow-up for their sample of daily users of smokeless tobacco. Current use of smokeless tobacco was the best predictor of later use; the initial rate of use was highly correlated with the rate of use nine months later and accounted for 33 percent of the variance. This finding suggests that the successful reduction of smokeless tobacco use will require early intervention before the development of physiological addiction.

Summary of Psychosocial Risk Factors for Smokeless Tobacco Use

The major factors associated with the initiation and development of smokeless tobacco use found in this review are shown in Table 1. With the exception of adequate knowledge of the health consequences of smokeless tobacco use and the social acceptance afforded by smokeless tobacco use, these factors are nearly identical to those found for the onset of smoking. Although most youth perceive that smokeless tobacco use can be harmful to health, most smokeless tobacco users do not perceive the risk to be great, particularly to themselves, and particularly compared with the health risk of cigarette smoking. Peer modeling of smokeless tobacco use seems to be strongly and consistently related to the onset and continued use of smokeless tobacco. Smokeless tobacco use serves social functions within the peer group that may support experimental and continued use. The evidence is less conclusive for modeling by parents and siblings. Peer and, notably, parental acceptance of smokeless tobacco use is much higher than for cigarette smoking.

Fairly consistent evidence indicates that smokeless tobacco use is related to concurrent use of cigarettes, alcohol, and marijuana. Findings from prospective studies suggest that the use of smokeless tobacco may precede the use of these other substances and occurs early in a sequence of drug use by some adolescents. Prospective evidence shows that smoking and the use of alcohol and marijuana are also related to the onset and continued use of smokeless tobacco. Engaging in risk-taking behavior and having poor academic performance also appear to be related to smokeless tobacco use (see "Smokeless Tobacco Use and Other Health-Related Behaviors" and "Sociodemographic Risk Factors for Smokeless Tobacco Use" in Chapter 3). There is mixed evidence that smokeless tobacco use is associated with youthful athletic participation; nonetheless, some professional athletes have promoted its use both indirectly (through visible personal use) and directly (through advertising).

Finally, there is evidence of concurrent relationships (but no prospective evidence) between smokeless tobacco use and health beliefs/knowledge, attitudes, expectancies, and social image. The perception that smokeless tobacco use may be a healthier choice than cigarette smoking consistently emerges in the data and indicates the need for prevention programs that stress the health consequences of smokeless tobacco use.

Smokeless tobacco use, then, appears to be a function of the social world of young people, who see this "adult" behavior as an aid—a generally accessible one—in improving their individual social image. Moreover, perhaps because even among adults the health consequences of smokeless tobacco use are not widely understood, adults lack consensus on whether smokeless tobacco use should be actively discouraged. Peer use of smokeless tobacco thus becomes a strong motivator for initiation and continued use.

These misperceptions on the part of adolescents and adults alike are of serious concern, given the health-compromising, addictive aspects of smokeless tobacco use. More strikingly, smokeless tobacco use is associated strongly with other drug use and may serve as an entry behavior to the use of cigarettes, alcohol, and illegal substances.

Implications of Research for Preventing Tobacco Use: Modifying Psychosocial Risk

Although substantial research has examined the onset of tobacco use for individual adolescents, there is clearly a need to examine how change in community and cultural factors may modify onset rates. This review of the literature strongly suggests that the onset of tobacco use is socially learned and is a social behavior for adolescents, with socially relevant meanings, images, and functions. Therefore, rather than focusing only on individuals and families as the primary targets of prevention efforts, attention should also be directed to the social environment of adolescents. These efforts should consistently and persuasively promote the prevention and cessation of tobacco use and should demonstrate that the meanings of tobacco use are negative. Prevention efforts should portray tobacco use as a behavior that is nonnormative, unattractive, addictive, and immature.

Although the meanings of tobacco use are learned in childhood, early to middle adolescence appears to be the time of greatest need for direct intervention. This idea is not only supported epidemiologically by the occurrence of highest onset rates during this time, but also developmentally, in that the challenges of adolescence can expose youth to the perceived utility of tobacco use. The meanings of tobacco use that have been established in our society become personally relevant during adolescence. Tobacco use becomes a mechanism to establish social relationships, display independence, and create a new, mature identity. Moreover, because many adolescents believe themselves to be all but invulnerable, have a short perspective on their future, have limited abstract cognitive abilities, and highly value their associations with same-age peers, adolescents may view tobacco use as particularly functional to them and not potentially harmful. Adolescence is clearly a vulnerable time when adult involvement and protection is still warranted and required. Adults should see the prevention of adolescent tobacco use as an important part of their responsibility in the healthful socialization of the young.

The onset of tobacco use is strongly associated with peer influences, peer smoking, and peer approval of smoking. Programs that prevent tobacco use should systematically seek peer-group involvement and enlist peer role models who do not use tobacco. The emphasis of this involvement should be to affect peer-related norms and to persuade adolescents that most people their age do not use tobacco, that tobacco use has negative social consequences, and that tobacco use projects an image that, instead of being "cool," is unattractive, unpopular, and immature. Parents should also pay attention to the amount of time adolescents spend with peers, to peers' behavior, and to unsupervised peer-group activities.

The increased need for social competencies during adolescence (i.e., the ability of young people to decipher, cope with, and deal with the social environment) should be a critical focus of comprehensive efforts to prevent tobacco use. Adolescents need skills to help them identify, resist, and refute environmental influences—whether from the media, adults, or peers—to use tobacco. Similarly, adolescents may need to be taught how to cope better with difficult, stressful situations at home or at school. Without such skills, many youth may continue to use tobacco as a mechanism to deal with low self-esteem, depression, and the feelings of helplessness that can result from the ordinary challenges of growing up.

Positive social bonding with family and schools and health-enhancing behavior, such as physical activity, should be encouraged among youth as protective factors against tobacco use. Students who perform poorly in school should be offered tutoring and academic counseling; besides being personally motivating, such support can increase students' affiliation with school and decrease their involvement in tobacco use. Encouraging sports participation (and countering the negative role models of some professional athletes by providing explicit messages about the health consequences of smokeless tobacco use), regular physical activity, and a healthy diet may increase adolescents' valuation of, and attachment to, health and a healthy body that might be compromised by tobacco use. Parents may also need to demonstrate their support for academic achievement, health activities, and a greater link between home and school.

Finally, to substantially modify tobacco use and to provide adolescents with consistent messages against tobacco use, the community (and society on the whole) should embrace the prevention of tobacco use. A focus on individuals, families, or peer groups is necessary but not sufficient to address the origins of tobacco's appeal to young people. Limiting the acceptability of tobacco use through restrictive policies, such as legislation supporting clean indoor air and school policies banning tobacco use, provides a clear message to adolescents that tobacco use is not acceptable as a public behavior. Severely limiting adolescents' access to tobacco products makes it clear that cigarettes and smokeless products are dangerous substances. Mandating tobacco-use prevention programs in schools signals the importance of this topic through the use of explicit, earmarked resources. These

community actions provide external support for parents, teachers, and adolescents to assert their beliefs about the health hazards of tobacco use and to assist their demand for tobacco-free environments. Such clear, normative messages emanating from the community level reinforce those messages given at school or at home. Above all, community action at multiple levels of the social environment directly and consistently refutes the notion that tobacco use is an attractive adult behavior. Community intervention should be a top priority in poorer communities, where the need for action is especially great.

Conclusions

1. The initiation and development of tobacco use among children and adolescents progresses in five stages: from forming attitudes and beliefs about tobacco, to trying, experimenting with, and regularly using tobacco, to being addicted. This process generally takes about three years.
2. Sociodemographic factors associated with the onset of tobacco use include being an adolescent from a family with low socioeconomic status.
3. Environmental risk factors for tobacco use include accessibility and availability of tobacco products, perceptions by adolescents that tobacco use is normative, peers' and siblings' use and approval of tobacco use, and lack of parental support and involvement as adolescents face the challenges of growing up.
4. Behavioral risk factors for tobacco use include low levels of academic achievement and school involvement, lack of skills required to resist influences to use tobacco, and experimentation with any tobacco product.
5. Personal risk factors for tobacco use include a lower self-image and lower self-esteem than peers, the belief that tobacco use is functional, and lack of self-efficacy in the ability to refuse offers to use tobacco. For smokeless tobacco use, insufficient knowledge of the health consequences is also a factor.

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