Changing Demographic Patterns of Adolescent Smoking over the Past 23 Years: National Trends from the Monitoring the Future Study

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INTRODUCTION Over the past quarter century, some important changes have occurred in the levels and patterns of cigarette smoking by American young people. Given the known consequences of smoking for morbidity and mortality rates (NCI, 1997) and the enduring nature of smoking habits established during adolescence (Burns *et al.*, 1997; O'Malley *et al.*, 1988), changes in smoking behaviors carry extraordinary implications for the health and longevity of these cohorts of youngsters throughout their lives. In this chapter, the overall trends in adolescent smoking for the period of 1975 to 1998—as well as differential trends for a number of key demographic subgroups—are documented and discussed. Changes in transition rates over the same period are also considered.

METHODS The data presented here all derive from the Monitoring the Future (MTF) study, which has been conducted by the author and his colleagues at the University of Michigan since 1975. Funded by the National Institute on Drug Abuse, MTF tracks and studies young people's use of many substances, ranging from tobacco to heroin (Johnston *et al.*, 1998). Because the study uses a cohort-sequential design in which each graduating class of high school seniors is followed in a panel study for many years past graduation, it can address a wide range of research questions (Johnston *et al.*, 1996).

The present chapter draws upon the cross-sectional data gathered annually from sequential graduating classes of 12th graders since 1975. The chapter will also draw upon data gathered from sequential classes of 8th and 10th graders since 1991, when these two lower grade levels were added to the study's design.

Samples Each year, a large, nationally representative sample of students in public and private schools within the coterminous United States is separately drawn for each of the grade levels (8, 10, and 12). The sample sizes usually range from 16,000 to 18,000 students per grade, with students coming from 125 to 160 schools at each grade level. Nonparticipating schools are replaced in the sample, but students absent on the day of the administration are excluded since no make-up administrations are given. Usually, 9 to 17 percent of students are absent on the day of the administration.

A three-stage stratified random sampling procedure is used. The first stage is the selection of primary sampling units (PSUs), which are counties and/or communities selected by the University of Michigan's Survey Research Center Sampling Section to be included in the study. These counties and/or communities contain populations that are highly representative of the nation as a whole. The second stage is the random selection of schools from a listing of all schools in each PSU, taken with probability proportionate to their estimated size. Schools are invited to participate for a period of 2 years, so a half-sample, which is in itself drawn to be nationally representative, is entering the sample each year. The third stage is the random selection of classrooms within each school, which is done only in those schools for which subsampling is indicated (usually those containing more than 300 students in the grade).

Field Procedures On a mutually agreed-upon day in the spring, University of Michigan staff members go to each selected school to conduct the data collection. Self-administered questionnaires are distributed to the students, usually in their normal classrooms during a normal class period. Class periods last approximately 45 minutes. The confidential questionnaires, of which there are multiple forms, are randomly distributed to individuals. These questionnaires, most of which are 12 pages in length, are self-administered and are answered in optically scannable booklets.

The questionnaires are completed by the students and collected by the University of Michigan staff members, who immediately remove the booklets from the schools and ship them to a central location for optical scanning. The data are cleaned and edited, and cases with high levels of inconsistency and/or improbably high rates of reported drug use are deleted.

Measures Most of the measures reported in this chapter, all of which are contained in all of the questionnaire forms, are based on self-reported data from students. The regions wherein the study is conducted and their population sizes are both derived from census categorization (more detail on the measures may be found in Johnston *et al.*, 1997 & 1998).

Cigarette smoking is among the various measures of the study. Cigarette smoking is measured with two questions. The first, "Have you ever smoked cigarettes?" is used to determine lifetime smoking prevalence (*i.e.*, one or more cigarettes ever smoked). It is also used to determine the prevalence of having ever smoked regularly, which is defined as the proportion of respondents who answer "regularly in the past" or "regularly now." The other question asked is "How frequently have you smoked cigarettes in the past 30 days?" This question is used to determine the prevalence and frequency of current smoking ("past 30 days"), the prevalence of "current daily" smoking (one or more cigarettes per day during the past 30 days), and the prevalence of "current half-pack a day" smoking. In the present chapter, emphasis is given to the prevalence of any cigarette smoking in the past 30 days ("current smoking") and to the prevalence of daily cigarette smoking in the past 30 days ("current daily" smoking).

Among the demographic and other characteristics to be discussed here are gender, college plans, socioeconomic level of the parents (as measured by their average education level), region, population density, and racial/ethnic identity.

- Gender is self-reported.
- College plans are measured by the question "How likely is it that you will do each of the following things?" One of the choices given is "Graduate from college (four-year program)." Those who respond to this choice with "probably will" or "definitely will" are considered to be college-bound.
- Parental education is measured as the mean of two identical questions. One question asks for the highest level of education obtained by the mother and the other asks for that obtained by the father. Stepparents and foster parents can be substituted for natural parents, where appropriate, and one missing data case is allowed.
- Race/ethnicity is measured by the answer to a single question: "How do you describe yourself?" Because of limited sample sizes for most minority groups, the only data presented here are from those identifying themselves as "White (Caucasian)," as "Black or African-American," or as any one of four categories of Hispanics.

It should be noted that, over the life of the study, high priority has been given to keeping the method and measures constant, so that observed shifts in outcomes will not be caused by method artifacts.

In general, measures of substance use, including smoking, have shown high levels of reliability. Smoking measures, in particular, have shown a high level of stability across the years (O'Malley *et al.*, 1983). Good evidence of the validity of these measures also exists (see Johnston *et al.*, 1998).

RESULTS Table 2-1 presents the data on the smoking trends observed over the life of the study for 8th-, 10th-, and 12th-grade students. Note that data are only available from 1991 to 1998 for the 8th and 10th grades, but are available from 1975 to 1998 for 12th grade—a 23-year span. Because of the longer span covered, emphasis will be given here to the 12th-grade data, though the relevant tabular data are included here for the lower two grades as well.

Overall Trends The reader is reminded that "cohort effects" (lasting differences across age between different birth or class cohorts) have generally predominated over period effects (differences defined by the calendar year in which they occur) in explaining smoking (Burns *et al.*, 1997; O'Malley *et al.*, 1988). Therefore, what we observe to be happening among 12th graders during a given historical period may be an "echo" of changes first observable among those same cohorts at earlier ages and, therefore, in a prior historical period. For example, Figure 2-1 gives trends in lifetime prevalence of cigarette use for various grade levels using the retrospective grade-of-first-use data from each of the 12th-grade classes. It shows that the downturn in smoking observed among 12th graders in the years 1977-1981 was actually observable in earlier time periods, when those same students were in lower grades.

Table 2-1

Long-Term Trends in Prevalence of Cigarettes for Eighth, Tenth, and Twelfth Graders

	Year											
Grade Level	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**
Lifetime												
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	73.6	75.4	75.7	75.3	74	71	71	70.1	70.6	69.7	68.8	67.6
Thirty-Day												
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	36.7	38.8	38.4	36.7	34.4	30.5	29.4	30	30.3	29.3	30.1	29.6
Daily												
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	26.9	28.8	28.8	27.5	25.4	21.3	20.3	21.1	21.2	18.7	19.5	18.7
1/2 Pack+ per Day												
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	17.9	19.2	19.4	18.8	16.5	14.3	13.5	14.2	13.8	12.3	12.5	11.4
Approx. N's												
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	9,400	15,400	17,100	17,800	15,500	15,900	17,500	17,700	16,300	15,900	16,000	15,200

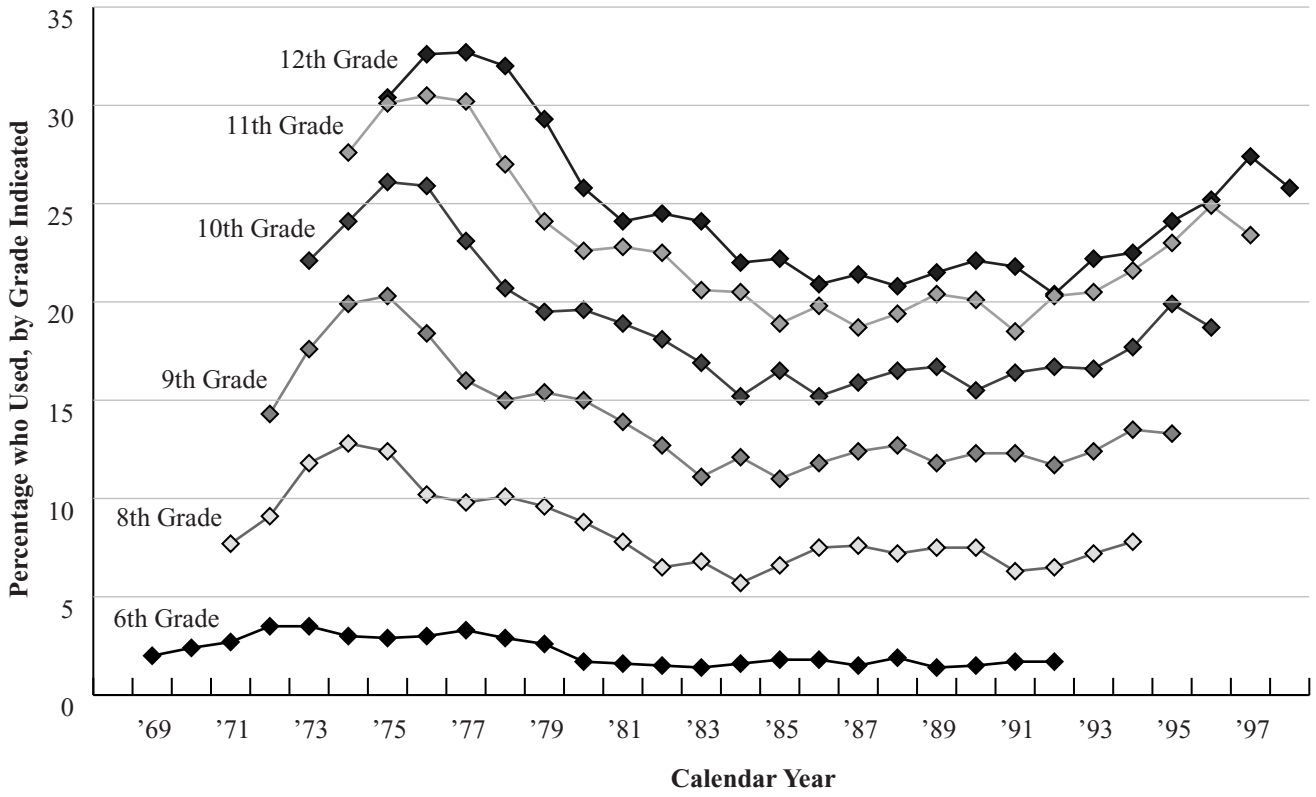
Table 2-1 (continued)

	Year												Change
Grade Level	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1997–1998**
Lifetime													
8th Grade	—	—	—	—	44	45.2	45.3	46.1	46.4	49.2	47.3	45.7	–1.6
10th Grade	—	—	—	—	55.1	53.5	56.3	56.9	57.6	61.2	60.2	57.7	–2.5*
12th Grade	67.2	66.4	65.7	64.4	63.1	61.8	61.9	62	64.2	63.5	65.4	65.3	–0.1
Thirty-Day													
8th Grade	—	—	—	—	14.3	15.5	16.7	18.6	19.1	21	19.4	19.1	–0.3
10th Grade	—	—	—	—	20.8	21.5	24.7	25.4	27.9	30.4	29.8	27.6	–2.2*
12th Grade	29.4	28.7	28.6	29.4	28.3	27.8	29.9	31.2	33.5	34	36.5	35.1	–1.4
Daily													
8th Grade	—	—	—	—	7.2	7	8.3	8.8	9.3	10.4	9	8.8	–0.2
10th Grade	—	—	—	—	12.6	12.3	14.2	14.6	16.3	18.3	18	15.8	–2.2**
12th Grade	18.7	18.1	18.9	19.1	18.5	17.2	19	19.4	21.6	22.2	24.6	22.4	–2.2*
1/2 Pack+ per Day													
8th Grade	—	—	—	—	3.1	2.9	3.5	3.6	3.4	4.3	3.5	3.6	0.1
10th Grade	—	—	—	—	6.5	6	7	7.6	8.3	9.4	8.6	7.9	–0.7
12th Grade	11.4	10.6	11.2	11.3	10.7	10	10.9	11.2	12.4	13	14.3	12.6	–1.7*
Approx. N's													
8th Grade	—	—	—	—	17,500	18,600	18,300	17,300	17,500	17,800	18,600	18,100	
10th Grade	—	—	—	—	14,800	14,800	15,300	15,800	17,000	15,600	15,500	15,000	
12th Grade	16,300	16,300	16,700	15,200	15,000	15,800	16,300	15,400	15,400	14,300	15,400	15,200	

*Note: Level of significance of difference between the 2 years indicated: * = 0.05, ** = 0.01, *** = 0.001.*
Source: The Monitoring the Future Study, University of Michigan.

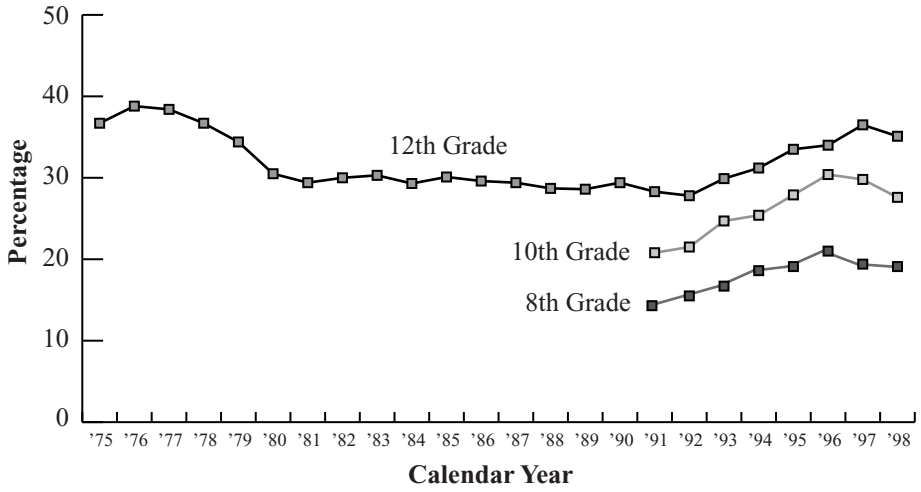
Figure 2-1

Percentage of Cigarette Smoking on a Daily Basis: Trends in Lifetime Prevalence for Earlier Grade Levels (Based on Retrospective Reports from 12th Graders)



SOURCE: The Monitoring the Future Study, University of Michigan.

Figure 2-2
Trends in 30-Day Prevalence of Cigarette Smoking for 8th, 10th, and 12th Graders



SOURCE: The Monitoring the Future Study, University of Michigan.

The data in Figure 2-1 show that an increase in youth smoking initiation was occurring in the 1970s (and possibly earlier); the increase was followed by a period of decline, and then a long period in which initiation rates, as well as current smoking rates, remained level (Figure 2-2). Beginning in the 1990s, however, all three grades showed a nearly simultaneous period of increasing current and daily smoking rates (though the 12th graders were 1 year later than the lower grades in turning up and, subsequently, in turning down). This nearly simultaneous movement suggests that a "period effect" occurred in the 1990s in addition to the more usual cohort and age effects. Furthermore, virtually all demographic subgroups exhibited this upturn (Tables 2-2 and 2-3). It has been suggested that these facts in combination imply that contemporaneous culture-wide forces were at work. Among the most plausible possibilities are 1) changes in the quantity and the quality (more youth-oriented) of cigarette advertising and promotion, 2) growing exposure of youths to smoking by popular role models in movies and television (both on and off screen), and 3) a decline in the price of cigarettes.

After a substantial and proportional increase in smoking rates among all three grades during the early and mid-1990s, evidence of a turnaround began to appear in 1997 (for the 8th and 10th graders) and in 1998 (for the 12th graders) and rates began to decline. It is suspected that the extensive adverse publicity associated with the emerging tobacco settlement and the Congressional and Administration debate over that settlement played an important role in bringing about this modest turnaround. If so, the nascent decline may not be one that continues, since the public debate has now subsided considerably.

Table 2-2
Cigarettes: Trends in 30-Day Prevalence of Use by Subgroups for Eighth and Tenth Graders

	Percentage of 8th Graders Who Used in the Last 30 Days								
***Class of*:**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**Change**
***Approx . N*:**	*17,500*	*18,600*	*18,300*	*17,300*	*17,500*	*17,800*	*18,600*	*18,100*	**1997–1998**
Total	14.3	15.5	16.7	18.6	19.1	21.0	19.4	19.1	–0.3
Sex									
Male	15.5	14.9	17.2	19.3	18.8	20.6	19.1	18.0	–1.1
Female	13.1	15.9	16.3	17.9	19.0	21.1	19.5	19.8	0.3
College Plans									
0 or <4 Years	29.2	31.9	34.1	36.6	36.5	39.2	40.0	40.1	0.1
4-Year Degree	11.8	13.1	14.3	16.1	16.8	18.2	16.9	16.5	–0.4
Region									
Northeast	13.7	14.4	15.0	17.8	18.6	22.1	18.0	15.6	–2.4
North Central	15.5	16.5	16.3	18.5	20.9	23.2	20.0	22.3	2.3
South	15.7	17.0	18.2	19.5	19.4	21.1	21.0	21.1	0.1
West	10.0	12.2	16.4	18.0	16.5	17.1	17.1	15.1	–2.0
Population Density									
Large MSA	12.8	15.0	14.1	15.5	16.5	19.4	15.8	16.4	0.6
Other MSA	14.9	15.3	17.8	20.7	19.4	21.4	19.7	17.7	–2.0
Non-MSA	14.8	16.4	17.9	17.8	21.5	22.1	22.8	24.8	2.0
Parental Education[a]									
1.0–2.0 (Low)	26.2	24.1	23.3	26.1	25.3	26.5	26.9	26.7	–0.2
2.5–3.0	16.4	16.9	19.8	20.6	22.7	24.4	22.4	23.9	1.5
3.5–4.0	13.9	14.9	17.4	20.1	20.8	21.4	20.9	21.4	0.5
4.5–5.0	10.1	13.3	12.5	14.9	14.9	18.4	16.2	14.2	–2.0
5.5–6.0 (High)	11.3	11.5	13.3	15.1	14.5	17.3	15.3	13.8	–1.5
Race (2-yr avg.)[b]									
White	—	16.2	17.8	18.9	20.7	22.7	22.8	21.5	–1.3
Black	—	5.3	6.6	8.7	8.9	9.6	10.9	10.6	–0.3
Hispanic	—	16.7	18.3	21.3	21.6	19.6	19.1	20.1	1.0

Table 2-2 (continued)

	Percentage of 10th Graders Who Used in the Last 30 Days								
***Class of*:**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**Change**
***Approx. N*:**	*14,800*	*14,800*	*15,300*	*15,800*	*17,000*	*15,600*	*15,500*	*15,000*	**1997–1998**
Total	20.8	21.5	24.7	25.4	27.9	30.4	29.8	27.6	–2.2*
Sex									
Male	20.8	20.6	24.6	26.6	27.7	30.1	28.2	26.2	–2.0
Female	20.7	22.2	24.5	23.9	27.9	30.8	31.1	29.1	–2.0
College Plans									
0 or <4 Years	36.5	35.0	41.9	42.2	46.3	46.2	47.2	45.2	–2.0
4-Year Degree	17.3	18.6	21.0	21.7	24.7	27.8	26.8	24.5	–2.3 *
Region									
Northeast	22.4	21.9	27.1	24.5	27.8	31.7	29.3	30.1	0.8
North Central	22.9	24.3	26.0	28.8	30.1	32.5	31.7	29.5	–2.2
South	21.2	19.8	24.0	25.7	30.8	33.4	32.2	29.8	–2.4
West	16.7	20.2	21.2	20.1	19.6	20.8	23.2	19.6	–3.6
Population Density									
Large MSA	19.7	21.6	22.5	22.3	23.3	26.2	26.6	22.5	–4.1 *
Other MSA	20.3	20.3	23.8	26.3	28.9	31.1	28.9	26.6	–2.3
Non-MSA	22.7	23.7	28.2	26.7	31.3	33.9	34.9	35.7	0.8
Parental Education[a]									
1.0–2.0 (Low)	23.5	28.4	29.5	26.4	30.9	28.7	28.2	28.0	–0.2
2.5–3.0	24.1	23.3	28.0	29.1	33.2	33.8	33.2	33.0	–0.2
3.5–4.0	20.4	20.6	24.8	26.0	27.8	31.6	30.9	27.3	–3.6 *
4.5–5.0	18.5	19.5	20.1	22.6	25.9	28.7	28.5	25.7	–2.8
5.5–6.0 (High)	18.5	18.9	21.4	20.7	21.8	27.8	24.6	22.5	–2.1
Race (2-yr avg.)[b]									
White	—	24.1	26.0	27.8	29.7	32.9	34.4	33.2	–1.2
Black	—	6.6	7.5	9.8	11.5	12.2	12.8	13.7	0.9
Hispanic	—	18.3	20.5	19.4	21.4	23.7	23.0	21.3	–1.7

** = 0.05 Level of significance of difference between the two most recent classes:*

— indicates data not available. See Table D-43 for the number of subgroup cases and Appendix B for definition of variables in Johnston, O'Malley, and Bachman (1998), National Survey Results on Drug Use from the Monitoring the Future Study, 1975–1998, Volume I: Secondary School Students. *Rockville, MD: National Institute on Drug Abuse.*

[a] *Parental education is an average score of mother's education and father's education.*

[b] *To derive percentages for each racial subgroup, data for the specified year and the previous year have been combined to increase subgroup sample sizes and thus provide more stable estimates.*

Source: The Monitoring the Future Study, University of Michigan.

Table 2-3.
Cigarettes: Trends in 30-Day Prevalence of Use by Subgroups for Twelfth Graders

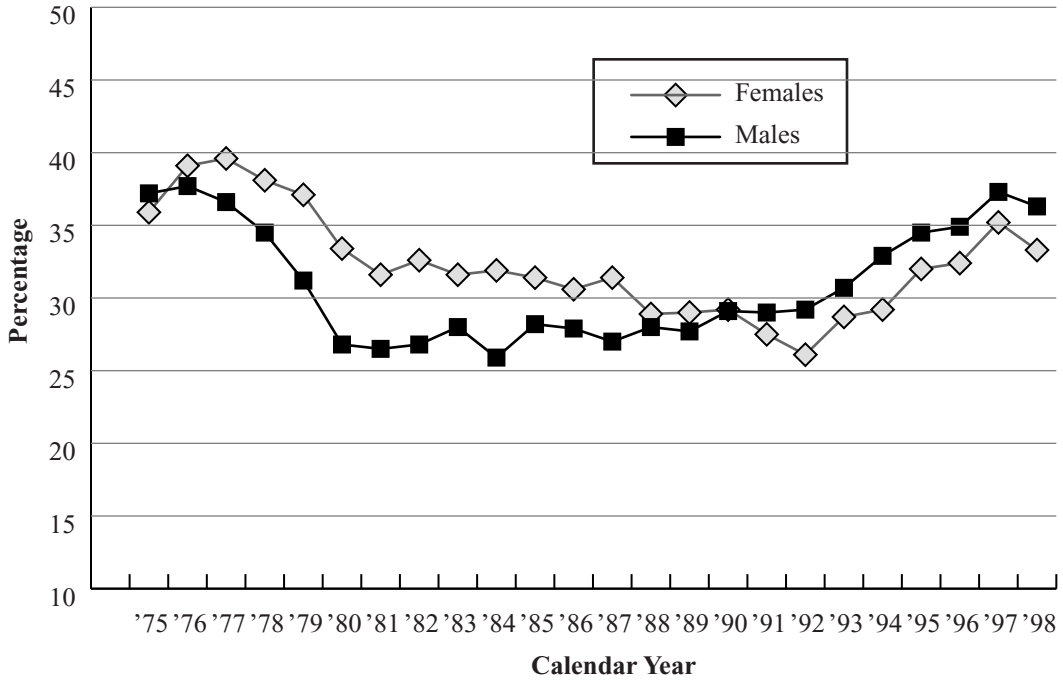
	Percentage Who Used in the Last 30 Days											
Class of:	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**
Approx. N:	*9,400*	*15,400*	*17,100*	*17,800*	*15,500*	*15,900*	*17,500*	*17,700*	*16,300*	*15,900*	*16,000*	*15,200*
Total	36.7	38.8	38.4	36.7	34.4	30.5	29.4	30.0	30.3	29.3	30.1	29.6
Sex												
Male	37.2	37.7	36.6	34.5	31.2	26.8	26.5	26.8	28.0	25.9	28.2	27.9
Female	35.9	39.1	39.6	38.1	37.1	33.4	31.6	32.6	31.6	31.9	31.4	30.6
College Plans												
0 or <4 Years	—	46.3	46.2	44.6	43.0	39.6	38.1	38.7	38.0	37.9	40.5	38.5
4-Year Degree	—	29.8	29.4	27.4	26.0	22.3	22.3	22.1	23.3	22.7	22.8	24.0
Region												
Northeast	40.1	41.8	43.0	40.6	37.0	34.1	31.5	32.1	34.6	33.5	34.2	35.2
North Central	39.5	41.3	40.5	39.0	36.6	31.5	32.4	33.5	33.2	31.4	34.1	32.5
South	36.2	39.1	37.6	35.7	35.4	31.8	28.9	29.4	28.7	28.6	25.6	26.1
West	26.3	28.3	27.7	27.3	24.8	21.2	21.8	20.4	21.8	22.9	26.3	23.3
Population Density												
Large MSA	39.7	40.4	40.9	37.5	33.4	31.2	30.6	32.1	30.8	31.3	31.9	30.8
Other MSA	35.1	35.9	36.1	34.3	33.5	29.7	27.4	27.8	29.1	28.2	28.5	28.0
Non-MSA	36.7	40.9	39.2	39.4	36.4	30.9	30.9	31.2	31.5	29.3	30.8	31.0
Parental Education[a]												
1.0–2.0 (Low)	37.2	43.2	39.6	38.1	38.1	32.7	32.5	32.6	32.7	33.6	32.3	28.6
2.5–3.0	37.0	41.2	40.8	39.3	35.9	34.2	31.7	32.0	32.2	31.8	32.3	32.3
3.5–4.0	31.9	35.3	37.3	34.0	33.3	28.0	28.2	29.0	28.0	28.1	29.7	29.7
4.5–5.0	32.3	35.0	33.0	32.6	30.1	25.7	26.0	25.5	27.8	25.2	27.7	26.4
5.5–6.0 (High)	26.8	30.8	32.8	31.9	29.6	24.0	22.5	25.1	25.5	23.7	22.6	26.7
Race (2-yr avg.)[b]												
White	—	—	38.3	37.6	36.0	33.0	30.5	30.7	31.3	31.2	31.3	31.9
Black	—	—	36.7	32.7	30.2	26.8	23.7	21.8	21.2	19.3	18.1	16.9
Hispanic	—	—	35.7	32.8	26.8	22.6	23.2	24.7	24.7	25.3	25.5	23.7

Table 2-3 (continued)

	Percentage Who Used in the Last 30 Days												
***Class of*:**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**Change**
***Approx. N*:**	*16,300*	*16,300*	*16,700*	*15,200*	*15,000*	*15,800*	*16,300*	*15,400*	*15,400*	*14,300*	*15,400*	*15,200*	**1997–1998**
Total	29.4	28.7	28.6	29.4	28.3	27.8	29.9	31.2	33.5	34.0	36.5	35.1	–1.4
Sex													
Male	27.0	28.0	27.7	29.1	29.0	29.2	30.7	32.9	34.5	34.9	37.3	36.3	–1.0
Female	31.4	28.9	29.0	29.2	27.5	26.1	28.7	29.2	32.0	32.4	35.2	33.3	–1.9
College Plans													
0 or <4 Years	39.7	37.5	38.0	37.5	38.1	38.6	37.3	40.9	43.5	45.0	45.7	46.7	1.0
4-Year Degree	24.3	24.4	24.1	25.4	24.2	23.8	27.3	28.0	29.9	30.8	33.1	31.3	–1.8
Region													
Northeast	34.1	31.2	29.4	31.9	30.5	29.6	34.2	33.2	34.4	38.5	40.6	35.9	–4.7
North Central	31.7	31.1	34.9	34.0	34.6	31.7	33.2	36.2	37.8	37.7	39.3	40.0	0.7
South	26.0	28.0	26.4	26.1	25.4	26.4	29.0	30.7	33.5	33.2	35.0	34.3	–0.7
West	26.6	23.9	22.7	25.1	23.2	22.8	22.9	24.0	26.5	24.4	30.5	29.1	–1.4
Population Density													
Large MSA	29.3	26.9	25.9	27.9	26.2	25.6	29.5	29.0	33.9	32.1	34.9	32.9	–2.0
Other MSA	28.2	28.3	28.2	29.6	29.3	26.9	29.8	31.1	31.7	32.6	35.7	34.2	–1.5
Non-MSA	31.8	31.4	32.2	30.4	28.6	31.5	30.3	33.8	36.2	38.2	40.0	39.7	–0.3
Parental Education													
1.0-2.0 (Low)	28.8	28.1	25.4	26.3	31.3	27.1	26.5	26.2	31.2	31.5	31.2	32.3	1.1
2.5-3.0	31.4	29.9	30.8	30.8	28.7	30.3	30.4	32.8	35.0	35.5	36.5	36.0	–0.5
3.5-4.0	28.8	27.8	29.4	29.3	28.4	27.8	29.9	31.4	33.2	33.2	35.6	36.7	1.1
4.5-5.0	27.6	28.6	27.0	29.1	26.9	25.8	30.1	32.0	32.6	34.5	37.5	34.2	–3.3 *
5.5-6.0 (High)	29.3	27.8	26.3	28.6	27.1	25.5	30.5	30.4	34.0	32.9	38.5	33.1	–5.4 *
Race (2-yr avg.)													
White	32.1	32.2	32.2	32.3	32.2	31.8	33.2	35.2	36.6	38.1	40.7	41.7	1.0
Black	14.2	13.3	12.6	12.2	10.6	8.7	9.5	10.9	12.9	14.2	14.3	14.9	0.6
Hispanic	22.7	21.9	20.6	21.7	24.0	25.0	24.2	23.6	25.1	25.4	25.9	26.6	0.7

*Level of significance of difference between the two most recent classes: * = 0.05, ** = 0.01, *** = 0.001. "*
"—" indicates data not available.
See Johnston et al., 1998, Table D-44 for the number of sub group cases and Johnston et al., 1998, Appendix B for definition of variables.
Source: The Monitoring the Future Study, the University of Michigan.
[a]*Parental education is an average score of mother's education and father's education.*
[b]*To derive percentages for each racial subgroup, data for the specified year and the previous year have been combined to increase subgroup sample sizes and thus provide more stable estimates.*

Figure 2-3
Trends in 30-Day Prevalence of Cigarette Smoking by Gender for 12th Graders

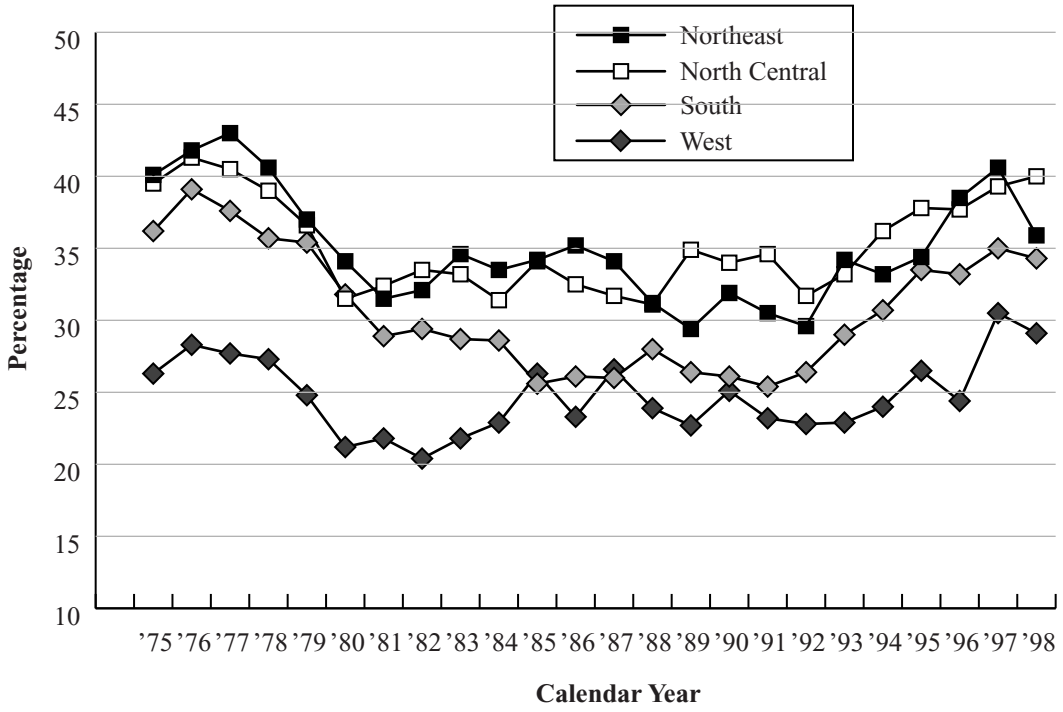


SOURCE: The Monitoring the Future Study, University of Michigan.

Gender Differences Before this study was launched in 1975, earlier studies had shown that males tended to have higher rates of smoking than females (U.S. DHHS, 1994). However, by 1976, females not only caught up to their male counterparts in 12th grade, but also attained a higher 30-day prevalence of smoking for some years thereafter (Figure 2-3). By 1990, however, males closed the gap and have been slightly more likely to smoke than females in the years since. Because a slightly higher proportion of male current smokers smoke at the "half-pack-a-day" level, there was practically no gender difference in that measure in the years of 1979-1990, after which period the "half-pack-a-day" smoking level for males in the 12th grade exceeded that for females in the same grade.

Differences by Region There have been some consistent, long-term differences in student smoking rates across the four major census regions. As Figure 2-4 illustrates, the West consistently has had the lowest rate of smoking, at least as far back as 1975. The Northeast and North Central generally have had the highest (and roughly equivalent) rates. The South has tended to fall in the middle. However, the South showed the greatest decline in smoking rates in the first part of this 23-year study, and then the greatest increase from 1985 to 1997, thus bringing its smoking rates close to the levels observed in the Northeast and North Central.

Figure 2-4
Trends in 30-Day Prevalence of Cigarette Smoking by Region for 12th Graders



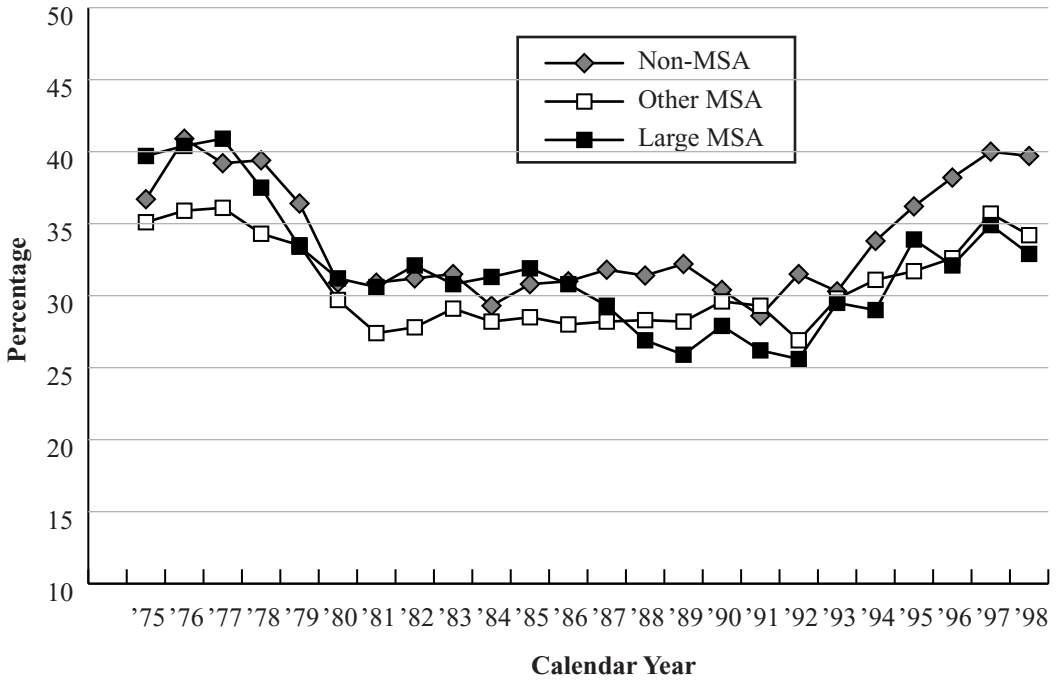
SOURCE: The Monitoring the Future Study, University of Michigan.

It should be noted that, over this 23-year interval, the proportion of the sample coming from each of the four regions has changed somewhat. In proportion to the total sample size, the South has shown the most growth, followed by the West, while the Northeast and North Central have both declined by roughly three percentage points each. Insofar as regional differences reflect cultural differences, this geographical redistribution of the population could be having subtle effects on the smoking rates.

Differences by Population Density

Three broad levels of population density have been distinguished for these analyses: self-representing metropolitan statistical areas, or "large MSAs" (currently, the 16 largest cities); "other MSAs" as defined by the Census; and non-metropolitan areas ("non-MSAs"). As Figure 2-5 shows, there were no very great differences in 30-day smoking prevalence among these three strata from 1975 to 1993, although the areas categorized as "other MSAs" tended to have slightly lower than average rates for much of that time period. After 1993, the increase in smoking rates was sharpest in the non-metropolitan ("non-MSA") stratum; by the late 1990s, this stratum had the highest smoking rate. A similar divergent change can be seen at grades 8 and 10 as well (see Table 2-2).

Figure 2-5
Trends in 30-Day Prevalence of Cigarette Smoking by Population Density for 12th Graders



NOTE: Census categories: Large MSA = 18 largest Standard Metropolitan Areas, Other MSA = all other Metropolitan Statistical Areas, Non-MSA = areas not designated as Metropolitan Statistical Areas
SOURCE: The Monitoring the Future Study, University of Michigan.

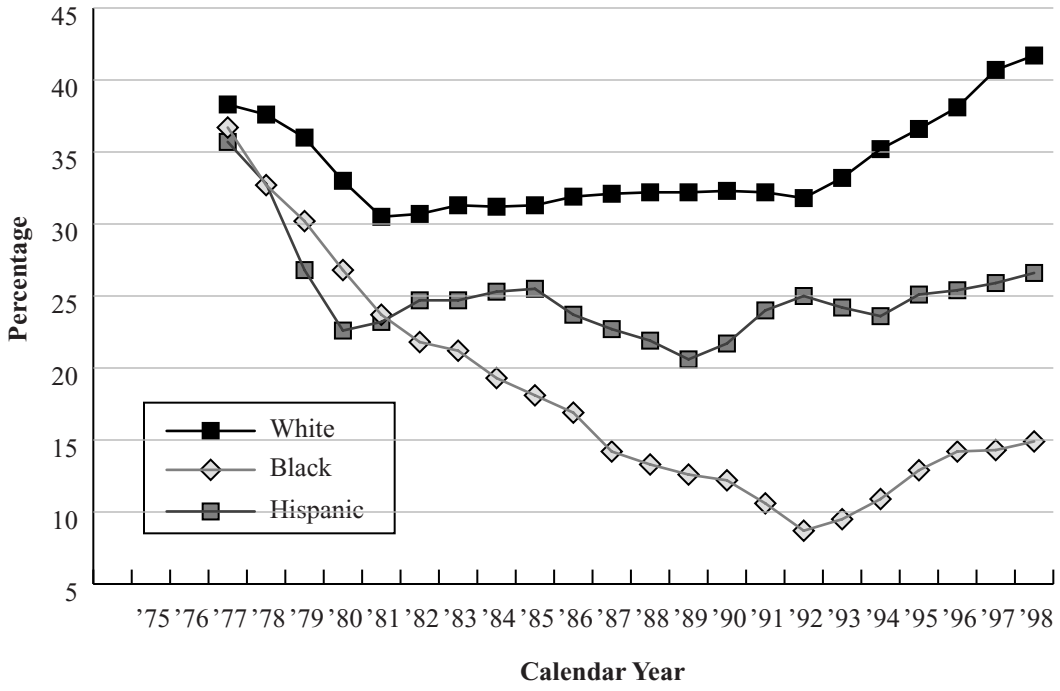
Over the 23-year life of the study, the proportion of the national sample coming from non-metropolitan areas has declined considerably, by about 7 to 10 percentage points. This reflects the continuation of longer term trends in migration to urban areas.

Differences by Race/Ethnicity

In recent years, perhaps the most dramatic differences in trends in youth smoking associated with demographic subgroups have occurred in relation to the dimension of race/ethnicity. Figure 2-6 and Table 2-3 show that there was little difference in smoking rates in 1976 among Whites, Hispanics, and African Americans. However, during the period of general decline in tobacco use (1977–1981), smoking rates among Blacks and Hispanics declined more than among Whites. Thereafter, the smoking rates of Hispanics moved more or less in parallel with those of Whites; that is, their use stayed stable, although at somewhat lower levels, through 1992. However, smoking rates among African American students continued to decline steadily from 1981 to 1992[1], opening a very large differential

1. Note that a 2-year moving average has been presented here for the three racial/ethnic groups in order to smooth out some of the random fluctuations that result from the limited annual sample sizes for the two minority groups.

Figure 2-6
Trends in 30-Day Prevalence of Cigarette Smoking by Race/Ethnicity for 12th Graders



SOURCE: The Monitoring the Future Study, University of Michigan.

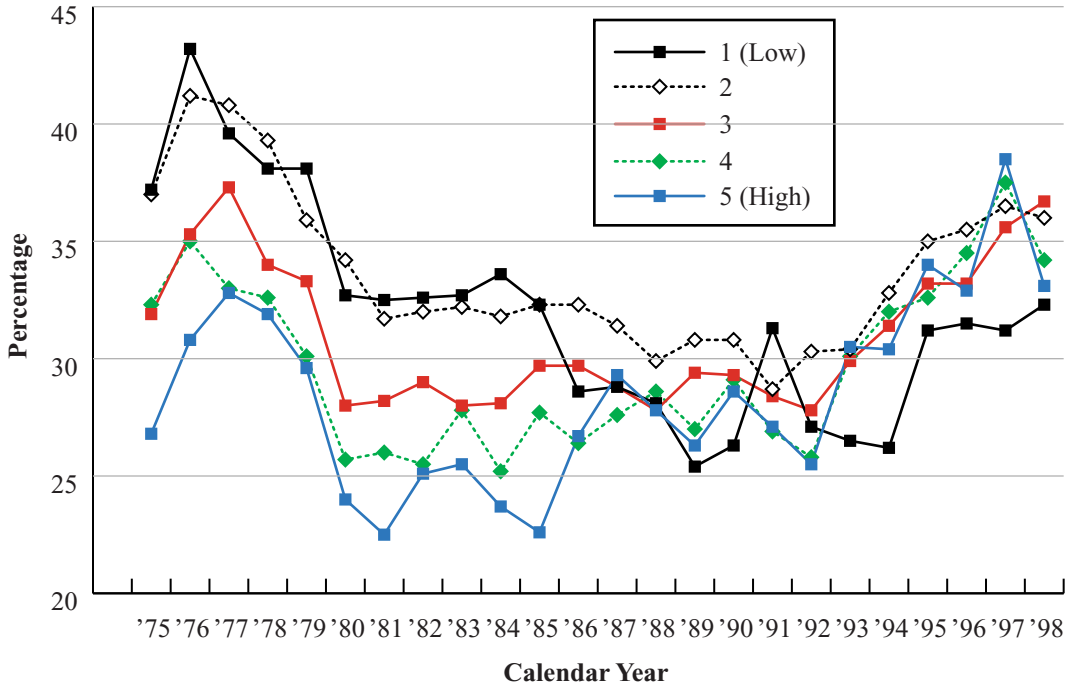
with the smoking rates of Whites and a sizeable differential with Hispanic smoking rates. After 1992, all three racial/ethnic groups showed some increase in smoking rates, though the increase was least among Hispanics.

As a proportion of the national sample of 12th-grade students, the Hispanic population has grown considerably over the 23-year interval (by roughly 8 percentage points), the Black population has grown modestly (by about 2 percentage points), and the White population has declined substantially (by about 10 percentage points). Had these changes in ethnic composition not been taking place, one might have expected somewhat more of an increase in the overall smoking rates than was actually observed (since the two minority groups generally have lower smoking rates than Whites). It is possible, therefore, that this change in the ethnic composition of the population masked some of the effects of other cultural forces that were leading to increased smoking rates among youths.

Differences Associated with Parents' Educational Level

Over the life of the study, an important change in the association between parental education and the cigarette smoking rates of their children has gradually emerged with the 12th graders. As Figure 2-7 illustrates, there was a fair-sized negative association between parental education and children's smok-

Figure 2-7
Trends in 30-Day Prevalence of Cigarette Smoking by Parents' Average Education for 12th Graders



NOTE: Parental education is an average score of mother's education and father's education reported on the following scale: 1. Completed grade school or less, 2. Some high school, 3. Completed high school, 4. Some college, 5. Completed college, 6. Graduate or professional school after college. Missing data were allowed on one of the two variables.
SOURCE: The Monitoring the Future Study, University of Michigan.

ing rates at the beginning of the study. In the last half of the 1970s, this association maintained, as all five parental education strata distinguished in the figure showed a decline in rates of smoking among the children from the mid-1970s through 1981. However, for roughly the decade that followed, this association gradually disappeared. During this time, smoking rates among children in the higher parental education strata gradually rose and rates among children in the lower parental education strata declined some (note that these changes pretty much canceled each other out in the overall smoking statistics). Since around 1990, there has been little difference in children's smoking rates among the various parental education strata, with the exception that the lowest stratum (which is fairly small) did not show as large an increase in smoking rates in the 1990s as did the other strata.

Of course, some of this change in the association between parental education and smoking rates may be explained in terms of the differential racial/ethnic trends just discussed (since race/ethnicity is correlated with social class). Another explanation for this change may be the changing proportions represented by the three racial/ethnic groups in the total sample of

the study. It should be noted that, in the lower grades, there still is a negative association between parental education and current smoking (Table 2-2). The fact that this association is not currently observable among 12th graders could reflect social class differences in the age at which smoking is initiated, but not in the smoking rate eventually attained. It could also indicate that differential rates of dropping out of school among the different social strata lead to a leveling of differences by 12th grade.

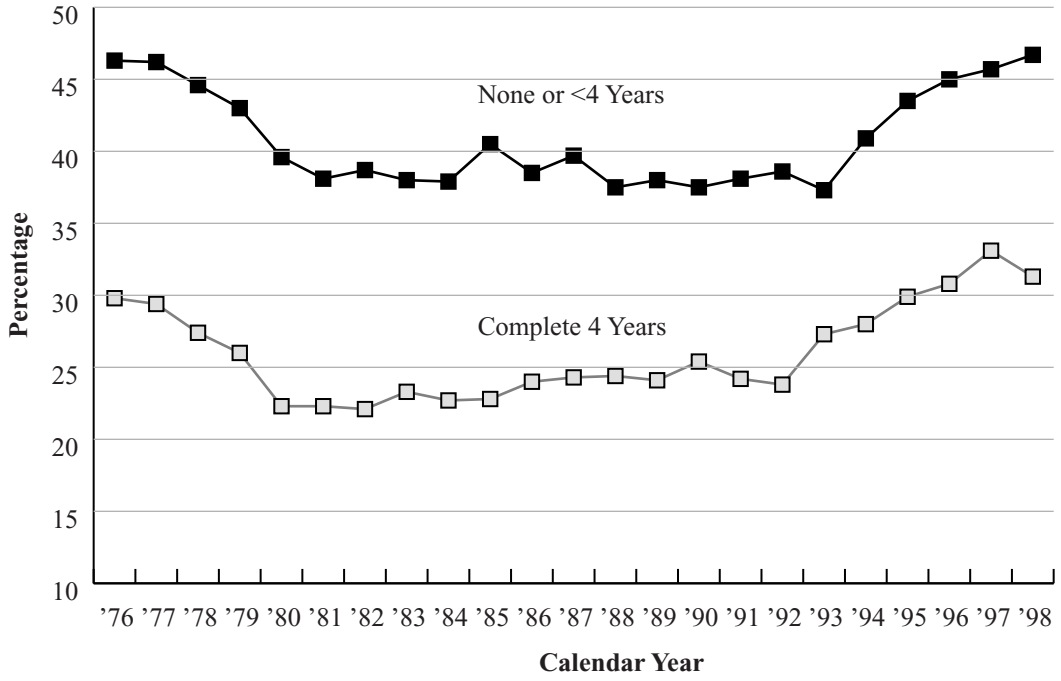
Overall, the average educational level of students' parents was rising steadily over the 23-year, historical interval covered by the study. Between 1975 and 1998, the size of the group representing the lowest educational stratum fell from about 20 percent of the national sample to about 8 percent, whereas the proportion in the top two strata increased from roughly 20 percent to roughly 38 percent of the sample (each level is defined by an absolute level of educational attainment). Given the nature of the changes in adult smoking that were occurring during that period—overall adult smoking rates were declining—and the fact that an increasing proportion of students were being raised by more educated adults, one would have expected that substantially more students were being exposed to constructive parental influences with regard to smoking. If this conjecture is true, then the impact of other cultural influences that have caused youth smoking rates to rise in the 1980s and 1990s may have been partially masked or offset by these more positive parental influences.

Differences Associated with College Plans

Educational aspirations and eventual educational attainment have long been strong negative correlates of cigarette smoking (Bachman *et al.*, 1978; Johnston, 1973). Thus, it comes as no surprise that, across the full 23-year interval of this study, data have shown that those who plan to attend college have been much less likely to smoke than those who do not (Figure 2-8). There have been two important changes in this relationship, however. One change was that the proportional difference between the two groups (college-bound vs. non-college-bound) narrowed considerably as the ratio of current smoking among the college-bound students rose from 57 percent of the non-college-bound rate in 1982 to 73 percent of that rate in 1993. The other change was that the proportion of 12th graders planning to attend college rose considerably—a trend that might have been predictable from the fact that the average educational level of their parents also had been rising.

The proportion of the sample claiming to be college-bound increased from about 51 percent of the sample in 1976 to about 79 percent by 1998—an increase of more than 50 percent. Given the long-standing differences in smoking rates for these two groups, one might have expected the shift to reduce the overall level of youth smoking. Clearly, this did not happen, which again could mean that other cultural influences working in the opposite direction more than offset any effects of educational aspiration. It could be, however, that the differences in educational aspirations were really proxies for other things that differentiated the two groups, things that perhaps did not shift over time (*e.g.*, academic ability). Therefore, the

Figure 2-8
Trends in 30-Day Prevalence of Cigarette Smoking by College Plans for 12th Graders



SOURCE: The Monitoring the Future Study, University of Michigan.

migration into the college-bound camp simply narrowed the differences between these two groups regarding those other factors and, thus, narrowed the differences in their smoking rates as well.

Changes in Transition Rates across Time

Changes in current smoking levels are brought about both by changes in initiation rates and changes in rates of transition to various stages of involvement with smoking. Table 2-4 provides trend data on a number of such transition rates along with other ratios of interest. The data show that there have been some systematic trends over the period 1975-1998 and, as might be expected, they correlate in general with changes in the level of current smoking.

For example, in the period of declining rates of current smoking among 12th graders (1977 through 1981), a number of transition rates were also declining. The rate of transition from "lifetime" use to current ("30-day") use declined from 0.51 to 0.41; rates from "lifetime" use to "current daily" use declined from 0.38 to 0.29; and rates from "lifetime" use to "current half-pack-a-day" use declined from 0.26 to 0.19. Similarly, transition from "lifetime" use to ever smoking "regularly" fell from 0.43 to 0.34 and the

subsequent transition from ever smoking "regularly" to current smoking fell from 0.84 to 0.79. Note the much smaller proportional shift in the transition rate for those who already have established a regular smoking pattern.

During the long period of stability in current smoking rates among 12th graders (1981 through 1992), most of the transition rates remained fairly steady. Note, however, that the ratio of "current half-pack-a-day" smoking to any current smoking, which is not a transition rate, continued to decline after 1981, from 0.46 in 1981 to 0.37 in 1988, before stabilizing.

Finally, in the period of increasing current smoking rates among 12th graders (1992 through 1997), most of the transition rates increased. Again, the ratio of "half-pack-a-day" smoking to current smoking moved differently, this time holding steady at around 0.36 to 0.39, which was about where it was in 1986.

Table 2-4 also shows that, during the life of the study, there was a downward shift in the proportion of current daily smokers who were smoking at a level of half-pack a day or more. That proportion fell from 0.68 in 1978 to 0.58 by 1991, where it has remained. This downward shift of smoking levels, in theory, could have important long-term health consequences for the smokers if more of the daily smokers could maintain a lighter habit. However, it is quite possible that this shift reflects more the effects of increasing environmental constraints on smoking in the high schools during this historical period rather than any lasting shift in the self-restraint of smokers. If so, the ratio would be expected to shift back up to prior levels of smoking after these graduating classes leave high school and its constraints.

The fact that the transition rate from regular use to current smoking is so high, and has changed so little over the years, is consistent with the notion that a pattern of regular smoking is hard to change once it is established. This transition seems to have been least affected by whatever social forces brought about the changes in initiation and continuation of cigarette smoking at the earlier stages of involvement.

Table 2-5 shows the rate of transition from "ever smoking" to "current smoking" for all of the various demographic subgroups discussed above. These differential trends in the transition rates (which are the complement of the quitting rate) help to explain some of the diverging subgroup trends discussed above. In particular, note how substantially the transition rate fell (or the rate of discontinuing smoking rose) among African American adolescents during the period 1976-1998.

Table 2-4
Trends in Various Smoking Events and in Transition Rates across Them: Twelfth Graders, 1975–1998

	Percentage Who Used											
Class of:	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**
Approx. N:	*9400*	*15400*	*17100*	*17800*	*15500*	*15900*	*17500*	*17700*	*16300*	*15900*	*16000*	*15200*
Lifetime	73.6	75.4	75.7	75.3	74.0	71.0	71.0	70.1	70.6	69.7	68.8	67.6
Thirty-Day	36.7	38.8	38.4	36.7	34.4	30.5	29.4	30.0	30.3	29.3	30.1	29.6
Current Daily	26.9	28.8	28.8	27.5	25.4	21.3	20.3	21.1	21.2	18.7	19.5	18.7
Current ½ Pack or More per Day	17.9	19.2	19.4	18.8	16.5	14.3	13.5	14.2	13.8	12.3	12.5	11.4
Ever Smoked Regularly	32.7	32.6	31.9	29.5	25.8	24.1	24.6	24.2	21.9	22.1	20.8	
Ratios:												
30-Day/Lifetime	0.50	0.51	0.51	0.49	0.46	0.43	0.41	0.43	0.43	0.42	0.44	0.44
Current Daily/Lifetime	0.37	0.38	0.38	0.37	0.34	0.30	0.29	0.30	0.30	0.27	0.28	0.28
Current ½ pk+/Lifetime	0.24	0.25	0.26	0.25	0.22	0.20	0.19	0.20	0.20	0.18	0.18	0.17
Current Daily/30-Day	0.73	0.74	0.75	0.75	0.74	0.70	0.69	0.70	0.70	0.64	0.65	0.63
Current ½ pk+/30-Day	0.49	0.49	0.51	0.51	0.48	0.47	0.46	0.47	0.46	0.42	0.42	0.39
Current ½ pk+/Current Daily	0.67	0.67	0.67	0.68	0.65	0.67	0.67	0.67	0.65	0.66	0.64	0.61
Smoked Regularly/Lifetime	—	0.43	0.43	0.42	0.40	0.36	0.34	0.35	0.34	0.31	0.32	0.31
30-Day/Smoked Regularly	—	1.19	1.18	1.15	1.17	1.18	1.22	1.22	1.25	1.34	1.36	1.42
Current Daily/Smoked Regularly	—	0.88	0.88	0.86	0.86	0.83	0.84	0.86	0.88	0.85	0.88	0.90
Current ½ pk+/Smoked Regularly	—	0.59	0.59	0.59	0.56	0.55	0.56	0.58	0.57	0.56	0.57	0.55

Table 2-4 (continued)

	Percentage Who Used											
Class of:	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Approx. N:	*16300*	*16300*	*16700*	*15200*	*15000*	*15800*	*16300*	*15400*	*15400*	*14300*	*15400*	*15200*
Lifetime	67.2	66.4	65.7	64.4	63.1	61.8	61.9	62.0	64.2	63.5	65.4	65.3
Thirty-Day	29.4	28.7	28.6	29.4	28.3	27.8	29.9	31.2	33.5	34.0	36.5	35.1
Current Daily	18.7	18.1	18.9	19.1	18.5	17.2	19.0	19.4	21.6	22.2	24.6	22.4
Current ½ Pack or More per Day	11.4	10.6	11.2	11.3	10.7	10.0	10.9	11.2	12.4	13.0	14.3	12.6
Ever Smoked Regularly	21.3	20.6	21.6	22.0	21.6	20.4	22.2	22.6	24.0	25.1	27.4	25.8
Ratios:												
30-Day/Lifetime	0.44	0.43	0.44	0.46	0.45	0.45	0.48	0.50	0.52	0.54	0.56	0.54
Current Daily/Lifetime	0.28	0.27	0.29	0.30	0.29	0.28	0.31	0.31	0.34	0.35	0.38	0.34
Current ½ pk+/Lifetime	0.17	0.16	0.17	0.18	0.17	0.16	0.18	0.18	0.19	0.20	0.22	0.19
Current Daily/30-Day	0.64	0.63	0.66	0.65	0.65	0.62	0.64	0.62	0.64	0.65	0.67	0.64
Current ½ pk+/30-Day	0.39	0.37	0.39	0.38	0.38	0.36	0.36	0.36	0.37	0.38	0.39	0.36
Current ½ pk+/Current Daily	0.61	0.59	0.59	0.59	0.58	0.58	0.57	0.58	0.57	0.59	0.58	0.56
Smoked Regularly/Lifetime	0.32	0.31	0.33	0.34	0.34	0.33	0.36	0.36	0.37	0.39	0.42	0.40
30-Day/Smoked Regularly	1.38	1.39	1.32	1.33	1.31	1.36	1.35	1.38	1.40	1.36	1.33	1.36
Current Daily/Smoked Regularly	0.88	0.88	0.87	0.87	0.86	0.84	0.86	0.86	0.90	0.89	0.90	0.87
Current ½ pk+/Smoked Regularly	0.54	0.51	0.52	0.51	0.49	0.49	0.49	0.50	0.52	0.52	0.52	0.49

Notes: Level of significance of difference between the two most recent classes: s =0.05, ss =0.01, sss =0.001.
Source: The Monitoring the Future Study, University of Michigan.

Table 2-5

Trends in the Transition from Lifetime Cigarette Use to Use in the Past 30 Days: Twelfth Graders, 1976–1998

	Transition Rate											
Class of:	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**
Total	0.49	0.51	0.51	0.49	0.48	0.43	0.42	0.43	0.44	0.42	0.44	0.44
Sex												
Male	0.50	0.48	0.47	0.43	0.38	0.39	0.40	0.41	0.39	0.42	0.42	0.41
Female	0.52	0.53	0.50	0.50	0.47	0.43	0.45	0.44	0.45	0.45	0.44	0.46
College Plans												
0 or <4 Years	0.57	0.57	0.56	0.54	0.51	0.49	0.51	0.50	0.50	0.53	0.51	0.53
Complete 4 Years	0.43	0.42	0.40	0.38	0.34	0.33	0.34	0.35	0.35	0.36	0.38	0.39
Region												
Northeast	0.53	0.56	0.53	0.49	0.48	0.44	0.45	0.47	0.47	0.48	0.50	0.49
North Central	0.54	0.52	0.51	0.48	0.43	0.44	0.45	0.45	0.43	0.48	0.47	0.47
South	0.52	0.50	0.47	0.48	0.44	0.41	0.43	0.42	0.42	0.39	0.40	0.40
West	0.41	0.39	0.40	0.37	0.33	0.33	0.32	0.34	0.35	0.39	0.36	0.39
Population Density												
Large MSA	0.54	0.53	0.50	0.46	0.43	0.43	0.46	0.43	0.45	0.45	0.45	0.44
Other MSA	0.49	0.49	0.46	0.46	0.43	0.40	0.41	0.42	0.41	0.42	0.42	0.42
Non-MSA	0.53	0.51	0.51	0.48	0.43	0.42	0.43	0.44	0.41	0.45	0.45	0.46
Parental Education												
1.0–2.0 (Low)	0.56	0.51	0.49	0.50	0.45	0.45	0.46	0.46	0.46	0.46	0.42	0.43
2.5–3.0	0.53	0.53	0.52	0.47	0.47	0.43	0.45	0.44	0.45	0.46	0.47	0.45
3.5–4.0	0.49	0.49	0.46	0.45	0.40	0.40	0.41	0.40	0.40	0.43	0.43	0.43
4.5–5.0	0.48	0.46	0.44	0.42	0.38	0.37	0.37	0.40	0.38	0.41	0.40	0.42
5.5–6.0 (High)	0.42	0.46	0.44	0.44	0.37	0.34	0.37	0.39	0.37	0.36	0.42	0.46
Race (2-year avg.)												
White	—	0.51	0.50	0.48	0.46	0.42	0.43	0.44	0.44	0.45	0.46	0.46
Black	—	0.49	0.46	0.43	0.38	0.36	0.34	0.32	0.32	0.30	0.30	0.26
Hispanic	—	0.46	0.45	0.39	0.34	0.34	0.37	0.36	0.38	0.38	0.37	0.36

Table 2-5 (continued)

	Transition Rate										
Class of:	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Total	0.44	0.44	0.46	0.48	0.46	0.47	0.49	0.49	0.55	0.51	0.56
Sex											
Male	0.43	0.43	0.45	0.46	0.46	0.48	0.52	0.53	0.54	0.57	0.54
Female	0.43	0.44	0.45	0.44	0.43	0.48	0.48	0.50	0.52	0.55	0.53
College Plans											
0 or <4 Years	0.51	0.52	0.52	0.54	0.53	0.52	0.57	0.60	0.62	0.62	0.62
Complete 4 Years	0.39	0.39	0.42	0.40	0.41	0.46	0.47	0.49	0.51	0.53	0.50
Region											
Northeast	0.47	0.45	0.48	0.47	0.46	0.51	0.51	0.53	0.58	0.60	0.56
North Central	0.45	0.50	0.50	0.51	0.49	0.53	0.56	0.55	0.59	0.58	0.59
South	0.43	0.41	0.42	0.42	0.43	0.47	0.50	0.52	0.52	0.55	0.52
West	0.37	0.35	0.41	0.39	0.40	0.41	0.42	0.47	0.43	0.49	0.48
Population Density											
Large MSA	0.42	0.41	0.44	0.43	0.43	0.49	0.49	0.53	0.52	0.55	0.52
Other MSA	0.42	0.43	0.46	0.46	0.44	0.48	0.50	0.51	0.53	0.56	0.53
Non-MSA	0.46	0.46	0.46	0.45	0.48	0.48	0.53	0.53	0.57	0.57	0.56
Parental Education											
1.0–2.0 (Low)	0.42	0.39	0.40	0.48	0.43	0.43	0.43	0.47	0.50	0.48	0.51
2.5–3.0	0.44	0.46	0.47	0.45	0.47	0.48	0.51	0.53	0.55	0.55	0.54
3.5–4.0	0.42	0.44	0.45	0.45	0.45	0.48	0.51	0.51	0.51	0.55	0.55
4.5–5.0	0.43	0.42	0.46	0.44	0.44	0.51	0.52	0.53	0.56	0.58	0.53
5.5–6.0 (High)	0.45	0.42	0.46	0.43	0.43	0.50	0.49	0.53	0.53	0.59	0.53
Race (2-year avg.)											
White	0.47	0.47	0.48	0.49	0.49	0.51	0.53	0.54	0.57	0.58	0.60
Black	0.24	0.25	0.25	0.23	0.20	0.21	0.26	0.27	0.31	0.31	0.31
Hispanic	0.33	0.32	0.35	0.37	0.39	0.39	0.39	0.39	0.40	0.40	0.43

Source: The Monitoring the Future Study, University of Michigan.

SUMMARY Over the 23-year interval covered by the Monitoring the Future study so far, there have been important changes in the patterns and trends of cigarette smoking by American adolescents. Overall, there was a decline in smoking rates early in the study interval and an equally substantial increase late in that same interval. These changes were attributable not only to changes in the rate at which young people were initiating cigarette smoking, but also to changes in the rates at which they were moving on to subsequent stages of use.

Although nearly all demographic subgroups showed an overall decline and subsequent overall increase in smoking rates, there have been some important changes in both the nature and extent of the subgroup differences in various demographic dimensions. In particular, racial/ethnic differences expanded substantially, while social class differences diminished considerably. At the lower (8th and 10th) grades, however, these differences did not disappear completely. Gender differences reversed twice during the study interval, whereas differences associated with college plans became less pronounced, though they are still large. There were also interesting changes associated with population density, in that the increase in teen smoking rates in the 1990s was greatest in the non-urban areas.

Substantial shifts in the demographic composition of the youth population occurred over this 23-year interval, with an increase in minority populations, particularly the Hispanic population. Substantial increases in the average educational level of parents and in the educational aspirations of the students themselves were also observed; some increase in the proportional concentration of the population in the Southern and Western regions of the country; and a continued concentration of the population in urban areas.

Given the general associations between youth smoking and most of these factors, one might have expected that these shifts in demographic composition of the national population would have led to decreases in the overall rate of youth smoking over the past 23 years. However, this has not been the case for most of the 1980s and 1990s, which suggests either (1) that cultural influences that have encouraged increased smoking rates have had their effects partially "masked" or were offset by those substantial demographic shifts, or (2) that the nature of the relationships between demographics and smoking rates is more complex than it appears to be on the surface.

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