

Table 29. Percentage of high school students who used tobacco, by participation on sports teams and steroid use, Youth Risk Behavior Survey, United States, 1991

| Category | Number | Any cigarette use* | Current cigarette use† | Current frequent cigarette use‡ | Current smokeless tobacco use§ |
|--|--------|--------------------|------------------------|---------------------------------|--------------------------------|
| Participation on sports teams ^Δ | | | | | |
| Total | | | | | |
| 0 teams | 5,738 | 73.6 | 31.3 | 17.2 | 6.6 |
| ≥ 1 team | 6,429 | 67.2 | 24.3 | 8.9 | 13.5 |
| Female | | | | | |
| 0 teams | 3,608 | 72.0 | 29.0 | 14.3 | 0.7 |
| ≥ 1 team | 2,635 | 66.3 | 24.8 | 9.6 | 2.1 |
| Male | | | | | |
| 0 teams | 2,125 | 76.1 | 34.8 | 21.6 | 15.5 |
| ≥ 1 team | 3,794 | 67.8 | 23.9 | 8.4 | 21.0 |
| Steroid use [¶] | | | | | |
| Total | | | | | |
| 0 times | 11,868 | 69.7 | 26.8 | 12.1 | 9.7 |
| ≥ 1 time | 382 | 87.2 | 54.8 | 35.7 | 38.7 |
| Female | | | | | |
| 0 times | 6,164 | 69.3 | 26.9 | 12.2 | 1.1 |
| ≥ 1 time | 116 | 88.5 | 61.8 | 29.9 | 16.5 |
| Male | | | | | |
| 0 times | 5,700 | 70.0 | 26.6 | 12.0 | 18.1 |
| ≥ 1 time | 265 | 86.8 | 52.6 | 27.0 | 44.6 |

Source: Centers for Disease Control and Prevention, Division of Adolescent and School Health (unpublished data).

* During the respondent's lifetime.

† Cigarette use on ≥ 1 day during the 30 days preceding the survey.

‡ Cigarette use on ≥ 20 days during the 30 days preceding the survey.

§ During the 30 days preceding the survey; includes chewing tobacco or snuff.

Δ During the 12 months preceding the survey; includes sports teams sponsored by school and other organizations.

¶ During the respondent's lifetime, without a doctor's prescription.

(under 20 years old) was highest among women aged 18 and 19 (24 percent) and lowest among women younger than 15 years of age (8 percent) (Table 30). White non-Hispanic adolescent mothers were more likely to have smoked during pregnancy than white non-Hispanic mothers 20 through 49 years old. Black non-Hispanic adolescent mothers were less likely to have smoked than those 20 through 49 years old; Hispanic adolescent mothers were about as likely as older Hispanic mothers to have smoked. Among the mothers who smoked during pregnancy, about 23 percent of those younger than 15 years of age smoked more than 10 cigarettes per day; 34 percent of mothers 15 through 19 years old, and 44 percent of mothers 20 through 49 years old smoked more than 10 cigarettes per day during the pregnancy (NCHS 1992b).

Self-Reported Indicators of Health Status Among Smokers

The MTFP collected data on self-reported indicators of health status among the nation's high school seniors. A five-category scale of lifetime smoking history was constructed from questions on lifetime smoking and on the grade in which the respondent began smoking daily (Table 31). Nine measures of health status were analyzed in terms of lifetime smoking history. Adjusted odds ratios were calculated by regressing the logit-transformed prevalence of each health measure over the prior year on the variable for lifetime smoking history and on the covariates of current marijuana use, lifetime cocaine use, parental education, and time (Hosmer and Lemeshow 1989). Alcohol use was also included as a covariate for the measures of staying at home because of not feeling well and of overall physical health. Current smokers were more likely than never smokers to report all of the symptoms or indicators listed. A trend test (using the linear contrast of the estimated regression coefficients for smoking history [Miller 1986]) revealed that these

adolescent smokers were more likely than never smokers to experience all but two of the health status measures (e.g., sinus congestion and sore throat).

Self-Reported Indicators of Nicotine Addiction Among Smokers

The research of McNeill (McNeill et al. 1986; McNeill, Jarvis, West 1987; McNeill 1991) has demonstrated the presence of nicotine addiction in young smokers (11 through 16 years old) in Great Britain. A majority of these young smokers experienced withdrawal symptoms during abstinence or had some difficulty quitting (McNeill et al. 1986; McNeill, Jarvis, West 1987). The 1991 NHSDA asked 12- through 18-year-olds questions that probed various components of nicotine addiction (USDHHS 1988b). Current smokers who had smoked at least 100 cigarettes in their lifetime were the most likely of adolescent smokers to report having experienced several indicators of nicotine addiction (Table 32). Four of every five of these heavier smokers who tried to cut down on cigarettes during the previous 12 months had failed. Seventy percent felt that they needed or were dependent on cigarettes.

Persons who had smoked at least 100 cigarettes in their lifetime but none in the last month were the next most likely to report that they felt dependent on cigarettes and that they had experienced withdrawal during the previous 12 months. These persons were more likely to have become regular smokers than were those who had not yet smoked 100 cigarettes. Though these respondents were more likely to show signs of addiction, they were evidently able to discontinue smoking for at least one month—a finding consistent with the observation that less-addicted smokers are more able to quit (USDHHS 1988b). Respondents who had not smoked 100 cigarettes by the time they were surveyed appeared less likely to become addicted to nicotine than those who had smoked at least 100 cigarettes.

Table 30. Cigarette smoking prevalence (%) during pregnancy among mothers of live-born infants, by age and race/Hispanic origin, 43 states and the District of Columbia, 1989

| Race/Hispanic origin | Age (years) | | | |
|----------------------|-------------|-------|-------|-------|
| | < 15 | 15-17 | 18-19 | 20-49 |
| Overall | 7.7 | 19.0 | 23.9 | 19.1 |
| White, non-Hispanic | 21.2 | 32.1 | 33.3 | 20.5 |
| Black, non-Hispanic | 2.7 | 6.2 | 10.4 | 20.2 |
| Hispanic | 5.9 | 7.5 | 8.7 | 8.0 |

Source: National Center for Health Statistics (1992b).

Table 31. Adjusted odds ratios* (and 95% confidence intervals) for symptoms of diseases and smoking status among high school seniors who have smoked occasionally or regularly, Monitoring the Future Project, United States, 1982–1989

| Self-reported symptom/indicator [†] | Have smoked occasionally, but not regularly | Smoked regularly at one time, but not in the past 30 days | Smoke regularly now, began daily smoking in grades 10–12 | Smoke regularly now, began daily smoking by grade 9 |
|--|---|---|--|---|
| Shortness of breath when not exercising | 1.38 (1.24, 1.52) | 1.90 (1.56, 2.31) | 2.32 (2.03, 2.64) | 2.72 (2.40, 3.08) |
| Chest cold | 1.34 (1.23, 1.46) | 1.34 (1.13, 1.60) | 1.53 (1.35, 1.73) | 1.72 (1.52, 1.93) |
| Sinus congestion, runny nose, sneezing | 1.31 (1.20, 1.44) | 0.99 (0.83, 1.19) | 1.17 (1.02, 1.34) | 1.19 (1.05, 1.35) |
| Coughing spells | 1.33 (1.24, 1.43) | 1.28 (1.11, 1.48) | 2.04 (1.83, 2.27) | 2.20 (1.98, 2.45) |
| Cough with phlegm or blood | 1.42 (1.28, 1.56) | 1.73 (1.44, 2.09) | 2.31 (2.02, 2.63) | 2.32 (2.04, 2.64) |
| Wheezing or gasping | 1.41 (1.26, 1.48) | 2.45 (1.99, 3.01) | 2.36 (2.06, 2.70) | 2.57 (2.25, 2.95) |
| Sore throat or hoarse voice | 1.36 (1.26, 1.48) | 1.07 (0.92, 1.26) | 1.34 (1.19, 1.52) | 1.17 (1.04, 1.32) |
| Stayed home most or all of day because not feeling well [‡] | 1.43 (1.31, 1.55) | 1.38 (1.17, 1.62) | 1.53 (1.35, 1.73) | 1.56 (1.39, 1.76) |
| Overall physical health [§] | 1.47 (1.32, 1.63) | 2.39 (1.98, 2.90) | 1.98 (1.72, 2.28) | 2.08 (1.81, 2.38) |

Source: Centers for Disease Control and Prevention, Office on Smoking and Health (unpublished data).

*Adjusted for past-month marijuana use, lifetime cocaine use, parental education, and time. Odds ratios are relative to those for seniors who had either never smoked cigarettes or had smoked cigarettes once or twice only.

[†]Occurrence during the previous 30 days, with the exception of overall physical health.

[‡]Also adjusted for past-month alcohol use.

[§]Odds ratios based on the percentage who reported that their health was poorer than average during the preceding year.

Table 32. Self-reported indicators of nicotine addiction among 12–18-year-olds (N = 1,589), by smoking history, National Household Surveys on Drug Abuse, United States, 1991

| Indicator [†] | Smoking history* | | | |
|--|---|--|--|---|
| | Have smoked 1–99 cigarettes, but none in past month (%) | Have smoked ≥ 100 cigarettes, but none in past month (%) | Have smoked 1–99 cigarettes and smoked in past month (%) | Have smoked ≥ 100 cigarettes and smoked in past month (%) |
| Tried to cut down on use of cigarettes | 43.7 | 72.2 | 44.9 | 73.4 |
| Unable to cut down on use of cigarettes [‡] | 46.9 | 40.4 | 59.5 | 81.2 |
| Felt need to have more cigarettes to get the same effect | 10.9 | 14.2 | 12.2 | 27.1 |
| Felt need to have cigarettes or felt dependent on cigarettes | 12.2 | 37.2 | 16.2 | 70.1 |
| Felt sick because of stopping or cutting down on cigarettes [‡] | 15.9 | 24.9 | 14.1 | 37.4 |

Source: Centers for Disease Control and Prevention, Office on Smoking and Health (unpublished data).

*Among people who smoked cigarettes at all in the past 12 months.

[†]Occurrence during the past 12 months.

[‡]Analysis limited to people who tried to cut down on cigarettes during the last 12 months.

Smokeless Tobacco Use Among Young People in the United States

Recent Patterns of Smokeless Tobacco Use

Ever Use of Smokeless Tobacco

The overall national estimates for adolescents who had tried smokeless tobacco were 18 percent for 12-through 18-year-olds in the 1989 TAPS, 13 percent for the same age group in the 1991 NHSDA, and 32 percent for high school seniors surveyed by the MTFP in 1992 (Table 33). In all three surveys, males were much more likely than females to have tried smokeless tobacco. White males were more likely than any other subgroup to have tried this product.

The prevalence of adolescents who had used smokeless tobacco increased with increasing age. Twenty-eight percent of 17- and 18-year-old TAPS respondents, 21 percent of 17- and 18-year-old NHSDA respondents,

and 32 percent of high school seniors in the 1992 MTFP survey reported that they had tried smokeless tobacco. Adolescents in the northeast region of the United States were less likely than those in the other regions to have tried smokeless tobacco.

Current Use of Smokeless Tobacco

Available data suggest that there was an increase in the use of smokeless tobacco among adolescents between 1970 and the mid-1980s. The prevalence of chewing tobacco use was 1.2 percent among 17- through 19-year-old males in the 1970 NHIS (USDHHS 1986, 1989b), 3.0 percent among 16- through 19-year-old males in the 1985 Current Population Survey (Marcus et al. 1989; USDHHS 1986), and 5.3 percent among 17- through 19-year-old males in the 1986 Adult Use of Tobacco

Table 33. Percentage of young people who have ever used smokeless tobacco, by gender, race/Hispanic origin, age/grade, and region, Teenage Attitudes and Practices Survey (TAPS), National Household Surveys on Drug Abuse (NHSDA), Monitoring the Future Project (MTFP), United States, 1989, 1991, 1992

| Characteristic | TAPS* | NHSDA [†] | MTFP ^{‡§} |
|----------------------|-------|--------------------|--------------------|
| Overall | 18.4 | 13.2 | 32.4 |
| Gender | | | |
| Male | 31.3 | 22.3 | 53.7 |
| Female | 4.4 | 3.5 | 12.1 |
| Race/Hispanic origin | | | |
| White, non-Hispanic | 22.4 | 16.6 | 38.2 |
| Male | 38.6 | 28.4 | 61.6 |
| Female | 4.8 | 4.4 | 15.2 |
| Black, non-Hispanic | 7.6 | 4.5 | 10.7 |
| Male | 11.9 | 6.7 | 18.0 |
| Female | 3.1 | 2.1 | 4.9 |
| Hispanic | 8.1 | 4.8 | NA ^Δ |
| Male | 13.4 | 8.8 | NA |
| Female | 2.3 | 0.5 | NA |
| Age/grade | | | |
| 12–14 years | 9.6 | 6.5 | |
| 15–16 years | 20.8 | 15.0 | |
| 17–18 years | 28.2 | 20.9 | |
| 8th grade | | | 20.7 |
| 10th grade | | | 26.6 |
| 12th grade | | | 32.4 |
| Region | | | |
| Northeast | 14.0 | 9.0 | 25.3 |
| North Central | 19.7 | 14.0 | 38.6 |
| South | 21.4 | 13.9 | 31.5 |
| West | 15.8 | 14.5 | 32.0 |

Sources: 1989 TAPS: Centers for Disease Control and Prevention (CDC), Office on Smoking and Health (OSH) (unpublished data); 1991 NHSDA: CDC, OSH (unpublished data); 1992 MTFP: Johnston, O'Malley, Bachman (in press); Institute for Social Research, University of Michigan (unpublished data).

*1989 TAPS, aged 12–18 years. Based on response to the question, "Have you ever tried using chewing tobacco or snuff?"

[†]1991 NHSDA, aged 12–18 years. Based on response to the question, "When was the most recent time you used chewing tobacco or snuff or other smokeless tobacco? ("Never used smokeless tobacco in lifetime" was a precoded response.)

[‡]1992 MTFP survey of high school seniors. Based on response to the question, "Have you ever taken or used smokeless tobacco (snuff, plug, dipping tobacco, chewing tobacco)?" Respondents who reported that they had taken or used smokeless tobacco at least once or twice were classified as ever users.

[§]With the exception of data for 8th- and 10th-grade students, all other data points for the MTFP surveys reflect estimates for high school seniors.

^ΔNA = Not available.

Survey (AUTS) (USDHHS 1989b). The same surveys indicated that the prevalence of snuff use was 0.3 percent among 17- through 19-year-old males in 1970, 2.9 percent among 16- through 19-year-old males in 1985, and 5.3 percent among 17- through 19-year-old males in 1986.

In the 1986-1989 MTFP surveys, high school seniors' past-month use of smokeless tobacco declined slightly for all respondents (from 12 to 8 percent), for whites (from 13 to 10 percent), and for males (from 22 to 16 percent) (Bachman, Johnston, O'Malley 1987, 1991; Johnston, Bachman, O'Malley 1991, 1992). In the 1992 MTFP survey, however, past-month use of smokeless tobacco was 11 percent for all respondents, 14 percent for whites, and 21 percent for males (ISR, University of Michigan, unpublished data). In the NHSDA, the prevalence of past-month use of smokeless tobacco among 12- through 17-year-old males was 6.6 percent in 1988 and 5.3 percent in 1991 (USDHHS 1989a, 1992a). In the same survey, use of smokeless tobacco in the past year was estimated to be 11.1 percent in 1985, 7.0 percent in 1988, 6.1 percent in 1990, and 6.1 percent in 1991. A parallel decline has been reported among young adults (18 through 25 years old): the prevalence of past-year use of smokeless tobacco in this group was 11.1 percent in 1985, 8.9 percent in 1988, 9.2 percent in 1990, and 8.7 percent in 1991 (USDHHS 1988a, 1989a, 1991a, 1992a).

The reduction in the late 1980s may be attributed to increased awareness resulting from several events: (1) the much-publicized Sean Marsee case, in which a star high school athlete who used snuff died of oral cancer (Fincher 1985); (2) the 1986 convening of a major national conference on smokeless tobacco use and the 1986 release of a report by the Advisory Committee to the Surgeon General on smokeless tobacco (*Journal of the American Medical Association* 1986; USDHHS 1986); (3) the introduction in 1986 of health warnings on smokeless tobacco packages and advertising; and (4) the enactment in 1986 of a ban on the advertising of smokeless tobacco products through the electronic media (USDHHS 1989b, 1992b).

The overall national prevalence estimates for current smokeless tobacco use (within the 30 days preceding the survey) were 3 percent for past-month users among persons 12 through 18 years old surveyed in the 1991 NHSDA (reflecting about 800,000 users), 11 percent for high school seniors in the 1992 MTFP survey, and 11 percent for students in grades 9-12 in the 1991 YRBS (Table 34). Current use was substantially more prevalent among males than females; 6 percent of the males in the NHSDA and 20 percent of the males in the other two surveys reported current use, whereas only about 1 percent of the females in the three surveys reported current use. Smokeless tobacco use was highest among white

males; Hispanic males had the next highest prevalence, and black males had the lowest. Although reliable national data are not currently available on smokeless tobacco use among American Indian and Alaskan Native adolescents, local surveys have reported very high prevalence (e.g., CDC 1987, 1988; Schinke et al. 1987; Hall and Dexter 1988; see also "Sociodemographic Factors in the Initiation of Smokeless Tobacco Use" in Chapter 4).

Smokeless tobacco use increased with increasing age in the NHSDA survey of 12- through 18-year-olds and by grade in the 1992 MTFP survey, but did not change appreciably among students in the four high school grades surveyed by the YRBS.

Individual YRBS surveys conducted in several state and local communities found that male high school students were far more likely than females to use smokeless tobacco (Table 35); nonetheless, smokeless tobacco was used by as much as 10 percent of female respondents in a given state survey. In some states (Alabama, Idaho, South Dakota, Colorado, Wyoming, and Montana), males were as likely to report current smokeless tobacco use as they were to report current cigarette use (see Table 3).

The 1992 MTFP survey gathered data on the frequency of smokeless tobacco use among approximately 2,600 high school seniors (ISR, University of Michigan, unpublished data). Users were classified according to the number of days they had used smokeless tobacco over a period of 30 days. Thirty-eight percent of male users and 20 percent of female users reported that they had used smokeless tobacco at least once every day. Seventy percent of the female users reported that they had used the product less than once each week. Thirty-nine percent of white users and 12 percent of black users reported daily use of smokeless tobacco. Almost 60 percent of the black users reported that they had used the product less than once each week. Among past-month users, 46 percent of those living in the West and 43 percent of those from the South had used smokeless tobacco at least once each day. Thirty-three percent of users who lived in the north-central and 22 percent from the northeast United States used smokeless tobacco on a daily basis.

Use of Smokeless Tobacco and Cigarettes

As was shown in Table 23, 43 percent of male high school seniors who used smokeless tobacco also smoked cigarettes. Tobacco, either in the form of cigarettes or smokeless tobacco, was used by 15 percent of 12- through 18-year-olds in the 1991 NHSDA, 32 percent of high school students in the 1991 YRBS, and 33 percent of high school seniors in the 1992 MTFP (Table 36). Males were substantially more likely than females to use tobacco. Regardless of gender, the prevalence of tobacco use for

Table 34. Percentage of young people who currently (within the past 30 days) use smokeless tobacco, by gender, race/Hispanic origin, age/grade, and region, National Household Surveys on Drug Abuse (NHSDA), Monitoring the Future Project (MTFP), Youth Risk Behavior Survey (YRBS), United States, 1991, 1992

| Characteristic | NHSDA* | MTFP ^{††} | YRBS [§] |
|----------------------|--------|--------------------|-------------------|
| Overall | 3.4 | 11.4 | 10.5 |
| Gender | | | |
| Male | 6.0 | 20.8 | 19.2 |
| Female | 0.6 | 2.0 | 1.3 |
| Race/Hispanic origin | | | |
| White, non-Hispanic | 4.4 | 13.5 | 13.0 |
| Male | 8.1 | 23.9 | 23.6 |
| Female | 0.5 | 2.5 | 1.4 |
| Black, non-Hispanic | 0.7 | 2.5 | 2.1 |
| Male | 0.5 | 5.2 | 3.6 |
| Female | 0.8 | 0.2 | 0.7 |
| Hispanic | 1.2 | NA [‡] | 5.5 |
| Male | 2.1 | NA | 10.7 |
| Female | 0.3 | NA | 0.6 |
| Age/grade | | | |
| 12–14 years | 1.5 | | |
| 15–16 years | 3.6 | | |
| 17–18 years | 5.9 | | |
| 8th grade | | 7.0 | |
| 9th grade | | | 9.0 |
| 10th grade | | 9.6 | 10.1 |
| 11th grade | | | 12.1 |
| 12th grade | | 11.4 | 10.7 |
| Region | | | |
| Northeast | 0.8 | 8.2 | 8.8 |
| North Central | 3.9 | 12.3 | 13.3 |
| South | 4.0 | 12.5 | 8.6 |
| West | 3.9 | 11.1 | 10.5 |

Sources: 1991 NHSDA: Centers for Disease Control and Prevention (CDC), Office on Smoking and Health (unpublished data); 1992 MTFP: Johnston, O'Malley, Bachman (in press); Institute for Social Research, University of Michigan (unpublished data); 1991 YRBS: CDC (1992c); CDC, Division of Adolescent and School Health (unpublished data).

*1991 NHSDA, aged 12–18 years. Based on response to the question, "When was the most recent time you used chewing tobacco or snuff or other smokeless tobacco?"

†1992 MTFP survey of high school seniors. Based on response to the question, "How frequently have you taken smokeless tobacco during the past 30 days?"

††With the exception of data for 8th- and 10th-grade students, all other data points for the MTFP survey reflect estimates for high school seniors.

§1991 YRBS, grades 9–12. Based on response to the question, "During the past 30 days, did you use chewing tobacco, such as Redman, Levi Garrett, or Beechnut, or snuff, such as Skoal, Skoal Bandits, or Copenhagen?"

‡NA = Not available.

Table 35. Percentage of high school students who use smokeless tobacco, by gender, Youth Risk Behavior Surveys, United States and selected U.S. sites, 1991

| Site | Smokeless tobacco use* | | |
|------------------------------------|------------------------|------|-------|
| | Female | Male | Total |
| Weighted data | | | |
| National survey | 1 | 19 | 10 |
| State surveys | | | |
| Alabama | 2 | 31 | 16 |
| Georgia | 2 | 22 | 12 |
| Idaho | 3 | 24 | 14 |
| Nebraska | 2 | 26 | 14 |
| New Mexico | 4 | 27 | 16 |
| New York [†] | 2 | 19 | 11 |
| Puerto Rico [‡] | 0 | 5 | 2 |
| South Carolina | 2 | 20 | 11 |
| South Dakota | 10 | 29 | 20 |
| Utah | 2 | 12 | 7 |
| Local surveys | | | |
| Chicago | 2 | 5 | 3 |
| Dallas | 1 | 7 | 4 |
| Fort Lauderdale | 1 | 9 | 4 |
| Jersey City | 1 | 6 | 3 |
| Miami | 1 | 6 | 3 |
| Philadelphia | 2 | 6 | 4 |
| San Diego | 1 | 7 | 4 |
| Unweighted data[§] | | | |
| State surveys | | | |
| Colorado [†] | 6 | 32 | 19 |
| District of Columbia [†] | 2 | 5 | 4 |
| Hawaii | 2 | 14 | 8 |
| Montana | 7 | 33 | 20 |
| New Hampshire | 4 | 22 | 13 |
| New Jersey [†] | 2 | 14 | 7 |
| Oregon | 5 | 28 | 16 |
| Oregon | 2 | 29 | 16 |
| Pennsylvania [†] | 2 | 34 | 17 |
| Tennessee | 1 | 19 | 11 |
| Wisconsin | 3 | 31 | 19 |
| Wyoming | 5 | | |
| Local surveys | | | |
| Boston | 1 | 5 | 3 |
| New York City | 1 | 5 | 3 |
| San Francisco | 2 | 6 | 4 |

Source: Centers for Disease Control (1992d).

*Respondents used chewing tobacco or snuff on 1 or more of the 30 days preceding the survey.

[†]Surveys did not include students from the largest city.

[‡]Categorized as a state for funding purposes.

[§]Fourteen sites had overall response rates below 60 percent or had unavailable documentation; weighted estimates were not reported.

Table 36. Percentage of young people who currently (within the past 30 days) use cigarettes and/or smokeless tobacco, by gender, race/Hispanic origin, region, and age/grade, National Household Surveys on Drug Abuse (NHSDA), Monitoring the Future Project (MTFP), Youth Risk Behavior Survey (YRBS), United States, 1991, 1992

| Characteristic | NHSDA* | MTFP† | YRBS‡ |
|-----------------------|--------|-------|-------|
| Overall | 15.1 | 33.2 | 31.8 |
| Gender | | | |
| Male | 17.1 | 38.8 | 35.8 |
| Female | 13.0 | 27.3 | 27.6 |
| Race/Hispanic origin§ | | | |
| White, non-Hispanic | 17.9 | 38.4 | 36.2 |
| Male | 20.3 | 43.0 | 40.0 |
| Female | 15.4 | 33.3 | 32.0 |
| Black, non-Hispanic | 6.0 | 8.8 | 13.7 |
| Male | 6.6 | 14.3 | 16.0 |
| Female | 5.4 | 4.5 | 11.6 |
| Hispanic | 10.9 | NA§ | 28.1 |
| Male | 10.8 | NA | 33.6 |
| Female | 10.9 | NA | 23.1 |
| Age/grade | | | |
| 12–14 years | 5.1 | | |
| 15–16 years | 16.2 | | |
| 17–18 years | 28.5 | | |
| 8th grade | | 20.5 | |
| 9th grade | | | 26.7 |
| 10th grade | | 27.6 | 29.6 |
| 11th grade | | | 36.3 |
| 12th grade | | 33.2 | 34.7 |
| Region | | | |
| Northeast | 28.2 | 35.1 | |
| North Central | 17.0 | 37.7 | 40.8 |
| South | 14.5 | 30.3 | 28.8 |
| West | 14.2 | 30.0 | 27.6 |

Sources: 1991 NHSDA: Centers for Disease Control and Prevention (CDC), Office on Smoking and Health (unpublished data); 1992 MTFP: Johnston, O'Malley, Bachman (in press); Institute for Social Research, University of Michigan (unpublished data); 1991 YRBS: CDC, Division of Adolescent and School Health (unpublished data).

*1991 NHSDA, aged 12–18 years. Based on responses to the questions, "When was the most recent time you smoked a cigarette?" and "When was the most recent time you used chewing tobacco or snuff or other smokeless tobacco?"

†1992 MTFP surveys of high school seniors. Based on responses to the questions, "How frequently have you smoked cigarettes during the past 30 days?" and "How frequently have you taken smokeless tobacco during the past 30 days?"

‡1991 YRBS, grades 9–12. Based on responses to the questions, "During the past 30 days, on how many days did you smoke cigarettes?" and "During the past 30 days, did you use chewing tobacco, such as Redman, Levi Garrett, or Beechnut, or snuff, such as Skoal, Skoal Bandits, or Copenhagen?"

§NA = Not available.

white adolescents was higher than for Hispanics and blacks. Tobacco use increased with increasing age and was most common in the north-central region of the United States.

Sociodemographic Risk Factors for Smokeless Tobacco Use

Current use of smokeless tobacco among male high school seniors varied according to several sociodemographic indicators, as shown by the 1986–1989 MTFP surveys (N [weighted] = 5,277). The prevalence of current smokeless tobacco use was 28 percent among those who lived alone, 29 percent among those living in father-only households, 16 percent among those living in mother-only households, and 20 percent among those living with both parents. Current use was more common among male seniors living on farms (34 percent) and in the country (31 percent) than among those living in medium-sized to very large cities or suburbs (11 to 17 percent). The prevalence of current use was greater among students who rated their academic performance as average (25 percent) or below average (26 percent) than among those who rated their performance as slightly above average (18 percent) or far above average (16 percent). Smokeless tobacco use was more common among male seniors who planned to enter the armed forces after high school than among those who did not have such plans (23 vs. 19 percent). The self-reported importance of religion did not affect the prevalence of smokeless tobacco use among these MTFP seniors.

Grade When Smokeless Tobacco Use Begins

The grade distribution for which MTFP seniors reported first trying smokeless tobacco was more similar to that reported for cigarettes than it was for those reported for alcohol, marijuana, and cocaine (Figure 8). Among seniors who had used smokeless tobacco, 23 percent had first done so by grade six, 53 percent by grade eight, and 73 percent by the ninth grade.

Attempts to Quit Using Smokeless Tobacco

Twenty-two percent of the male high school seniors in the 1986–1989 MTFP who had regularly used smokeless tobacco reported that they had not used the product during the 30 days preceding the survey. In the 1986–1989 TAPS, 12- through 18-year-olds who regularly used smokeless tobacco were asked to report the number of times they had tried to quit. Nineteen percent of males and 14 percent of females reported never making a quit attempt. Thirty-three percent of males and 72 percent of females had made one attempt to quit, 27 percent of males and 14

percent of females had tried quitting two or three times, and 21 percent of males and no females had tried to quit four or more times (1989 TAPS, CDC, OSH, unpublished data).

Smokeless Tobacco Brand Preference

TAPS also asked those who had regularly used smokeless tobacco what brand they usually bought. Among males in this subgroup (N = 300), 38 percent usually bought Copenhagen, 26 percent purchased Skoal or Skoal Bandits, 9 percent purchased Redman, 6 percent bought Levi Garrett, 2 percent purchased Beechnut, and 19 percent purchased other smokeless tobacco brands (1989 TAPS, CDC, OSH, unpublished data).

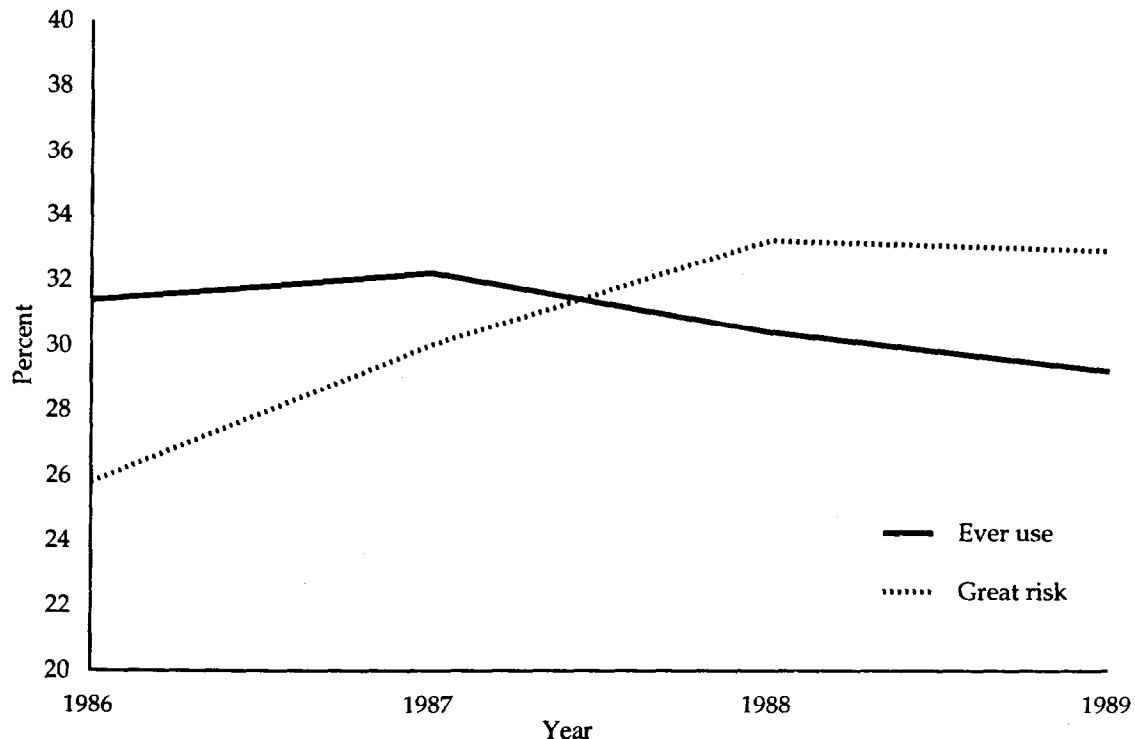
Trends in Perceived Health Risks of Smokeless Tobacco Use

High school seniors in the MTFP were asked, "How much do you think people risk harming themselves (physically or in other ways) if they use smokeless tobacco regularly (chewing tobacco, plug, dipping tobacco, snuff)?" Overall in 1991, 37 percent reported that great risk of harm is associated with smokeless tobacco use (ISR, University of Michigan, unpublished data); more females (43 percent) than males (32 percent) and more blacks (44 percent) than whites (36 percent) were of this opinion. Western respondents more frequently held this belief (43 percent) than respondents in the South (37 percent), the Northeast (36 percent), and the north-central United States (35 percent). Respondents who planned to attend college for four years were more likely to report this belief than those without college plans (39 vs. 33 percent).

When the overall percentage of seniors in the 1986–1989 MTFP who believed that great risk is associated with smokeless tobacco use is plotted against the percentage of seniors who had used smokeless tobacco, the trends of these percentages are inversely related (Figure 9). Between 1986 and 1988, the percentage of seniors who believed that great risk is associated with smokeless tobacco use increased from 26 to 33 percent. Between 1988 and 1989, this percentage remained relatively stable. The percentage of seniors who had used smokeless tobacco increased slightly between 1986 (31 percent) and 1987 (32 percent) and decreased by 1989 (29 percent). This finding is similar to that observed for cigarette smoking (Figure 5).

In the 1989 TAPS, 94 percent of 12- through 18-year-old males reported that use of chewing tobacco and snuff can cause cancer. Ninety-three percent of those males who had never used smokeless tobacco and 96 percent of those who had regularly used the product endorsed that statement (Allen et al. 1993).

Figure 9. Trends in the percentage of high school seniors who believe that regular use of smokeless tobacco is a serious health risk and who have ever used smokeless tobacco, Monitoring the Future Project, United States, 1986–1989



Sources: Bachman, Johnston, O'Malley (1987, 1991); Johnston, Bachman, O'Malley (1991, 1992).

Smokeless Tobacco Use and Other Drug Use

Prevalence of Smokeless Tobacco Use and Other Drug Use

The majority of male high school seniors in the 1986–1989 MTFP who used alcohol, marijuana, cocaine, or inhalants did not use smokeless tobacco (Table 37). Smokeless tobacco use, however, was from 1.5 to 3.9 times higher among users of these drugs than among nonusers. Most notably, 90 percent of smokeless tobacco users were also alcohol drinkers. Almost one-third (31 percent) of smokeless tobacco users also used marijuana, 7 percent used cocaine, and 5 percent used inhalants. The prevalence of other drug use was from 1.4 to 1.9 times greater among smokeless tobacco users than nonusers.

Grade When Use of Smokeless Tobacco and Cigarettes Begins

In the 1986–1989 MTFP, 28 percent of all males had never tried cigarettes or smokeless tobacco by the 12th

grade; 44 percent had tried both; 18 percent had tried cigarettes but not smokeless tobacco; and 9 percent had tried smokeless tobacco but not cigarettes (Table 38). Of those male seniors who had tried both, 37 percent had tried cigarettes before smokeless tobacco, 24 percent had tried smokeless tobacco before cigarettes, and 40 percent had first tried both at about the same time.

Smokeless Tobacco Use and Other Health-Related Behaviors

In the 1991 YRBS, male high school students were more likely to report past-month use of smokeless tobacco if they rarely or never wore seat belts, were frequently involved in physical fights, carried weapons during one or more of the preceding 30 days, and had made one or more suicide attempts during the preceding 12 months (Table 27). These students were also more likely to currently use smokeless tobacco if they had ever had sexual intercourse (Table 28). Smokeless tobacco use did not vary appreciably (compared with cigarette smoking)

Table 37. Prevalence (%) of smokeless tobacco use among users of other drugs and prevalence of other drug use among smokeless tobacco users,* male high school seniors, Monitoring the Future Project, United States, 1986–1989

| Other drugs | Prevalence of smokeless tobacco use among users of other drugs | Prevalence of smokeless tobacco use among nonusers of other drugs | Prevalence of other drug use among smokeless tobacco users | Prevalence of other drug use among nonusers of smokeless tobacco |
|-------------|--|---|--|--|
| Alcohol | 26.3 | 6.8 | 89.6 | 63.8 |
| Marijuana | 27.6 | 17.6 | 30.9 | 20.0 |
| Cocaine† | 28.7 | 19.6 | 7.4 | 4.6 |
| Inhalants‡ | 32.3 | 19.6 | 5.0 | 2.6 |

Source: Centers for Disease Control and Prevention, Office on Smoking and Health (unpublished data).

*Any use of smokeless tobacco or other drugs during the past month.

†Includes "coke," "crack," and "rock."

‡Glue, aerosols, laughing gas, etc.

Table 38. Percent distribution of male high school seniors (N [weighted] = 4,254), by grade in which they first used cigarettes and smokeless tobacco (used in the past 30 days), Monitoring the Future Project (MTFP), United States, 1986–1989

| Grade when respondent first tried cigarettes | Grade when respondent first tried smokeless tobacco | | | | | | Never used | Row total |
|--|---|------|------|-----|-----|-----|------------|-----------|
| | ≤ 6 | 7–8 | 9 | 10 | 11 | 12 | | |
| ≤ 6 | 7.1 | 4.9 | 2.3 | 1.4 | 0.7 | 0.3 | 5.8 | 22.4 |
| 7–8 | 2.1 | 5.8 | 2.5 | 1.3 | 0.8 | 0.3 | 4.7 | 17.5 |
| 9 | 1.3 | 2.0 | 2.3 | 0.9 | 0.4 | 0.2 | 3.2 | 10.3 |
| 10 | 0.6 | 0.7 | 1.0 | 1.5 | 0.2 | 0.1 | 2.3 | 6.4 |
| 11 | 0.1 | 0.5 | 0.7 | 0.5 | 0.5 | 0.1 | 1.5 | 3.9 |
| 12 | * | 0.3 | 0.2 | 0.1 | 0.1 | 0.3 | 0.9 | 1.9 |
| Never used | 2.0 | 2.7 | 1.9 | 1.1 | 1.3 | 0.2 | 28.3 | 37.6 |
| Column total | 13.3 | 16.9 | 11.0 | 6.9 | 4.0 | 1.4 | 46.7 | 100.0 |

Source: Centers for Disease Control and Prevention, Office on Smoking and Health (unpublished data).

* < 0.05.

Note: Totals may not equal the sum of individual percentages because of rounding.

by how many lifetime sexual partners these males had had or by whether they had used a condom during their most recent sexual intercourse. Lastly, students were consistently more likely to currently use smokeless tobacco if they had participated on a sponsored sports

team (Table 29). This finding is opposite to that found for cigarette smoking and sports. Smokeless tobacco use was also more likely among students who had used steroids without a doctor's prescription.

Conclusions

1. Tobacco use primarily begins in early adolescence, typically by age 16; almost all first use occurs before the time of high school graduation.
2. Smoking prevalence among adolescents declined sharply in the 1970s, but the decline slowed significantly in the 1980s. At least 3.1 million adolescents and 25 percent of 17- and 18-year-olds are current smokers.
3. Although current smoking prevalence among female adolescents began exceeding that among males by the mid- to late-1970s, both sexes are now equally likely to smoke. Males are significantly more likely than females to use smokeless tobacco. Nationally, white adolescents are more likely to use all forms of tobacco than are blacks and Hispanics. The decline in the prevalence of cigarette smoking among black adolescents is noteworthy.
4. Many adolescent smokers are addicted to cigarettes; these young smokers report withdrawal symptoms similar to those reported by adults.
5. Tobacco use in adolescence is associated with a range of health-compromising behaviors, including being involved in fights, carrying weapons, engaging in higher-risk sexual behavior, and using alcohol and other drugs.

Chapter 4: Psychosocial Risk Factors for Initiating Tobacco Use

Introduction

Tobacco use begins primarily through the dynamic interplay of sociodemographic, environmental, behavioral, and personal factors. These psychosocial risk factors increase a person's chances both of beginning to use tobacco and of experiencing the immediate and long-term health problems associated with tobacco use. Young people (aged 10 through 18 years) are particularly affected by psychosocial factors and are thus particularly vulnerable to adopting tobacco use. Since psychosocial risk factors are the initial influences in the causal chain that leads to tobacco-related health consequences, primary prevention efforts to reduce smoking prevalence must take these influences into account.

Psychosocial risk factors for tobacco use can be viewed as a continuum of proximal to distal factors. Personal and behavioral factors that directly affect an individual's choice to use tobacco (when a cigarette is offered, for example) are considered proximal risk factors, whereas environmental and sociodemographic factors (such as billboard advertising and household income) that indirectly affect the accessibility or acceptability of tobacco use are classified as distal factors. Proximal factors are considered more immediate to a person's decision to use tobacco than distal factors. Still, as is shown in Chapter 5 (see "Research on the Effects of Cigarette Advertising and Promotional Activities on Young People"), distal factors acquire potency if they are pervasive and provide consistent, repetitive messages across multiple channels. Distal factors are also powerful because, over time, they affect proximal factors as these influences become interpreted and internalized, particularly among adolescents as they try to shape a mature self-identity.

This review examines each of these sets of risk factors to provide a comprehensive view of the antecedents of tobacco use, first for cigarette smoking, then for smokeless tobacco use. The database for this review includes research studies that have been published primarily in peer-refereed journals or books during the past 15 years. Results from these studies were grouped

according to psychosocial risk factor, and conclusions were based on the availability and conclusiveness of the evidence for a given risk factor. Table 1 summarizes the major psychosocial risk factors examined in this chapter and in Chapter 5.

Table 1. Psychosocial risk factors in the initiation of tobacco use among adolescents

| Risk factors | Smoking | Smokeless tobacco |
|---------------------------------|---------|-------------------|
| Sociodemographic factors | | |
| Low socioeconomic status | x | |
| Developmental stage | x | x |
| Male gender | | x |
| Environmental factors | | |
| Accessibility | x | x |
| Advertising | x | x |
| Parental use | | |
| Sibling use | x | |
| Peer use | x | x |
| Normative expectations | x | x |
| Social support | x | |
| Behavioral factors | | |
| Academic achievement | x | x |
| Other problem behaviors | x | x |
| Constructive behaviors | x | |
| Behavioral skills | x | |
| Intentions | x | x |
| Experimentation | x | x |
| Personal factors | | |
| Knowledge of consequences | | x |
| Functional meanings | x | x |
| Subjective expected utility | x | |
| Self-esteem/self-image | x | x |
| Self-efficacy | x | |
| Personality factors | x | |
| Psychological well-being | x | |

Initiation of Cigarette Smoking

Introduction

Early public health efforts to prevent smoking among adolescents were largely informed by health-related and demographic findings from research stimulated by the landmark 1964 Surgeon General's report on smoking and health (Public Health Service 1964; Chassin, Presson, Sherman 1990). By the mid-1970s, the ineffectiveness of these attempts to reduce rates of smoking onset among adolescents further stimulated research into what motivates young people to begin smoking (Thompson 1978). Significant support for such research was provided by the National Clearinghouse for Smoking and Health, the National Institutes of Health, the National Institute on Drug Abuse (NIDA), and various private health organizations, including the American Lung Association, the American Cancer Society, and the American Heart Association.

The application of psychosocial theories to the area of adolescent smoking behavior provided a major breakthrough in the understanding of smoking initiation and development, pioneered by the conceptual and pilot work of Leventhal (1968), Bandura (1977), Evans et al. (1978), McAlister, Perry, and Maccoby (1979), and McGuire (1984). Rather than view cigarette smoking as a health behavior, these researchers examined smoking as a social behavior, with social causes, functions, and reinforcements. Although this early work involved mostly correlational research, such as examining the relationship between parental smoking and children's smoking behavior, research became increasingly theory-driven, longitudinal, prospective, and multivariate during the 1980s (Chassin, Presson, Sherman 1990). Conrad, Flay, and Hill (1992) recently reviewed 27 prospective studies on smoking initiation published since 1980 (see Table 2 for characteristics of these studies). The large number of such methodologically sophisticated studies provides a sufficient base of knowledge to begin drawing conclusions about the relative importance of a variety of risk factors for the onset of tobacco use.

The process of onset requires clarification. Regardless of the age at which they smoke their first cigarette, young people appear to progress through a sequence of stages that takes them from receptivity to dependence on tobacco use (Leventhal and Cleary 1980; Flay et al. 1983). Not all young people who try a cigarette become daily smokers; still, almost all of those who become daily smokers have experienced similar, well-defined stages in the behavior-acquisition

process. The risk factors for each of these stages appear to differ; this variation suggests that even within the seven years of adolescence (ages 11 through 17), developmentally appropriate prevention programs should be used (Leventhal, Fleming, Glynn 1988).

Developmental Stages of Smoking

Flay (1993) discusses the five primary stages of smoking initiation among children and adolescents (Figure 1). During the first or preparatory stage, attitudes and beliefs about the utility of smoking are formed. At this stage, even if no actual smoking behavior is enacted, the child or adolescent may see smoking as functional—as a way to appear mature, cope with stress, bond with a new peer group, or display independence (Perry, Murray, Klepp 1987). The second or trying stage encompasses the first two or three times an adolescent smokes. Peers are usually involved in situations that encourage trying (Conrad, Flay, Hill 1992). Whether the physiological effects of smoking are perceived to be negative and whether these tries are socially reinforced determine if an adolescent will proceed to the next stage (Leventhal, Fleming, Ershler, unpublished data), experimentation, which includes repeated but irregular smoking. At this third stage, smoking is generally a response to a particular situation (such as a party) or to a particular person (such as a best friend). These influences will not yet have prompted a regular pattern of use. In the fourth stage, regular use, an adolescent smokes on a regular basis, usually at least weekly, and increasingly across a variety of situations and personal interactions. The final stage, nicotine dependence and addiction (see "Nicotine Addiction in Adolescence" in Chapter 2), is characterized by a physiological need for nicotine. This need includes tolerance for nicotine, withdrawal symptoms if the person tries to quit, and a high probability of relapse if the person does quit (Flay 1993). These stages have been further quantified and validated by Stern et al. (1987).

The time interval from the initial try to the stage of regular use takes an average of two to three years, with considerable interval variation among individuals (Leventhal, Fleming, Glynn 1988). McNeill (1991) found in a prospective study that of those who experimented with cigarettes, approximately half were smoking on a daily basis within one year. Leventhal, Fleming, and Glynn (1988) suggest that the time interval from the initial try to the stage of regular use may be extended, particularly if the time is lengthened between the first

and second try. This observation suggests that to delay both the onset of first trials as well as the progression to regular use, it seems critical to examine risk factors for first use. Since a young person may become a regular smoker in only two to three years, the adolescent period of development (particularly middle school, junior high school, and senior high school) is a crucial time for prevention efforts (Evans et al. 1978).

Sociodemographic Factors in the Initiation of Smoking

Sociodemographic factors involve the economic, political, social, and educational systems of a society. These factors can be determinants of behavior, such as tobacco use, even if the systems they originate in are not directly associated with the choice to begin that behavior. Within these systems, social disorganization or

Table 2. Characteristics of 27 prospective studies of smoking onset, various countries, 1980–1991

| Study | Year of publication | Place | Age* (years) | Time† (months) | Number‡ (nonsmokers) |
|----------------------------|---------------------|----------------------------|-------------------|----------------|----------------------|
| Ahlgren et al. | 1982 | Minnesota | 10–11, 11–12 | 6 | 562 |
| Alexander et al. | 1983 | NSW Australia [§] | 10,11,12 | 12 | 5,065 |
| Ary et al. | 1989 | Oregon | 12–13,14–15,15–16 | 6 | 801 |
| Ary and Biglan | 1988 | Oregon | 12–15,15–16 | 12 | 737 |
| Bauman et al. | 1984 | North Carolina | 14–15 | 12 | 519 |
| Brunswick and Messeri | 1984 | New York City | 12–16 | 84 | 380 |
| Charlton and Blair | 1989 | Manchester, UK | 12–13 | 4 | 1,513 |
| Chassin et al. | 1984 | Indiana | 11–16 | 12 | 1,207 |
| Chassin et al. | 1986 | Indiana | 11–16 | 12 | 145 |
| Collins et al. | 1987 | Los Angeles | 12–13 | 16 | 1,354 |
| de Vries et al. | 1990 | Netherlands | Secondary | 12 | 555 |
| Goddard | 1990 | England | 11–15 | 24 | 2,251 |
| Kellam, Ensminger, Simon | 1980 | Chicago | 6–7 | 120 | 705 |
| Krohn et al. | 1983 | Iowa | 12–18 | 12 | NA ^Δ |
| Lawrance and Rubinson | 1986 | Illinois | 12–14 | 8 | 346 |
| McCaul et al. | 1982 | Minnesota | 12–13 | 12 | 268 |
| McNeill et al. | 1988 | Bristol, UK | 11–13 | 30 | 1,261 |
| Mittelmark et al. | 1987 | Minnesota | 12–14,14–16 | 18 | 887 |
| Murray et al. | 1983 | Derbyshire, UK | 11–12 | 48 | 2,217 |
| Newcomb, McCarthy, Bentler | 1989 | Los Angeles | 12–13,13–14,14–15 | 96 | NA |
| Pulkkinen | 1982 | Finland | 8–9 | 144 | 135 |
| Semmer, Cleary, et al. | 1987 | Berlin–Bremen | 12–13 | 24 | 761 |
| Semmer, Lippert, et al. | 1987 | Berlin–Bremen | 12–14 | 6 | 763 |
| Skinner et al. | 1985 | Iowa | 12–18 | 24 | 426 |
| Stacy et al. | unpublished | Los Angeles | 12–13 | 16 | 1,116 |
| Sussman et al. | 1987 | Los Angeles | 12–13 | 16 | 338 |
| Urberg, Cheng, Shyu | 1991 | Detroit suburb | 13–14,16–17 | 12 | NA |

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

*Age = Age (in years) of students at the beginning of the study.

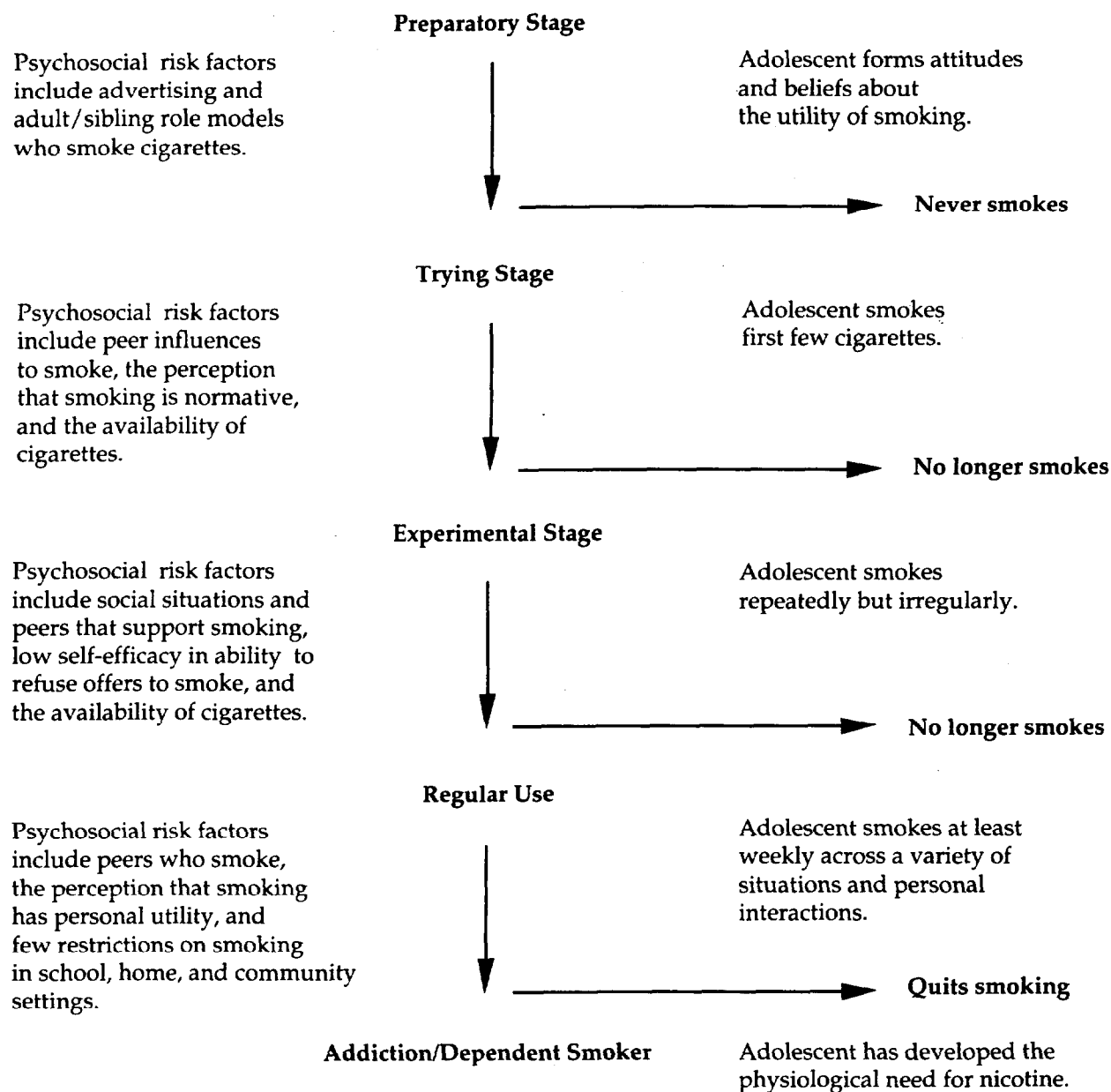
†Time = Number of months from the beginning of the study to the final follow-up wave.

‡Number = Number of nonsmoking students at the beginning of the study.

§NSW Australia = New South Wales, Australia.

ΔNA = Not available.

Figure 1. Stages of smoking initiation among children and adolescents



Sources: Adapted from Flay (1993); U.S. Department of Health and Human Services (1991).

breakdown and discrepancies between role aspirations and achievements may lead to incomplete or inappropriate social development of adolescents. Inappropriate social development, in turn, can alter personal and

behavioral factors, such as normative expectations of smoking, that affect the choice to use tobacco (Flay 1993). Tobacco use may vary according to broad factors such as an individual's socioeconomic status, family

structure, age, gender, and ethnicity, especially when examined across an entire population. Many of these factors are covered in Chapter 3 (see "Recent Patterns of Cigarette Smoking").

Socioeconomic Status

Low socioeconomic status (SES) has been shown to predict smoking initiation in multiple longitudinal studies (Conrad, Flay, Hill 1992). Semmer, Lippert, et al. (1987) examined tobacco use among students in two schools in Germany. These investigators found that seventh- and eighth-grade students from the school in a low-income area (children of primarily blue-collar parents) had higher baseline rates of tobacco use than youth from the school in a higher-income area. Low-income students were also more likely to begin smoking over the course of this six-month study. Low-income students had greater expectations of positive consequences of smoking, lower self-image scores, and more friends who smoked. One possible explanation of the impact of SES supported by these findings is that lower-income students may have to cope more often with stressful situations, such as lacking sufficient resources or living in a one-parent family, and are therefore more likely to perceive smoking as a quick, easy coping strategy for stress or loneliness—and as a strategy that is socially accepted and effective (Semmer, Cleary, et al. 1987). Adolescents from low-income families may also have more role models who smoke and less supervision to discourage experimentation than adolescents from higher-income families (Perry, Kelder, Komro 1993).

Parental Education

The level of parental education has been shown to have a significant impact on adolescent smoking behavior in some studies. Although Ary et al. (1983) failed to find a relationship between parental education and children's smoking behavior, in a later report, Ary and Biglan (1988) found that low educational attainment among fathers was predictive of smoking onset in middle school youth. Waldron and Lye (1990) reported that high school seniors who had less-educated parents were more likely to have tried a cigarette and to have adopted cigarette smoking and were less likely to have quit smoking. Finally, Mittelmark et al. (1987) found that both adolescent females at all grade levels and adolescent males in grades 9 through 11 who began to smoke during the course of the study had parents with fewer years of formal education than their peers who remained nonsmokers. However, for seventh- and eighth-grade males in this study, parental educational level did not help to predict smoking initiation. See "Trends

in Cigarette Smoking" in Chapter 3 for a trend analysis of adolescent smoking behavior and level of parental education.

Number of Parents Living in the Home

Several studies document an association between beginning to smoke during childhood or adolescence and living in a single-parent home (Oei, Egan, Silva 1986; Elder, Molgaard, Gresham 1988; Isohanni, Moilanen, Rantakallio 1991; Goddard 1990; see "Sociodemographic Risk Factors for Smoking" in Chapter 3). These findings must be interpreted with caution, since most are from cross-sectional studies that were unable to determine with certainty which occurred first—living in a single-parent home or smoking. If a predictive relationship does exist, a mechanism described by Castro et al. (1987) may help to explain the causal link. Their analyses found that living in a disrupted family system is an initial stressor that appears to predict social nonconformity and affiliation with cigarette-smoking peers. In turn, as will be discussed later in this chapter, both social nonconformity and peer affiliation are significant predictors of cigarette smoking among adolescents.

Developmental Challenges of Adolescence

The life stage of adolescence itself has been a consistent predictor of smoking initiation across studies (Alexander et al. 1983; Coombs, Fawzy, Gerber 1986; Bauman et al. 1990). The transition years from elementary to secondary school seem to be a particularly high-risk time for adolescent initiation of tobacco use (Alexander et al. 1983; Coombs, Fawzy, Gerber 1986). Indeed, both the rate of onset of smoking and the prevalence of regular smoking may level off during the high school years (Kandel and Logan 1984; McDermott et al. 1992). The relationship between adolescence and smoking initiation that is seen in these studies may be related to the developmental challenges of adolescence and to the social meaning of smoking.

Adolescence is characterized by three major types of developmental challenges (Hooker 1991). The first involves physical maturation, particularly sexual maturation, and the establishment of intimate relationships. A second group of challenges involves responses to cultural pressures to begin making the transition to adult roles and responsibilities and to emotional independence from parents. The third area, the personal, involves establishing a coherent sense of self and a set of values to guide future behavior. As adolescence begins, efforts to meet these various challenges are characterized by experimentation and risk-taking behaviors (Konopka 1991). Cigarette smoking is a risk behavior portrayed by

advertising and role models as a way to be attractive to one's peers (see "Contemporary Strategies of the Tobacco Industry" in Chapter 5), and smoking appears to contribute to a positive social image in some settings (Sussman et al. 1987). The functions of smoking established by advertising and adult role models coincide with the challenges of adolescence and thus make this age group the most vulnerable for experimentation and initiation.

Gender

Although current smoking prevalence is roughly equal among males and females in the United States, different historical trends for men and women are evident (Grunberg, Winders, Wewers 1991). Between 1974 and 1985, smoking initiation declined from 45 to 33 percent among young men but remained constant at 34 percent among young women (Fiore et al. 1989; see "Trends in Cigarette Smoking" in Chapter 3). Two studies have discussed the impact of changing gender roles (e.g., more women are in traditionally male positions of authority) on smoking behavior and the resulting difference in meaning that smoking has for males and females (Gritz 1984; Gilchrist, Schinke, Nurius 1989). Though some have suggested that generic factors that influence smoking initiation, such as appealing to the opposite gender, become more pronounced for one gender or the other at certain ages (Chassin et al. 1986), others have further concluded that the complex combinations of risk factors and processes leading to smoking are fundamentally different for females and males (Brunswick and Messeri 1984). In a review of research on gender differences, Clayton (1991) found both considerable similarities (for instance, the influence of peer and parent models) and a number of possible differences between adolescent females and males who smoke. For example, adolescent girls who smoke are more socially skilled (e.g., more at ease with their peers, with strangers, or with adults) than their nonsmoking peers, whereas adolescent boys who smoke tend to lack such skills. Concern about body weight and the belief that smoking might help control body weight may also lead adolescent females to begin smoking (Gritz and Crane 1991; Camp, Klesges, Relyea 1993). Further longitudinal research is needed to investigate gender differences in the determinants of tobacco use and thus to clarify the effect of gender on smoking initiation.

Ethnicity

Research also indicates that the rate of smoking initiation varies among ethnic groups. Sussman et al. (1987) found that among California youth progressing

from seventh to eighth grade, onset rates were higher for Hispanics and blacks than for whites and were lowest for Asians. Similarly, Maddahian, Newcomb, and Bentler (1986) found that among California students followed from 7th through 12th grades, black youth maintained higher rates of smoking than youth of other ethnic groups. White and Hispanic students had intermediate rates of smoking, and Asian youth reported the lowest levels, although this difference decreased over time. Other national reports, however, indicate a higher percentage of smoking among white adolescents and young white adults than among their black or Hispanic counterparts (Remington et al. 1985; Fiore et al. 1989; Bachman et al. 1991; see "Trends in Cigarette Smoking" in Chapter 3). These findings suggest different onset and quitting patterns among ethnic groups, as well as potential regional differences in these patterns.

Maddahian, Newcomb, and Bentler (1986) have proposed antecedents that may help explain these ethnic differences in tobacco use, including income levels that preclude or enable the acquisition of cigarettes, different levels of tobacco availability, and psychosocial influences associated with belonging to a particular ethnic group. These investigators found that among California students, the level of income earned by youth had a significant impact on explaining ethnic differences in tobacco use. However, ethnic differences were virtually eliminated when availability and ease of cigarette acquisition from friends were considered.

Sussman et al. (1987) found that unique combinations of psychosocial factors may be relevant to the ethnic differences in smoking initiation. Three variables—availability of cigarettes, difficulty in refusing offers of cigarettes, and intentions to smoke in the future—were significant predictors among youth from all ethnic groups included in their study. However, only among select groups were certain other variables important predictors of smoking initiation. For instance, social environmental variables (including peer smoking and adult smoking) were important predictors for white youth, but direct personal and social reinforcement variables (including improved self-image and adult and peer approval of smoking) were more important variables for Hispanic youth. General risk-taking behavior was an important additional predictor for black youth only. The strongest additional predictors for Asian students included lack of general self-esteem and decreased school-related self-esteem.

Environmental Factors in the Initiation of Smoking

Environmental factors are those that are external (or perceived as external) to adolescents and yet

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, Creaser, 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 evaluative 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 (Mittelman 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, Creaser, 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