

Age and Alcohol and Other Drug Use

Adolescents
College Students
Young Adults
Older Populations

Age, Cohort, and Period Effects
Summary
Stimulus/Response

The nature of alcohol and other drug use, abuse, and dependency changes over the course of life. When children become adolescents, they want to—and usually are expected to—become more independent. Eventually adolescents move out of the home for many reasons, and they are no longer directly under the observation or control of their parents. They get a job and live on their own, drop out of high school, leave to attend college, join the military, or get married, for example. Many engage in new activities, some of which their parents may disapprove of, including use of many drugs. Not all adolescents will take this route, but for many others the temptation may be irresistible and the peer pressure overwhelming.

Later, as individuals assume adult roles, they take on the responsibilities of jobs and careers. Most also enter marriage and possibly eventual parenthood. Changes occur in their views of normative drinking, friends' alcohol use, social and recreational activities, and religious involvement. Consequently, many of them reduce the extent of their drug use as it might interfere with the fulfillment of the obligations and commitments associated with these roles (Bachman et al., 2002; Johnston, Wadsworth, O'Malley, Bachman, & Schulenberg, 1997). In midlife, other role transitions occur. Some will divorce, others will experience widowhood, and some will enter new marriages. Their children will grow up and leave the home. During later years, they may change jobs, reduce their workload, or retire. In addition, with age, physical decline and major health problems occur that may alter the effect of alcohol and other drugs. Smaller doses of alcohol and other drugs may produce greater physical and behavioral impairment. Accordingly, some older drinkers may reduce their drinking to compensate.

Alcohol and other drug use must be studied across the life span because use patterns can change over these life transitions. Such evidence could help identify and modify the antecedents and consequences of alcohol and other drug use patterns and problems. The present chapter focuses on factors involved in alcohol and other drug use for different age groups. First, findings about alcohol and other drug use and problems among adolescents will be presented, followed by a similar analysis for college students. Finally, evidence on the nature of alcohol and other drug use and problems among middle-aged and older populations will be discussed.

Age differences in alcohol use and consequences will not be the same for men and women or across all racial/ethnic groups. However, it would be difficult to examine all three of these key factors—and their combinations—in relationship to alcohol and other drug use in a single chapter. To simplify the presentation, evidence about gender and racial/ethnic group differences in alcohol and other drug use will be presented separately in the next two chapters. However, whenever generalizations are made about one factor such as age, it should be kept in mind that there may be variations for subgroups along the two other factors, gender and race/ethnicity.

ADOLESCENTS

Adolescence is a stage of development with rapid biological, physical, and psychological changes when young people learn the expectations and norms of the adult society into which they will soon be entering. This period involves discovery about oneself and the formation of values and goals. The process of identity development involves trying out different roles and encountering different experiences before deciding what behaviors best fit. This process occurs with respect to a variety of important concerns such as careers, marriage, and parenthood. Thus, adolescents typically date a variety of persons before entering marriage. They work at a variety of jobs to gain knowledge and experience before making commitments about careers.

A similar attitude of experimentation lies behind the initial use of alcohol and other drugs for many youth. Although drinking and smoking is a legal activity for individuals over the age of 21 and 18, respectively, in most states, the same behavior is prohibited for minors who are considered “too young” to use these drugs. The added incentives of challenging authority might increase the appeal of drinking and smoking for some younger adolescents. Doing what you are not supposed to do might be a way of asserting independence and gaining peer approval.

For underage adolescents, unlike for most adults, alcohol and other drugs are lower in availability or accessibility due to legal, economic, and social factors. Thus, not using drugs may be due not to choice but to lack of opportunity. If adolescents cannot buy licit drugs because they are too young or because they do not have enough money, their drug use may be sporadic rather than continuous. Because their alcohol use is of relatively recent onset, dependency involving physical damage may be less likely for adolescents than for older drinkers. Even when alcohol use involves harmful consequences, they may often be

immediate and short in duration. In contrast, the toll on physical health from prolonged drug use over many years may occur mainly in older people.

Most adolescents, prior to having their first drink, already have acquired firm expectations about how alcohol alters behavior and feelings (Miller, Smith, & Goldman, 1990). They know that when adults are depressed or angry they often consume more alcohol. Adolescents also recognize that adults also drink at social gatherings and parties to become less inhibited and to have more fun. Adolescents also have learned that drinking too much or too often has ruined many lives and created problems for others, but until they have actually used these drugs adolescents do not know what the actual effects of drinking will be for them physically and psychologically.

Faced with this background, most young adolescents approach alcohol with curiosity and fascination as well as some fear and anxiety. Alcohol advertising and media images promise that drinking will make life more exciting, alleviate negative moods, and impress peers. On the other hand, they realize that there are costs and benefits to drinking. Drinking could be detrimental to academic, social, or athletic success. In addition, many parents and other adults might strongly disapprove of drinking by adolescents.

Although a minority of adolescents abstain completely, sooner or later most adolescents will at least “experiment” with alcohol and other drugs. Some will satisfy their curiosity quickly and discontinue use or use infrequently and in small amounts. However, others will increase their frequency of use as well as use higher amounts. A variety of personal and social problems may result from drug use ranging from accidents to impaired work and school performance to physical health problems to interpersonal conflicts and aggression. Adolescents may believe that because they are young and relatively healthy, they can use drugs without losing control over their use.

Similar processes may be involved for the experimental use of illicit drugs but for a much smaller percentage of adolescents (Johnston, O’Malley, & Bachman, 1997). The same blend of curiosity, conformity to peer pressure, and fear may be present, perhaps coupled with rebellion and defiance among some.

Prevalence of Adolescent Alcohol and Other Drug Use

Since 1975, an annual national survey called **Monitoring the Future (MTF)** has documented the extent to which high school students, college students, and adults up to age 45 use different drugs (Johnston, O’Malley, Bachman, & Schulenberg, 2007b). We will focus on the data collected in classrooms from a total of 48,500 students in the 8th, 10th, and 12th grades from 400 schools across the United States. Participation was voluntary, and responses were anonymous.

Table 10.1 shows that past-30-days, past-12-months, and lifetime rates for alcohol, cigarette, marijuana, and any illicit drug use increase for the 8th, 10th, and 12th grades in the 2006 MTF survey. Data on the same variables for a decade earlier from 1995 are included as a comparison to show that all indices have shown a decline over that decade.

Alcohol was by far the most frequently used drug reported in the 2006 MTF survey. Table 10.1 shows that about 3 of every 4 students in the 12th grade had used alcohol at one time in their life, but only about half had used alcohol in the past month. Over half had been drunk,

TABLE 10.1 Comparison of 2006 and 1995 past-30-days, past-12-months, and lifetime percentages of use among 8th-, 10th-, and 12th-grade students for any illicit drug, marijuana, alcohol, "ever drunk," and cigarettes.

	8th Grade			10th Grade			12th Grade		
	30 days	12 months	Lifetime	30 days	12 months	Lifetime	30 days	12 months	Lifetime
Any Illicit Drug									
2006	8.1	14.8	20.9	16.8	28.7	36.1	21.5	36.5	48.2
1995	12.4	21.4	28.5	20.2	33.3	40.9	23.8	39.0	48.4
Marijuana									
2006	6.5	11.7	19.5	14.2	25.2	31.8	18.2	31.5	42.3
1995	9.1	15.8	25.3	17.2	28.7	24.1	21.2	34.7	41.7
Alcohol									
2006	17.2	33.6	43.5	33.8	55.8	61.5	45.3	66.5	72.7
1995	24.6	45.3	54.5	38.8	63.5	70.5	51.3	73.7	80.7
Ever Drunk									
2006	6.2	13.9	19.5	18.8	34.5	41.4	30.0	47.9	56.4
1995	8.3	18.4	25.3	20.8	34.1	46.9	33.2	52.5	63.2
Cigarettes									
2006	8.7	NA	24.6	14.5	NA	36.1	21.6	NA	47.1
1995	19.1	NA	46.4	27.9	NA	57.6	33.5	NA	64.2

Source: From *Monitoring the Future National Survey Results on Drug Use, 1975–2006: Volume I: Secondary School Students*, by L. D. Johnston, P. M. O'Malley, J. G. Bachman, and J. E. Schulenberg, 2007, Bethesda, MD: National Institute on Drug Abuse.

and just under half had smoked cigarettes during their lifetime. Close to half had used an illicit drug during their lifetime, but this rate was due mainly to marijuana (42%) use.

Unless they were involved with other forms of problem behavior, adolescents were likely to later lower their drinking levels (Donovan, Jessor, & Jessor, 1983), suggesting that their earlier use was a reflection of curiosity or experimental use rather than a precursor to heavier use. Over half of the adolescent problem drinkers who became nonproblem drinkers by young adulthood had married during the period in contrast to only 20% of the adolescent problem drinkers who remained so during young adulthood. Similar changes have been found with adolescents during the transition period from late adolescence to adulthood. Alcohol, cocaine, and marijuana use peaked in the mid-20s for both males and females compared to their use rates as high school seniors. Only cigarette use levels tended to persist (Johnston et al., 1997).

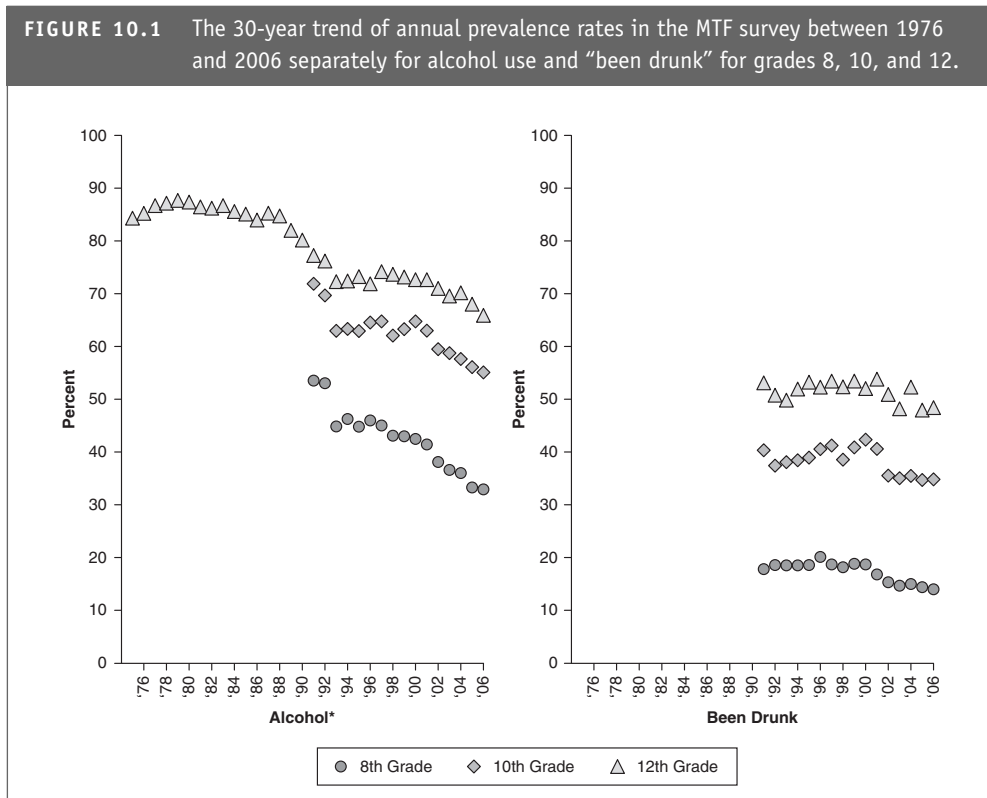
The National Survey on Drug Use and Health (NSDUH), described in detail in Chapter 4, examined a wider age range than the MTF survey. Only the alcohol section of the 2006 survey (Substance Abuse and Mental Health Services Administration [SAMHSA], 2007) will be presented here (refer to Figure 4.1). Among persons over age 12, rates of current alcohol use

increased from 3.9% for ages 12–13 to a peak of 68.6% for ages 21–25. Drinking may peak around that age because many young adults begin to assume the adult responsibilities of careers, marriage, and childrearing.

The 2006 NSDUH found drinking by persons under the minimum legal age for drinking (persons aged 12–20) occurred in the past month for 10.8 million members (28.3%) of this age group. An estimated 7.2 million (19.0%) were binge drinkers, and 2.4 million (6.2%) were heavy drinkers. There was a gender difference in underage drinking, with higher current use for males than for females (29.2% vs. 27.4%, respectively); binge drinking (21.3% vs. 16.5%); and heavy drinking (7.9% vs. 4.3%). These patterns are similar to those found since 2002.

Long-Term Trends

Figure 10.1 presents the 30-year trend of annual prevalence rates in the MTF survey between 1976 and 2006 (Johnston et al., 2007b) separately for alcohol use and “been drunk” for grades 8, 10, and 12. After a peak around 90% in 1979 for 12th graders, the alcohol use



Source: From *Monitoring the Future National Survey Results on Drug Use, 1975–2006: Volume I: Secondary School Students*, by L. D. Johnston, P. M. O’Malley, J. G. Bachman, and J. E. Schulenberg, 2007, Bethesda, MD: National Institute on Drug Abuse.

*Beginning in 1993, a revised set of questions on alcohol use was introduced. From 1993 on, data points are based on the revised questions.

rate dropped steadily over the 1980s to around 70%. It increased slightly during the 1990s before declining after 2000 to around 70% and lower for younger students.

Age of First Drink

The age of first use of alcohol is a good predictor of future problems with alcohol (Dawson, Goldstein, Patricia Chou, June Ruan, & Grant, 2008; Zucker, Donovan, Masten, Mattson, & Moss, 2008). Early onset of drinking seems to be associated with future likelihood of heavy drinking, binge drinking, alcohol abuse, and alcohol dependence. Figure 10.2 shows the percentage of adults over age 21 with alcohol abuse or dependence in the 2006 NSDUH. Those who started alcohol use by age 14 had substantially greater risk of subsequent alcohol abuse and alcohol dependence than those who started at an older age.

Exactly what the relationship means is not clear. Does early drinking simply reflect a symptom, or marker, of high risk-taking tendencies in some children? Or might early use of alcohol cause later dependence on alcohol possibly by altering neurophysiological reactions and sensitivity to alcohol to increase its use? A prospective study (McGue, Iacono, Legrand, Malone, & Elkins, 2001) of 1,343 11-year-olds found that oppositionality, hyperactivity/impulsivity, and inattentiveness predicted drinking onset by age 14. These adolescents had high levels of disinhibitory behavior and psychopathology prior to their first use of alcohol, which suggests that they may have contributed to their subsequent drinking problems.



Source: From *Results From the 2006 National Survey on Drug Use and Health (NSDUH): National Findings*, by the Substance Abuse and Mental Health Services Administration [SAMHSA], 2007, Rockville, MD: SAMHSA Office of Applied Studies.

Early age of drinking may only be a marker of subsequent alcohol dependence among children from alcoholic families, according to findings from a prospective study (King & Chassin, 2007) of adolescent children of alcoholics and matched control children of non-alcoholics ($n = 395$) at age 20 or 25. When other risk factors were controlled for, first use of alcohol at or before age 13 was not related to the odds of alcohol and drug dependence provided hard drugs were not used. However, early users of hard drugs were more likely to develop drug dependence by young adulthood, even while shared risk factors were controlled for.

Underage drinking is of great concern for many reasons. Early drinking may lead to poor school achievement, dropping out of school, and other forms of delinquency that may jeopardize users' futures. Underage alcohol use may increase the chances of subsequent alcohol and drug consumption and possible development of abuse and dependence.

Findings based on animal models suggest that heavy alcohol use may disrupt and alter important neurophysiological functions and processes in developing organisms related to alcohol metabolism, absorption, elimination, and sensitivity ("The Effects of Alcohol on Physiological Processes and Biological Development," 2004/2005). Early and extensive alcohol consumption can also produce serious physical harm to the adolescent's liver, bones, growth, and endocrine functions ("Genetics, Pharmacokinetics, and Neurobiology of Adolescent Alcohol Use," 2004/2005).

Gateway Drugs

Alcohol and tobacco have been dubbed "gateway drugs" since use of these drugs precedes the use of illicit drugs in many adolescents. The term implies that use of drugs such as alcohol and tobacco opens the way to use of illicit drugs and involvement in other forms of socially deviant behavior. Hence, these drugs are deemed additionally dangerous because of what they portend by way of future illicit drug use.

Numerous studies have shown that adolescents who drink or smoke are more likely to experiment with illicit drugs. For example, adolescents of high school age who either smoked or drank during the past month were much more likely to use other drugs (Department of Health and Human Services, 1997). Use of any illicit drug, for example, was reported by 35.3% of cigarette smokers but only by 4.7% of nonsmokers. Heavy users of alcohol (54.9%) were more likely to use any illicit drug than nondrinkers (4.3%).

A test of the gateway drug model (Tarter, Vanyukov, Kirisci, Reynolds, & Clark, 2006) compared boys who consumed licit drugs only ($n = 99$), boys who consumed licit drugs before marijuana use (gateway sequence; $n = 97$), and boys who used marijuana before using licit substances ($n = 28$) from ages 10–12 years through 22 years to determine what psychological, family, peer, school, and neighborhood characteristics were associated with each drug use pattern. Contrary to the gateway model, 22.4% of the participants who used marijuana did not exhibit the gateway sequence. Delinquency was more strongly related than licit drug use to marijuana use among those following the gateway pattern. Deviance proneness and drug availability in the neighborhood promoted marijuana use more than prior alcohol use.

Although use of alcohol and/or tobacco does not guarantee use of marijuana and other drugs, it seems to increase the chances substantially as the use of illegal drugs is much lower

for those who have not first used alcohol or tobacco. In a temporal sense, it is undoubtedly true that most users of illicit drugs started with alcohol, tobacco, and/or marijuana. However, there is no evidence for a *pharmacological* gateway in the sense that use of these drugs alters the nervous system in ways that facilitate the use of illicit drugs. Use of licit drugs such as tobacco and alcohol is apt to precede most use of illicit drugs simply because of their easier availability and lower cost. Labeling them as “gateway” drugs only *describes* the sequence in which users move from one drug such as alcohol or tobacco to other drugs such as cocaine. However, to call them gateway drugs does not *explain* the underlying mechanisms for how they contribute to or influence the use of other drugs. It may mislead us to think that if social policies restricted access to the gateway drugs, there would be less eventual use of the illicit drugs.

The relationship of the use of gateway drugs to the use of other drugs is not necessarily a causal one. Some “third variable” such as a predisposing factor related to different personal backgrounds may determine which minority of gateway drug users move on to illicit drugs while the majority do not. Most adults engage in alcohol use to some extent, but only a relatively small percentage ever go on to use illicit drugs. Use of alcohol does not open a gate to use of illicit drugs in the sense of facilitating movement. Most illicit drug users started using alcohol before using other drugs, but the implication of the gateway metaphor that most alcohol users later take illicit drugs is obviously false.

Cross-Sectional Versus Longitudinal Studies

Most major surveys of adolescent drinking have been cross-sectional in design, comparing individuals from different age groups. However, this method does not allow for firm inferences about underlying processes responsible for the age differences. Several explanations can be considered for observed patterns. One explanation is that the level of alcohol and drug involvement leads to different consequences as age increases. Thus, high use may contribute to poor school achievement and work performance at a later age. Alternatively, it may be just the reverse, with low school and work accomplishments leading these individuals to cope by using alcohol and other drugs. Age differences might just reflect individual differences on factors that exist prior to initiation of alcohol and other drug use, such as personality traits, and that continue to operate at older ages.

To identify the processes involved in the initiation and development of alcohol and other drug use over age, we need *longitudinal* studies that assess the same individuals before substance use begins and observe how it changes over time. One example of the value of longitudinal studies is a study (Shedler & Block, 1990) covering individuals from preschool to age 18. Adolescents who engaged in some experimentation and temporary use of alcohol and other drugs were better adjusted with lower anxiety and higher social skills than those who did not. At the other extreme, frequent users were maladjusted and alienated, with more emotional distress. These differences in drug use were related to differences in parenting; adolescents who experimented with drugs but did not become heavy users had closer ties with parents than did either heavy users or nonusers.

Developmental Trajectories

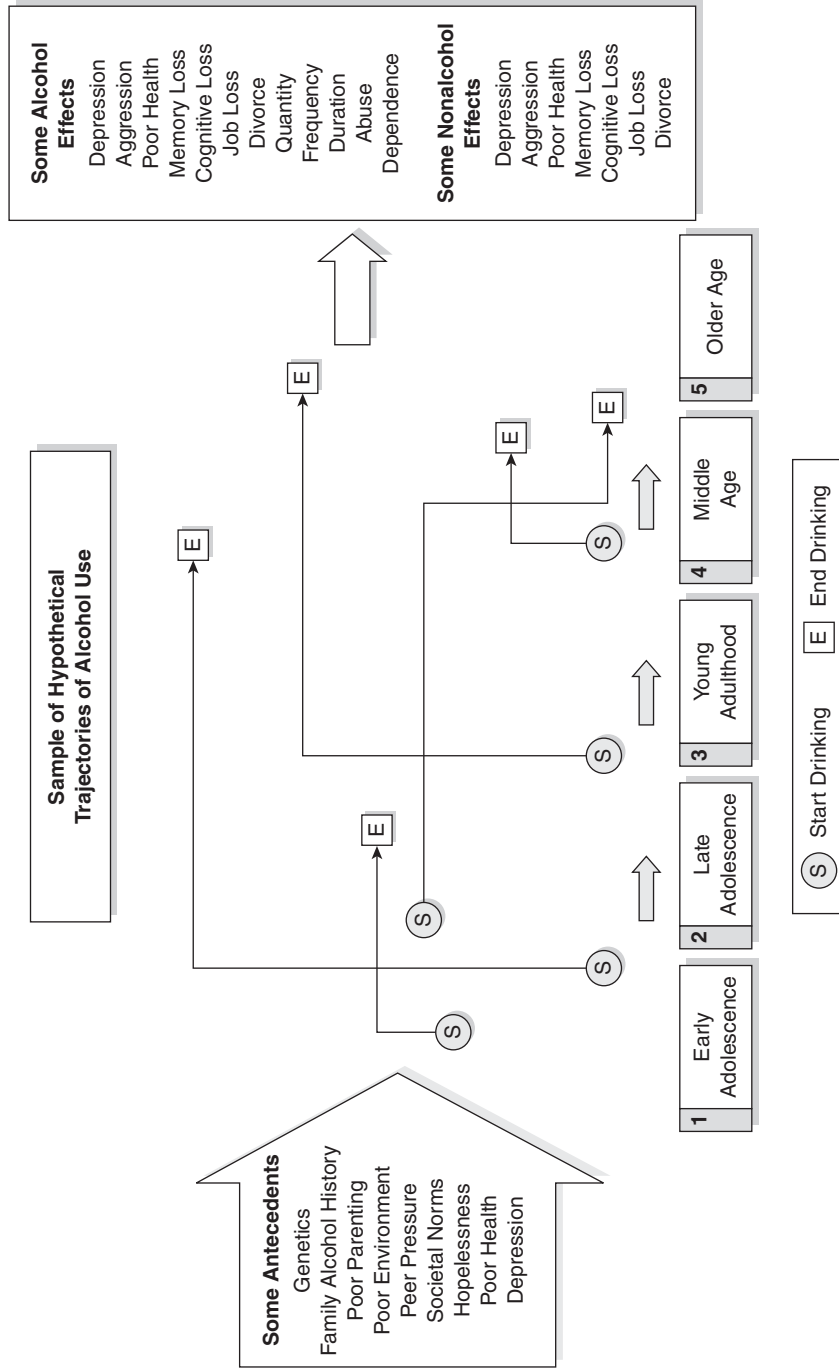
Longitudinal studies examining change in use of alcohol and other drugs have increased efforts to identify variations in the developmental course of alcohol and other drug use patterns over the life span. Figure 10.3 diagrams a small sample of hypothetical **developmental trajectories**, or patterns of change over age. Whereas some drinkers start at low frequencies and/or amounts and remain at that level for many years, other drinkers may start at high frequencies and/or amounts, and still others may continue to drink at even higher levels. Others may start low and then increase later while still others may start high but later sharply reduce their use. The number of years that different individuals spend drinking also varies from a few to many years. Some start in their youth, others at midlife, and some during old age. Of course, many more complex patterns are possible as well. The value of identifying these trajectories is that the antecedents and consequences of different trajectories probably differ in important ways. Knowledge of these factors may prove valuable in designing more effective prevention and intervention strategies by tailoring them for drinkers with different use trajectories (Maggs & Schulenberg, 2004/2005).

Studies that identify trajectories apply complex statistical modeling techniques known as **latent growth curve models** and multilevel models. These tools search for trends in the temporal pattern of changes of alcohol and other drug use over three or more time points spanning several years. Some trajectory studies are primarily descriptive and designed to identify a normative or general trajectory across an age span. These studies seek to identify subgroups or define a taxonomy of distinct trajectories that describe the use patterns for the entire sample under investigation. An example is a model (Auerbach & Collins, 2006), based on data from the Reducing Risk in Young Adult Transitions Study ($n = 1,143$), that identified five dimensions of alcohol use among young adults: no use, occasional low use, occasional high use, frequent high use, and frequent high use with heavy episodic drinking. All categories of participants showed increased alcohol use over the 4 years. While low-alcohol users were more likely to remain at that level, moderate- and higher-level users were more likely to eventually be in the frequent high use with heavy episodic drinking group.

The most common trajectory subgroup observed across different studies of adolescents and young adults contains abstainers, light drinkers, or very rare heavy drinkers across all time periods measured (Maggs & Schulenberg, 2004/2005). Depending on the ages and other characteristics of the sample, the size of the low-risk group varies widely from as low as one fifth to over two thirds of the sample. Stable-moderate drinkers are heavy drinkers across adolescence and young adulthood but do not escalate—or even decrease—their use dramatically into middle age. About one third of adolescents and young adults fall into this group. Chronic heavy drinkers typically are early-onset heavy drinkers and generally do not decrease their drinking in their 20s. Late-onset heavy drinkers start to drink later (i.e., middle to late high school) than stable-moderate and chronic heavy drinkers, but their use escalates steeply. Decreasers begin heavy drinking at an early age, such as in middle school, but reduce their consumption significantly during high school. About 10% of adolescents and young adults fall into this subgroup.

These different trajectories or categories of users may have different causes and consequences of their alcohol and drug use. For example, do adolescents who are heavy

FIGURE 10.3 A sample of hypothetical trajectories of alcohol use with increasing age.



drinkers differ from low-level drinkers in home background, parental drinking, and delinquency? If so, do these factors cause or are they merely correlates of alcohol use patterns? With respect to drinking consequences, do heavy versus light adolescent drinkers have greater alcohol problems as adults, differ in future school achievement, and have more psychiatric problems later?

Trajectories help show how aspects of early alcohol experience are related to subsequent problem drinking (Warner, White, & Johnson, 2007). Three trajectory groups of drinkers were identified through analyses of five waves of data from 438 12-year-old respondents who were followed until age 30 or 31. About two thirds of the respondents were classified as no- or low-problem drinkers, one fifth as adolescence-limited problem drinkers, and one eighth as escalating problem drinkers. Several aspects of early drinking—age at drinking onset, feeling drunk during the first alcohol experience, and family history of alcoholism—were associated with significantly greater odds of being in a problem trajectory group relative to the no- or low-problem trajectory. The two problem-drinker groups did not differ on their early alcohol experiences.

Another trajectory study (Chassin, Fora, & King, 2004) examined how adolescent personality traits and family alcoholism were related to alcohol dependence later in life. Using 454 adolescents ranging in age from 10.5 to 15.5 years from an earlier ongoing study of parental alcoholism, 246 adolescents who had an alcoholic biological parent as their custodial parent and 208 demographically matched adolescents with no alcoholic biological or custodial parents were compared on three annual assessments of their alcohol and drug use. Two follow-ups were made when the adolescents were older (median age of 20 and 25).

A model was developed that identified three trajectories: heavy drinking/heavy drug use, moderate drinking/experimental drug use, and light drinking/rare drug use. The heavy drinking/heavy drug use group was at risk for both alcohol and drug dependence, which were persistent. It also showed more familial alcoholism, negative emotionality, and low constraint. Although the moderate drinking/experimental drug use group was also at risk for alcohol dependence, it was not at risk for drug dependence. It showed less negative emotionality and higher constraint than the heavy drinking/heavy drug use group. Having an alcohol-dependent custodial parent elevated the risk for both alcohol and drug dependence in part because of impulsivity, neuroticism, and lowered agreeableness.

Trajectory studies do not provide definitive conclusions at this relatively early point in their use. Different studies of trajectories may often produce contradictory or inconsistent conclusions because they do not cover the same age span or the same type of population, study the same potential causes, or examine the same outcomes (Schulenberg, Maggs, & O'Malley, 2003). These variables will limit the generalizability of these models. As a whole, however, these longitudinal studies of developmental trajectories increase the understanding of factors related to patterns of alcohol and other drug use over long periods.

Defining Adolescent Problem Drinking

One limitation of past research is the assumption that adolescent problem drinking can be accurately described with the traditional measures and conceptions of alcohol use and abuse developed for adult samples. For example, items on questionnaires designed for

adults focus on typical drinking quantities and frequencies. While these types of questions may be appropriate for many adults, they may be of limited validity for understanding adolescent drinking behavior. A similar problem applies to comparisons of drug use in general among adolescents and adults.

The context and meaning of drinking for adolescents is different from that of their parents and other adults. Drinking patterns of adolescents, in that drinking alcohol is a relatively new behavior for them, fluctuate more over time than those of adults for many reasons. Adolescents may be more likely than adults to encounter problems from a single drinking episode, perhaps due to inexperience or lack of knowledge. In contrast, numerous drinking episodes over many years of chronic alcohol use are more likely associated with the likelihood of problems for alcoholic adults. Physical and medical impairments stemming from such adult drinking histories are less applicable to young people, who, as a group, have a briefer history of drinking. In addition, some problems associated with drinking are unique to young people such as troubles with parents or with the law due to underage drinking.

Due to the legal inaccessibility of alcohol for underage adolescents, their problems with alcohol may be more often related to having consumed too much on specific drinking *occasions* or *episodes* as compared to adults for whom the problem often involves chronic consumption, sometimes at less extreme quantities consumed per occasion. In short, the nature of alcohol problems for nonclinical populations of adults and adolescents may be quite dissimilar.

Relation to Family Structures

Adolescent alcohol and drug abuse may vary in different family structures. Family structure in America has changed rapidly over the past generation, with a shift from the nuclear family with two parents and their two children toward more single-parent, stepparent, and extended-family homes.

The relationship of family structure to adolescent alcohol use was studied with data from the 1995 National Household Survey on Drug Abuse survey ($n = 17,747$; Department of Health and Human Services, 1997). Compared to the two-biological-parent home as the baseline, adolescents from one-parent or stepparent families were at higher risk for a number of problems including poorer school performance, lower college attendance, early sexual initiation and parenthood, later marital problems, delinquency, and use of alcohol and most other drugs. A general explanation for this pattern is that if families are dissolved due to parental conflict and spousal abuse, the children may experience stress, anxiety, depression, and low self-esteem, which in turn may lead to use of alcohol and other drugs.

Complications arise in the causal interpretation of the relationship of family structure to outcomes in studies unless there is control for variables that covary with family structure. Thus, the lower income of single-parent families due to a large percentage of single-mother families may contribute to the adolescent problems more than the nature of the family structure per se.

Still, even with controls for important demographic variables such as age, race/ethnicity, and family income, the finding of lower alcohol use for adolescents from two-parent families persists. Females from mother-only and mother/stepfather families are more likely to abuse drugs, even after demographic factors are controlled for.

However, the study was limited to examining only family structure but not the *quality* of family interaction, which can vary within each subgroup. Quality of family life may be a more important or at least an additional determinant of adolescent alcohol use. Moreover, it is not possible to rule out reverse causation in a cross-sectional study. Thus, instead of family structure affecting adolescent drug abuse, it is possible that adolescent alcohol abuse may contribute to family dissolution by placing stress on the parents. Longitudinal data are needed to see the temporal relationship between important changes in the family structure and adolescent initiation, continuation, escalation, or reduction of substance use.

COLLEGE STUDENTS

After high school, students head off into different directions that have a profound impact on their futures. Those with academic talent—or at least leanings—seek entrance to colleges and universities, others enter careers or trades, and yet others enter military service. These alternative life paths may in part reflect existing drug use patterns, and they may also determine future drug use styles. For example, high school students who are heavily into drugs, especially illicit drugs, may be less likely to become college students. College students, if they live away from home, come under the influences of dormitory, fraternity, and sorority norms of alcohol and other drug use that may differ markedly from the practices acceptable in their parents' home. Thus, college students increase rates of heavy drinking and use of marijuana during their college years, although use of cocaine does not increase. Cigarette use is relatively low among college students and does not change much during college (SAMHSA, 2007).

Prevalence of College Alcohol and Other Drug Use

Although most college students are over 18 years of age, those who are not living at home, which is a large percentage, would not be included in national probability surveys. Therefore, surveys of college students may yield different results from surveys of high school students. In comparing use patterns of high school and college samples, differences in drinking between high school and college students should not be attributed entirely to age differences since the two populations vary in many respects other than age that might affect drinking.

High alcohol use rates were found in a synthesis (O'Malley & Johnston, 2002) of the findings from several large surveys of college student drinking conducted since the 1980s including the College Alcohol Study, the Core Institute Survey, Monitoring the Future, the National College Health Risk Behavior Survey, and the National Household Survey on Drug Abuse. About 40% of American college students were heavy drinkers, based on the definition of five or more drinks in a row in the past 2 weeks. Males drank more often and in larger amounts with more alcohol-related problems than female students. The percentage of heavy drinking was highest for White, lower for Hispanic, and lowest for Black students.

Survey Findings

A mail survey of about 7,000 college students at 34 New England colleges and universities (Wechsler & McFadden, 1979) with a return rate ranging from 51% to 87% across different campuses showed that men drank more frequently and in larger quantities than women, with a third of men being classified as frequent-heavy drinkers in comparison to a tenth of the women. The extent to which they drank in high school and the level of parental drinking were related to more college drinking. There was an inverse relationship between academic performance and amount of drinking. Over a third of the men and a sixth of the women were drunk at least once a month. Physical fights and difficulties with authorities due to drinking occurred for a fifth of the men.

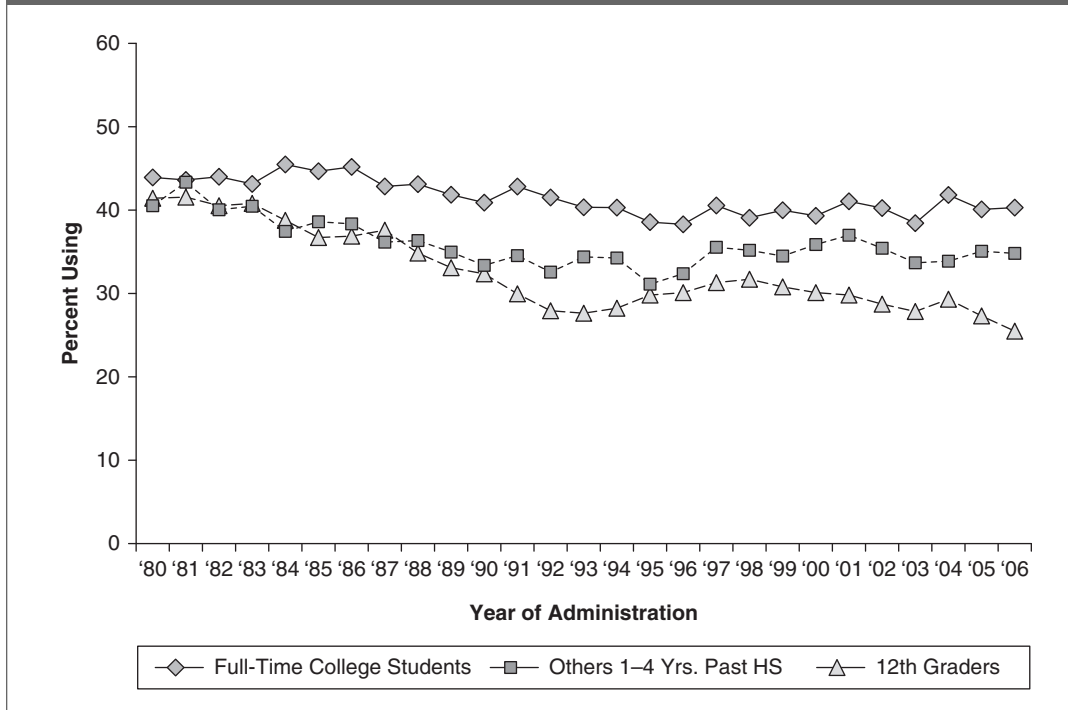
A replication study (Meilman, Stone, Gaylor, & Turco, 1990) was conducted at a private rural New England university with a random sample of 350 mostly White respondents between the ages of 17 and 21 (about 60% males and 40% females). The results suggested a lower rate of daily consumption, especially among males, than found 10 years earlier (Wechsler & McFadden, 1979). In fact, a quarter of the respondents drank less than a drink per week. Nonetheless, alcohol-related problems were still frequent with over a quarter of the respondents reporting having a “hangover” and 30% indicating some disruption of normal functioning due to drinking within the past week. The 30-day prevalence rates showed that alcohol, tobacco, and marijuana were the most frequently used drugs, followed by amphetamines, hallucinogens, and cocaine. Use of alcohol, tobacco, and marijuana was higher for males.

A longitudinal study ($n = 7,083$) with measures at three time points over a 6-year period (Timberlake et al., 2007) found a higher percentage of college students were binge drinking and consuming higher quantities than their peers who did not attend college, just the reverse of the pattern in high school. A comparison of another sample of 855 sibling pairs compared the magnitude of genetic influences on alcohol consumption for college and noncollege youth. Concordance rates for drinking among identical twins, fraternal twins, siblings, and half-siblings varied more among college students than among noncollege peers, possibly because college environments allow for a wider range of drinking opportunities for youth.

Long-Term College Student Drinking Trends

Figure 10.4 shows the trend over 26 years from 1980 to 2006 in the MTF survey for rates of the occurrence of at least one heavy drinking occasion (five or more drinks) within the past 2 weeks (Johnston et al., 2007b). College students consistently had higher drinking rates than age-matched noncollege students and 12th-grade students. Since college students are a select group with higher intelligence, aspirations, and expectations for achievement than their high school classmates who are not attending college, one might expect their alcohol and other drug use to be lower because it may interfere with college success. One explanation (Johnston, O’Malley, Bachman, & Schulenberg, 2007a) for increased binge drinking after leaving high school and entering college is that many of these students no longer are under parental surveillance. Moreover, college students are less likely to get married in the 4 years after high school than their noncollege age mates, which may lead them to spend more time in drinking situations such as parties.

FIGURE 10.4 Trends over 26 years in rate of drinking five or more drinks in the past 2 weeks for college, age-matched noncollege, and high school students.



Source: From *Monitoring the Future National Survey Results on Drug Use, 1975–2006: Volume I: Secondary School Students*, by L. D. Johnston, P. M. O'Malley, J. G. Bachman, and J. E. Schulenberg, 2007, Bethesda, MD: National Institute on Drug Abuse.

Over this 26-year period, as Figure 10.4 shows, the rates of consuming five or more drinks per occasion tended to be slightly lower whereas the rates of alcohol use in the past year (not shown) showed a downward trend for college as well as noncollege students.

Trajectories of College Student Drinking

Using data from the National Longitudinal Survey of Youth ($n = 1,265$), patterns of heavy drinking of college and noncollege samples were compared at four ages: high school, college, young adult, and adult (Lanza & Collins, 2006). Heavy drinking occurred in eight patterns: young adulthood only (3.7%); young adulthood and adulthood (3.7%); college age only (2.6%); college age, young adulthood, and adulthood (8.7%); high school and college age (4.4%); high school, college age, and young adulthood (6.3%); persistent heavy drinking (16.9%); and no heavy drinking (53.7%).

College and noncollege students showed no differences in heavy drinking at any of the four examined developmental ages. Those college-enrolled individuals who showed heavy drinking during college ages were less likely to do so prior to and after college. In contrast,

those not enrolled in college who did not drink heavily during high school or college ages had a greater risk for heavy drinking later as adults.

A similar comparison (Harford, Yi, & Hilton, 2006) of the relationship between educational attainment and drinking suggested a protective effect of education. In a 10-year prospective follow-up of a sample of 8,661 respondents drawn from the National Longitudinal Survey of Labor Market Experience in Youth, education beyond high school was related to a lower risk for alcohol dependence whereas high school dropouts had a higher long-term risk for alcohol dependence.

Binge Drinking

A survey (Wechsler, Dowdall, Davenport, & Castillo, 1995) conducted at 140 colleges and universities involving 17,592 students measured the extent of binge drinking (defined as five or more drinks in a row for men and four or more drinks in a row for women in the 2 weeks prior to the survey). A different criterion of binge drinking was used for men and women to reflect the gender differences in metabolism and body mass, as women who typically drink four drinks in a row had about the same likelihood of experiencing drinking-related problems as men who typically drink five drinks in a row (Wechsler, Dowdall, Davenport, & Rimm, 1995). Also referred to as frequent heavy drinking in some studies, binge drinking may be more serious in its adverse consequences for both these drinkers and those around them because it produces more impaired functioning.

About 50% of men and 39% of women binged, although the percentage varied widely across different campuses. About half of these drinkers were considered frequent binge drinkers, defined in this study as engaging in three or more such binges in the past 2 weeks. Prior bingeing in high school was related to college binge drinking, suggesting that, for many students, binge drinking begins before college. Those who binged in high school were three times as likely to do so in college. Being White, membership in fraternities and sororities, and involvement in athletics were risk factors.

Despite the high percentage of binge drinkers, less than 1% felt they had a drinking problem. Still, binge drinkers had more alcohol-related problems than nonbinge drinkers during the school year. In a follow-up survey (Wechsler et al., 2002), about a third (34.9%) of the men and a fourth (24.3%) of the women reported having been intoxicated three or more times in the past month, with similar percentages indicating that getting intoxicated was a primary reason for their drinking. The follow-up found that drinkers in the past 30 days reported more adverse consequences such as injury (12.8%) and property damage (10.7%), arguments with friends (22.9%), driving after drinking (29%), and unprotected sex (10.4%).

Binge drinkers not only suffer harmful psychological consequences from their own behavior but also produce detrimental psychological consequences for others (Wechsler, Moeykens, Davenport, Castillo, & Hanson, 1995). A survey of 28,709 students at 140 campuses across the nation assessed the adverse impact of heavy drinkers on other college students. A response rate of 69% was obtained from the predominantly White (81%) sample. Nonheavily drinking students living on campuses that were among those with the

highest drinking levels (campuses with over 50 % classified as heavy drinkers) were 3.6 times as likely to report having experienced a serious problem such as violence, vandalism, or unwanted sexual advances caused by another student's drinking than were students at campuses with lower drinking levels (campuses with less than 50 % classified as heavy drinkers).

Nondrinking students in a follow-up survey in 2001 (Wechsler et al., 2002) reported that their interactions with a drinking student had caused them to be insulted or humiliated (29.2%); to be pushed, hit, or assaulted (8.7%); to have to take care of a drunken student (47.6%); to have studying or sleeping interrupted (60.0%); or to experience an unwanted sexual advance (19.5%).

Drinking Setting

Do aspects of college residential environments contribute to drinking among college students? Alcohol use and related problems in heavily drinking students between their senior year in high school and their first autumn in college were studied (Baer, Kivlahan, & Marlatt, 1995). Increases in the frequency of drinking over the college years were strongly associated with residence in a fraternity or sorority, possibly reflecting the drink-friendly environments of these social organizations. However, this difference could also reflect a selection process where fraternal organizations and students with interests in drinking parties choose each other. In contrast, the students' family history of alcohol problems was not consistently related to changes in use rates or problems.

Drinking After College

Many heavy drinkers in college show a reduction or stability in drinking levels only a few years after leaving college. The change in drinking may result from the departure from the college environment where the norm is for many students to drink frequently and heavily. The assumption of adult roles requires greater responsibility as well as independence. Many abandon their youthful alcohol and drug patterns because they are incompatible with their career and life objectives. Dropping out of school because of involvement in drugs, for example, limits opportunities for successful careers and jobs.

Follow-up surveys of high school seniors from the MTF studies assessed their changes in drinking after they became young adults (Schulenberg, O'Malley, Bachman, Wadsworth, & Johnston, 1996). Many heavy drinkers (five or more drinks on one or more occasions in the past 2 weeks) "matured out" during their 20s, with the frequency of heavy drinking dropping from 55 % for 21- to 22-year-old males to about 36 % by the time they were 31 or 32. Young women showed even greater declines, going from 33 % at age 19 or 20 to about 15 % at age 31 or 32. However, others (12 % of males and 3 % of females) maintained their heavy drinking between ages 18 and 24 while some (14 % of males and 7 % of females) showed increased heavy drinking over this period.

Thus, most young adults seem to reduce their alcohol and other drug use as they assume the responsibilities of work, marriage, and parenthood. These adult roles serve as

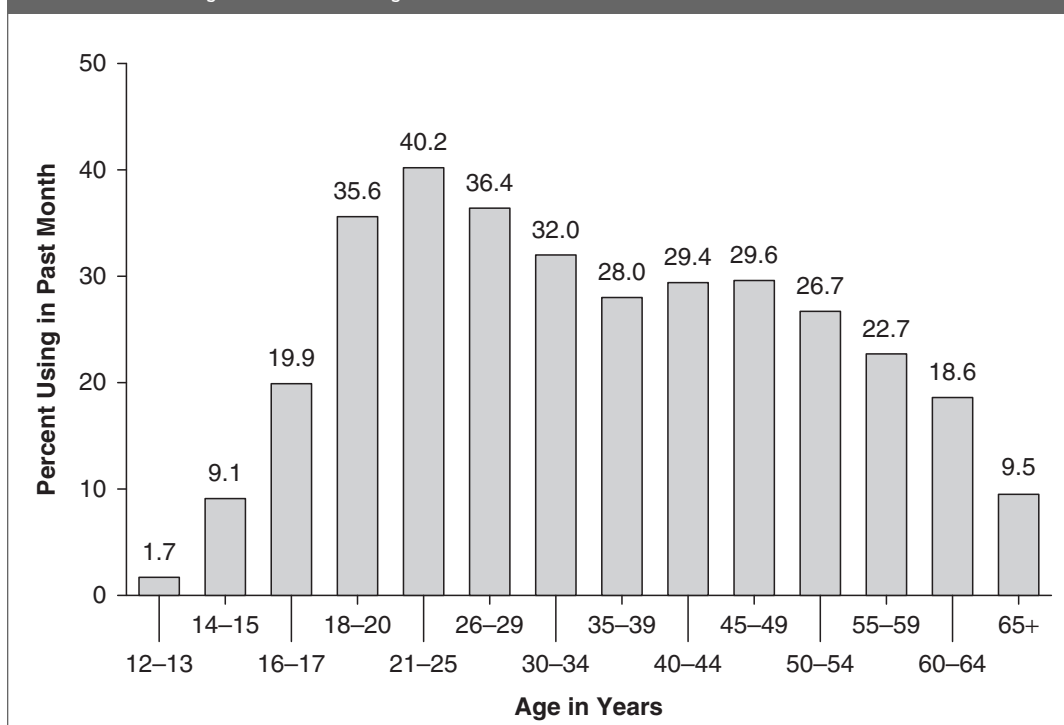
protective rather than risk factors for substance abuse. These roles may be stressors for most people, but some cope without abuse of alcohol and other drugs. Exactly why these life transitions lead to different consequences for different people is an important issue for further research.

Other Drug Use

Cigarette Smoking

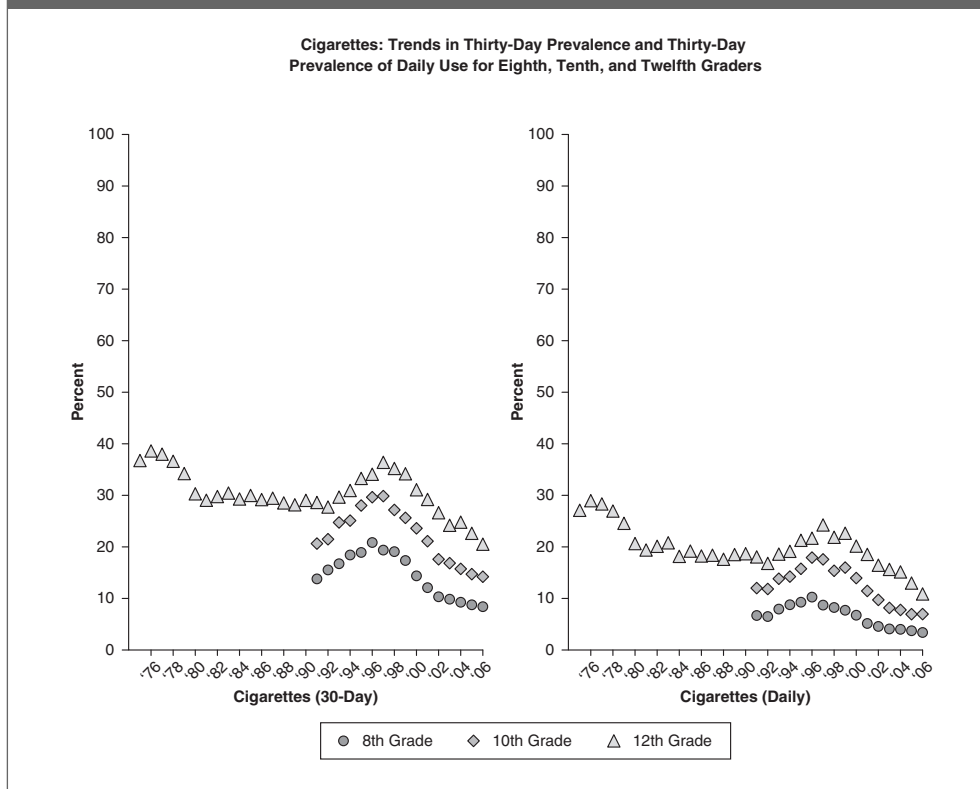
Cigarette smoking in the past month started during the early teen years and was most prevalent for ages 21–24 before gradually declining with increasing age in the 2006 NSDUH, as Figure 10.5 shows. Figure 10.6 presents the 30-year trends in the MTF survey of student smoking rates from 1976 to 2006 (Johnston et al., 2007b) separately for use in the past 30 days and for daily use for that period. Since 1976 when rates were highest for all grade levels, rates have generally declined sharply. Twelfth graders were highest, with around 40%

FIGURE 10.5 Age differences in cigarette use in the 2006 NSDUH.



Source: From *Results From the 2006 National Survey on Drug Use and Health (NSDUH): National Findings*, by the Substance Abuse and Mental Health Services Administration [SAMHSA], 2007, Rockville, MD: SAMHSA Office of Applied Studies.

FIGURE 10.6 MTF 30-year trend cigarette use among 8th, 10th, and 12th graders for the past 30 days and daily in the past 30 days.

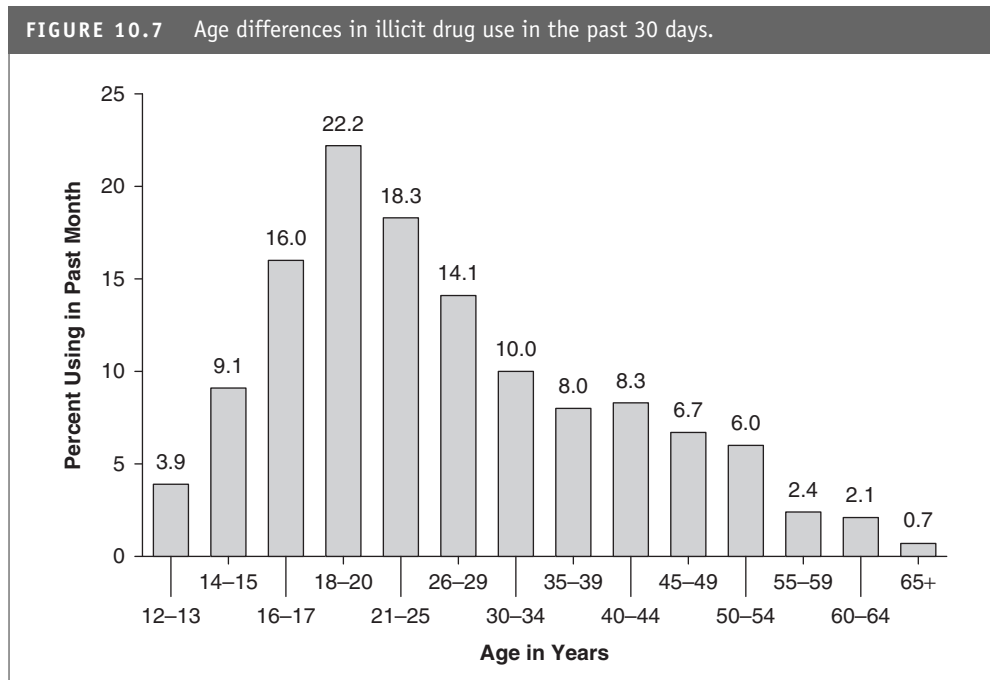


Source: From *Monitoring the Future National Survey Results on Drug Use, 1975–2006: Volume I: Secondary School Students*, by L. D. Johnston, P. M. O'Malley, J. G. Bachman, and J. E. Schulenberg, 2007, Bethesda, MD: National Institute on Drug Abuse.

reporting use in the past month and about 30% having used daily in the past month. Cigarette smoking then declined before rising again in the late 1990s, after which it declined again to a 30-year low of around 10% for 12th graders and lower for 10th and 8th graders.

Illicit Drugs

Due to the illegal nature of many drugs, there have not been as many surveys of their use as there have been of alcohol use. Figure 10.7 presents rates of illicit drug use in the past 30 days as a function of age from the 2006 NSDUH. The group of 18- to 20-year-olds had the highest percentage, 22%, who used illicit drugs, but the NSDUH did not measure the quantity or frequency of use. Rates declined in half to 10% for the group of 30- to 34-year-olds, continued to drop slightly until ages 50–54, and then significantly declined to less than 1% for those over age 65.



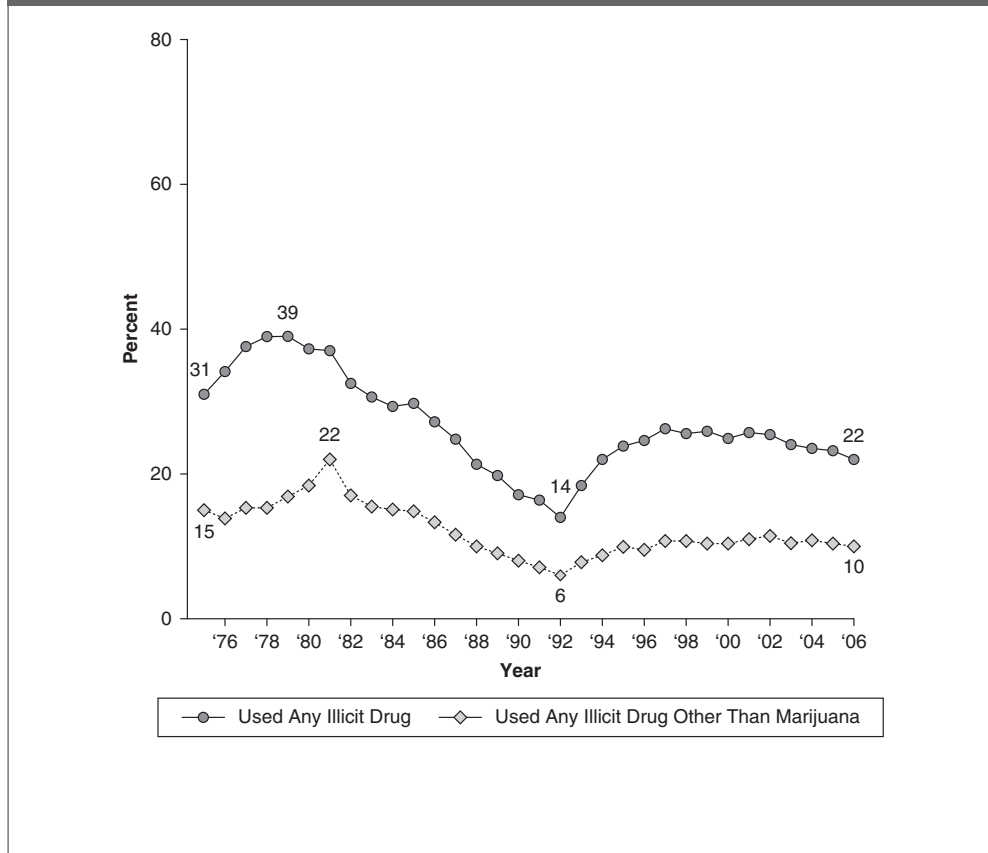
Source: From *Results From the 2006 National Survey on Drug Use and Health (NSDUH): National Findings*, by the Substance Abuse and Mental Health Services Administration [SAMHSA], 2007, Rockville, MD: SAMHSA Office of Applied Studies.

Figure 10.8 displays the 30-year trend in the MTF survey data (Johnston et al., 2007b) from 1976 to 2006 for the past-month use by 12th graders of *any illicit drug* (any use of marijuana, LSD or other hallucinogens, crack, cocaine, heroin, or any other drug that is not under a doctor's orders). However, due to changes in the survey items in 1982, the data for "any illicit drug other than marijuana" before and after 1982 are not comparable. Use rates were highest in the early 1980s and generally declined to a low in the early 1990s. They rose gradually over the rest of the decade and have been fairly stable since.

A study of the relationship among self-reported level of use of alcohol, that of tobacco, and that of several illicit drugs was based on 28,709 predominantly White college students from 140 different colleges and universities with predominantly White enrollments (Wechsler, Dowdall, et al., 1995). About equal numbers of men and women were included. Heavier drinkers were more likely to use illicit drugs as well as cigarettes. Only a small percentage of nondrinking students reported use of illegal substances. Marijuana was the most widely used illicit drug, although the percentage of students who used marijuana varied widely across colleges, ranging from 0% to 52% of the respondents (Bell, Wechsler, & Johnston, 1997). These findings are limited in that the survey did not assess frequency or quantity of marijuana use.

A study involving four waves of measurement examined the trajectory of marijuana use among 1,205 adolescents (Windle & Wiesner, 2004) and identified five different patterns of

FIGURE 10.8 MTF 30-year trend for illicit drug use in the past 30 days for 12th graders.



Source: From *Monitoring the Future National Survey Results on Drug Use, 1975–2006: Volume I: Secondary School Students*, by L. D. Johnston, P. M. O'Malley, J. G. Bachman, and J. E. Schulenberg, 2007, Bethesda, MD: National Institute on Drug Abuse.

change in the frequency of marijuana use: abstainers, experimental users, decreasees, increasees, and high chronic. The high chronic group had higher levels of delinquency, lower academic performance, more drug-using friends, and more stressful life events than the other four groups. Comparisons of the five groups on 10 risk behaviors as young adults (mean age, 23.5 years) showed that adolescent risk factors predicted marijuana use and substance abuse but not depressive or anxiety disorders in young adulthood.

Problems of Interpretation

Most studies of college drinking are cross-sectional in design, so trends and changes cannot be determined. However, cross-sectional findings are often interpreted as if they involve longitudinal evidence (Liljestrand, 1993). Moreover, most studies give only mean

scores for the entire sample presented. This failure to disaggregate the data might hide some differences among subgroups that are buried in the overall means. Alternatively, if changes in some subgroups are large enough, aggregated data will make it appear that the same trends exist for all groups. Therefore, it is difficult to determine from these studies if rates of drinking are increasing, unchanging, or decreasing. Another problem is that surveys vary as to whether they report the percentage of participants who drink during a specific time period, the percentage who drink different quantities, or both (Liljestrand, 1993). These variations in measures make it difficult to compare across studies.

YOUNG ADULTS

Cross-Sectional Evidence

Table 10.2 shows age differences on several aspects of alcohol and other drug use in the 2006 NSDUH (SAMHSA, 2007). In addition to measuring the past-month, past-year, and lifetime rates of alcohol use, the study determined rates in the past-month binge use of alcohol, heavy use of alcohol, cigarette use, and any illicit drug use. Table 10.2 shows that the younger groups, ages 12–17 and 18–25, had the highest rates on all variables, while there were lower rates except for lifetime alcohol use for those aged 26 and older.

Longitudinal Evidence

A follow-up study (Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997) over 14 years after high school with a sample of more than 33,000 respondents from the MTF survey found evidence of decreases in alcohol and other drug use. The declines are not surprising because with each year following college, increased numbers of individuals marry

TABLE 10.2 Age differences in lifetime, past-year, and past-month alcohol use and in past-month binge and heavy use of alcohol, cigarettes, and any illicit drug.

Age Group	Alcohol Use Lifetime	Alcohol Use Past Year	Alcohol Use Past Mo	Alcohol Binge Past Mo	Heavy Alcohol Past Mo	Cig. Past Mo	Any Illicit Drug Past Mo
12–17	40	33.3	16.5	9.9	2.4	10.4	9.8
18–25	85.7	77.9	60.9	41.9	15.3	38.4	19.8
26 up	88.2	69.0	55.1	21.0	5.6		6.1
35 up						22.5	

Source: From *Results From the 2006 National Survey on Drug Use and Health (NSDUH): National Findings*, by the Substance Abuse and Mental Health Services Administration [SAMHSA], 2007, Rockville, MD: SAMHSA Office of Applied Studies.

and start families. In line with new responsibilities of this new role, alcohol and drug use should decline, particularly for women when they become pregnant.

Changes in smoking were examined in a 10-year study of 5,115 young adults, aged 18–30, who were taking part in a coronary artery risk study (Wagenknecht et al., 1998). Results with this sample, of course, may not be representative of the general population of this age, but they show how different subgroups may change in different patterns. Smoking rates declined in White men and women and remained stable in Black women but increased in Black men, possibly due to more new smokers among the youngest birth cohort in this group.

A model (White, Pandina, & Chen, 2002) of trajectories for cigarette smoking from early adolescence into young adulthood that used five interviews from 374 participants from age 12 until age 30 or 31 identified three groups: heavy/regular, occasional/maturing out, and non-/experimental smokers. In comparison to nonsmokers, the probability of belonging to a smoking group was higher for females and those who had higher disinhibition, received lower grades, and had more frequent use of alcohol or other drugs.

Sex differences in developmental trajectories and in smoking behavior among regular smokers were notable. Socioeconomic status, parent smoking, and friend smoking were related to smoking for females but not for males. Between adolescence and adulthood, cessation and escalation of smoking may be affected by different factors for males and females.

According to a model using data from 5,115 participants (55% women) in the CARDIA (Coronary Artery Risk Development in Young Adults) Study, a longitudinal study of young adults conducted from 1985 to 1995 (Costanzo et al., 2007), heavy-drinking trajectories from early to middle adulthood generally declined between 18 and 40 years of age for White men and women. Trajectories over these ages were flat for Blacks and did not change; Black women had the lowest rates of heavy drinking while Black men had high rates of heavy drinking. High rates of heavy drinking persisted longer for individuals high in hostility, anxiety, or depressive symptoms.

Among those who did not go to college, similar changes occurred in the decade following high school graduation as the new responsibilities of employment, marriage, and parenthood were assumed after high school. In comparison to use during high school, those who entered military service were likely to increase smoking and heavy drinking. However, dramatic declines in rates of use of marijuana and cocaine occurred, perhaps in part due to the strong antidrug policies of the military. Women who became full-time homemakers rather than attending college showed lower rates of smoking increase but greater reduction of alcohol consumption, heavy drinking, and illicit drug use. These changes were probably not due to the status of homemaker per se but to the fact that typically homemakers were married, sometimes with children, or pregnant, all conditions that could account for their changes in alcohol and drug use.

OLDER POPULATIONS

As the “graying of America” increases with the baby boomer post–World War II generation reaching old age, it becomes even more important to understand the nature of alcohol and

drug problems among the elderly. In 1990, persons over age 65 represented 12% of the total U.S. population, but it is estimated to increase to 65 million persons, or 22% of the total population, by the year 2030 (Spencer, 1989).

Physiological changes due to normal aging can alter the effects of drugs. Older persons have a higher percentage of body fat and less dilution of a given dose of alcohol relative to younger persons. Consequently, a specific dose of alcohol produces a higher blood alcohol level for older persons (Kalant, 1998). However, whether or not a given dose produces greater impairment for older persons depends on other factors. It is commonly assumed that older persons are more sensitive to alcohol, so a given dose should have more impact on older persons. For example, a dose that would not be problematic for a younger person may be disruptive for an older person. Alcohol-impaired motor coordination among older drinkers occurs possibly because a given dose produces a higher blood alcohol level in older than in younger drinkers (Vogel-Sprott & Barrett, 1984). However, the impairment is not due entirely to the alcohol. Age and correlated factors, such as diseases related to aging and use of more medications, act like alcohol in that they generally impair performance. However, whether alcohol has a *greater* impairment for older persons is not yet firmly established. Comparisons of younger and older persons receiving the same dose under equivalent conditions are needed to test this assumption.

As older persons face these psychosocial adjustments of normal aging coupled with physical aches and pains, they may increase their use of drugs and medication in the form of legal prescription and proprietary over-the-counter drugs. The combination of alcohol with many drugs and medicines taken for old-age-related health problems may produce some dangerous outcomes and cross-tolerances between the substances. There are also reasons to assume that many older individuals drink less due to lower tolerance for alcohol, medical problems that may be seriously affected by alcohol use, and lower income.

An overview (Brennan & Moos, 1996a) of the major factors influencing late-life drinking and its effects showed the role of personal factors, life context, and treatment factors. Personal factors include demographic variables and past drinking history as well as modes of coping with stress. The life context or environment of the person includes negative life events and chronic stressors, the availability of social resources (perceived social support), and the attitudes about and use of alcohol by significant others. Finally, treatment refers to past experiences with alcohol treatment, including treatment seeking and the characteristics of treatment programs. Together these factors determine drinking behavior and outcomes.

Difficulties in Studying Aging and Alcohol Problems

Conceptual and methodological problems exist in research on alcohol problems of the aged. There is a lack of consensus about when an adult becomes “elderly.” Usually an arbitrary chronological age is imposed—such as 65, the age for receiving Social Security payments in the United States—rather than one based on physical or biological factors. Many measures and criteria of alcohol problems that may be appropriate for younger ages may not be valid for older ages.

Causal interpretation of the relationship of alcohol use to stresses such as accidents, health problems, poor work performance, weak relationships with family and friends, and

criminal behavior are always difficult to make for any age group. The view that major life stressors may increase drinking among the elderly has an intuitive appeal, but one must recognize that a large percentage of the older population copes with these stressors without becoming problem drinkers. It is important to include an analysis of sociodemographic and personal factors when analyzing problem drinking among the elderly (Finney & Moos, 1984). The social status and background, as well as the level of self-esteem, coping skills, cognitive appraisal, and availability of social resources, may alter the impact of stressful events and moderate the need for alcohol abuse as a means of coping.

Prevalence of Older-Population Alcohol Use

Surveys of older persons yield a wide range of estimates about the prevalence of alcohol problems as they vary in their definitions of old age and drinking problems and whether the source of respondents is from the community or clinical settings. In this section, we will examine age differences with few comparisons between men and women, a topic deferred until the next chapter on gender differences because much of the early research did not examine this variable among the older population.

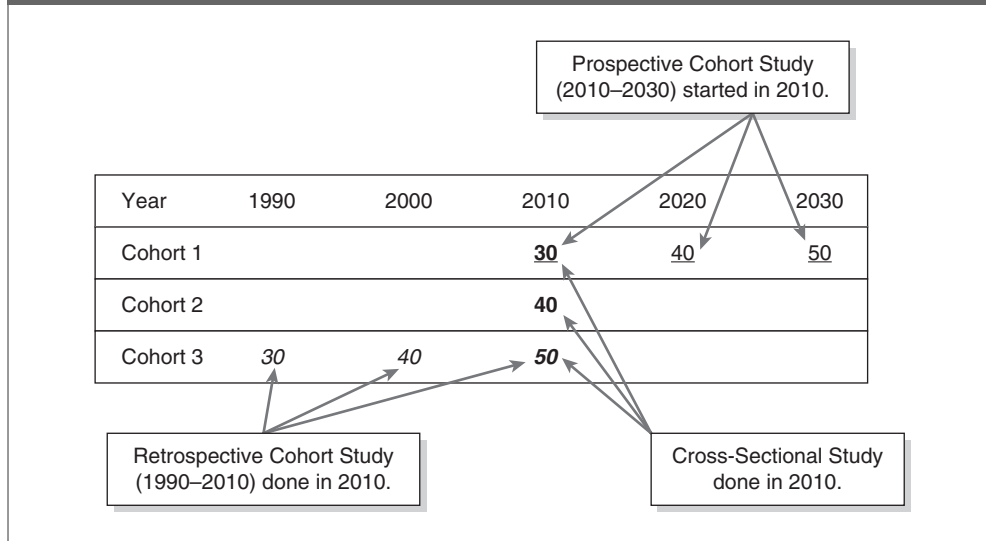
The 2006 NSDUH (SAMHSA, 2007) found that use in the past month declined to 48.0% for ages 60–64 and dropped to 38.4% for those over 65. Problematic types of alcohol use, binge and heavy drinking, showed similar age declines. For those over age 65, “binge” use (five or more drinks on the same occasion on at least 1 day in the past 30 days) occurred for 7.6%, and heavy alcohol use (five or more drinks on the same occasion on each of 5 or more days in the past 30 days) occurred for 1.6%.

An analysis (Breslow & Smothers, 2004) based on 40,556 adults aged 60 years and older pooled from five cross-sectional National Health Interview Surveys in 1997–2001 found that 52.8% of men and 37.2% of women were current drinkers. For older age groups, the proportions of men and women drinking higher quantities of alcohol (two drinks or more) decreased whereas the proportions consuming lower quantities (one drink) increased. The proportions of men and women drinking on both fewer than 12 days per year and between 260 and 365 days per year were higher for older age groups. In sum, quantity and frequency measures of alcohol consumption showed strikingly different patterns of age-related change.

Overall, alcohol use and heavy alcohol use were lower among older than among younger age groups. However, the implications of such reductions are unclear because of the lack of equivalent criteria to define problematic consequences for different age groups. Thus, older drinkers have fewer job-related difficulties due to alcohol use than younger drinkers simply because many of them are retired.

An alternative to cross-sectional research where different ages are compared during a given year for assessing age effects is a longitudinal design in which the same individuals are assessed at two or more different time points. As diagrammed in Figure 10.9, an example of a longitudinal study with a retrospective comparison of ages 30–50 might compare present data collected in 2010 from 50-year-olds with information collected about them at an earlier date, 1990, when they were 30 years old. However, sometimes this is not possible as this earlier information was not collected or no longer exists. Figure 10.9 also shows a longitudinal design from age 30 to age 50 from 2010 to 2030 with a prospective comparison

FIGURE 10.9 Diagram showing cross-sectional, retrospective longitudinal cohort and prospective longitudinal cohort designs to measure age differences from 30 to 50 years of age.



of present data with information to be collected in the future. A limitation to this method is that we would have to wait for many years before the comparison could be completed.

Another problem for longitudinal studies that extend over many years is the likelihood of **differential attrition**. Over the course of a longitudinal study, heavier drinkers may be less likely to continue in the study for many reasons. Problem drinkers may be more transient, be less likely to be married, or have unstable employment, so they would be difficult to follow up on (Temple & Leino, 1989). Heavy drinking may lead to more accidents, diseases, and other sources of fatality among younger groups. Although drinking declines with increased age for most people, this elimination of the heavier drinkers artificially inflates the extent of the decline.

Early- Versus Late-Onset Problem Drinking

It is important to distinguish between those older alcoholics who developed their problems with alcohol very early in life and those who had a later onset. In addition, there may exist a third group of intermittent or episodic problem drinkers whose levels of drinking have fluctuated widely over their lifetimes. The cumulative effects of alcohol should be greater for those who have been drinking longer, all else being equal. Unfortunately, many age comparison studies do not include the distinction based on **age of onset** of drinking problems.

Early-onset alcoholics will have had many more years of abusive levels of drinking than other older drinkers. According to a model of accelerated aging (Ryan & Butters, 1984), early-onset alcoholics might have cognitive deficits at later ages. But an alternative model of increased vulnerability holds that the impairment of alcoholics is relatively small at

younger ages and widens with increased age. Thus, we would expect early-onset alcoholics who maintain a lifetime of alcohol abuse to show large deficits compared to nonalcoholic elderly cohorts.

Late-onset problem drinkers, or reactive drinkers, are defined as not having problems with alcohol until after about age 40. They may be using alcohol to cope with the medical and physical impairments associated with aging as well as social status changes such as retirement or widowhood. These specific stressors encountered at older ages may precipitate the development of drinking problems. With a definition of late onset set at age 40, however, by age 65 many so-called late-onset alcoholics would have had drinking problems for as long as 25 years (Gomberg, 1990)! Perhaps a more useful comparison would be between distant and recent onset.

Since late-onset problem drinkers have shown no evidence of a lifelong drinking lifestyle, there is a tendency to assume the drinking is reactive or a coping response to stress. We may tend to search for a specific overwhelming negative life event to blame for the drinking. However, stress was not related to heavy drinking in general or to late-onset heavy drinking in one study of heavy drinkers aged 60 and older (Welte & Mirand, 1995) in a random telephone survey ($n = 2,325$). Chronic stress was, however, positively related to alcohol dependence and consequences.

In contrast, we may fail to detect specific stressors that instigate drinking for early-onset problem drinkers simply because it is more difficult to recall specific stressors from the distant past associated with problem drinking. Thus, it may only seem that specific stressors are more often involved in late- as opposed to early-onset problem drinking.

A 4-year prospective study (Brennan & Moos, 1996b) of late-life problem drinkers ($n = 581$) found that heavier baseline alcohol use and being male predicted more alcohol consumption later. More drinking problems were found at follow-up for those with early-onset and a higher number of drinking problems at baseline. Those who used avoidance coping strategies had *more* drinking problems if their friends' approved of their drinking. However, individuals with more drinking problems at baseline had *fewer* subsequent drinking problems if they experienced negative health events and friend stressors.

Stress and Coping

A community study of older persons living in New York state did not find higher drinking for persons with more health-related stressors (Welte, 1998). Instead, those who were sick or ill actually drank less while those who were active and healthy tended to drink more. Although these findings might be interpreted as showing that higher stress, fewer social resources, and avoidance coping "causes" problem drinking, it is also possible that the opposite process is involved whereby problem drinking increases stress, reduces social resources, and leads to avoidance coping.

The type of stressor was also important in a community sample of older persons (Brennan, Moos, & Mertens, 1994). Those with higher levels of health-specific stressors at the start of the study had fewer drinking problems 1 to 4 years later. However, non-health-related stressors were associated with increased drinking problems over the period of 1 to 4 years.

How stress affects drinking also appears to be affected by the individual's coping method and level of alcohol use. Increased stress led to more alcohol-related problems for

those who relied more on avoidance coping (Brennan & Moos, 1996a) or drank at higher levels (Brennan et al., 1994). Heavy drinking can be viewed as a form of avoidance coping that is used when stressed if few alternative solutions for dealing with life stressors exist. In contrast, persons with personal and social resources for dealing with their stress were less likely to drink. Lighter drinkers showed reduced drinking a year later if their stress level was higher (Moos, Brennan, & Schutte, 1998). In contrast, those who were heavier drinkers reacted with increased drinking a year later if they had higher stress.

Many older problem drinkers eventually stop drinking. In a study with 330 untreated remitters, 120 treated remitters, and 130 untreated nonremitters, about 3 in 4 of the older problem drinkers showing **remission** did so without any formal treatment. Compared with remitters who received treatment and to untreated nonremitters, they had completed more schooling, reached their peak alcohol consumption, and stopped having new drinking problems earlier. Moreover, untreated remitters were more likely to be women, more likely to have less severe drinking and depression histories, and less likely to have been advised to reduce consumption. Finally, untreated remitters were more likely than untreated nonremitters to have reduced their drinking because of late-life health problems.

Effects of Retirement on Drinking

The effect of retirement on drinking may vary. On one hand, boredom and increased leisure time may allow for more drinking, but retirement may reduce the stresses of work as well as contact with the drinking companions from the workplace. One study (Ekerdt, Labry, Glynn, & Davis, 1989) compared drinking in men over a brief period of 2 years after retirement with a group of men from the same age cohort who remained employed. Retirees showed more variability in drinking levels during this period but overall were not different from the working group. However, retirees were more likely to report problems caused by their drinking toward the end of the 2 years. These results suggest that problems associated with drinking may become more evident with increased time since retirement began.

A study (Bacharach, Bamberger, Sonnenstuhl, & Vashdi, 2008) of retirement-eligible employees ($n = 1,122$) in construction, manufacturing, and transportation work examined the relationship between positive alcohol expectancies and drinking problems. Employees still working despite retirement eligibility had increased drinking problems 4 years later if they held high positive alcohol expectancies. In contrast, those with low positive alcohol expectancies had decreased drinking problems. The work environment in many occupations contributed to this effect, as workers used alcohol to cope with work stress as well as to promote camaraderie among coworkers (Sonnenstuhl, 1996). Fully retired workers, no longer exposed to these stressors, had a weaker relationship between positive alcohol expectancies and drinking problems.

Retirees may not be regarded by society—or by their families—as requiring treatment for alcohol and drug problems because no jobs are jeopardized. Family members, embarrassed by excessive drinking of their elders, may find it more convenient to deny or cover up the problem. A retired person may drink to the point of intoxication, but unless he or she becomes aggressive or annoying, this behavior may be tolerated whereas the same impairment in a younger person would be considered a problem because it could impair job performance. Thus, the criterion of what constitutes a substance problem may vary with age.

Older persons are underrepresented in alcohol and drug abuse treatment, suggesting that they may not perceive themselves as having abuse problems. Such perceptions are not entirely independent of societal standards and values. In addition, the elderly may face social and economic barriers to treatment access.

Older Populations and Other Drugs

National Health Interview Survey results from almost 30 years, 1965–1994, provide prevalence rates of smoking for older persons (Husten, McCarty, Giovino, Chrismon, & Zhu, 1998). Current smoking among 65-year-olds and older individuals declined over this period from 17.9% to 12.0%. Among older adults, the prevalence of smoking cessation rose with higher educational attainment and was consistently higher for men than for women and for Whites compared with Blacks. There were no racial differences among women, but older White and Hispanic men were more likely to be former smokers than older Black men.

Less is known about the use of illicit drugs such as cocaine and heroin among older populations (Rosenberg, 1995). Available evidence suggests that very low rates of illicit drug use exist for those over 60 years of age, except among special groups such as psychiatric and criminal populations (Caracci & Miller, 1991).

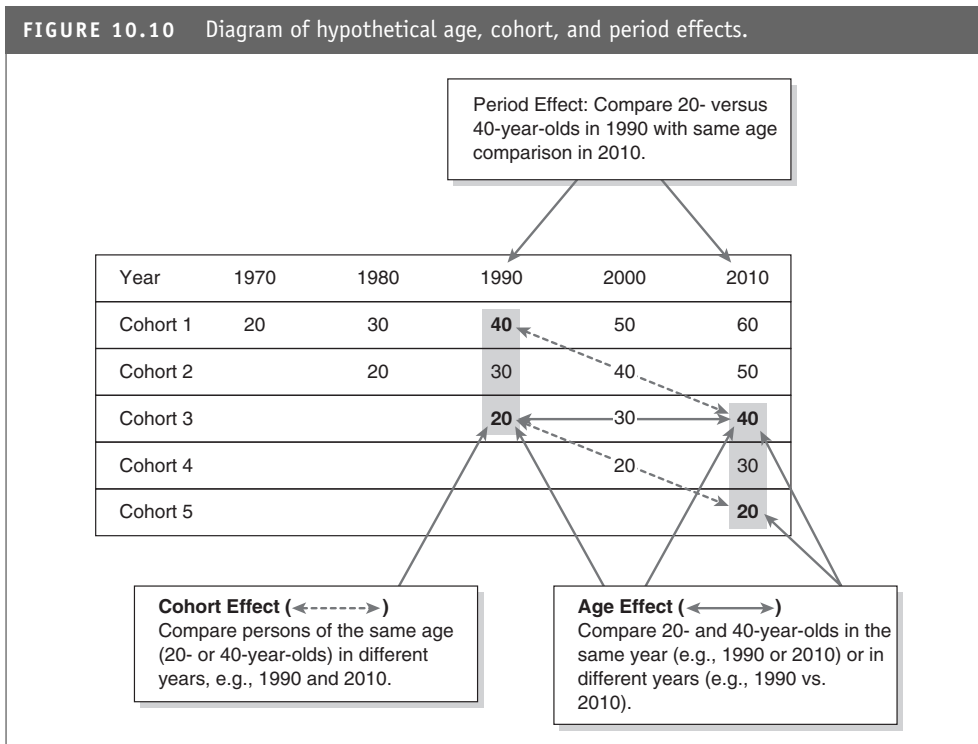
The 2000 National Household Survey on Drug Abuse (SAMHSA, 2001) found that 1% of adults over age 55 had used illicit drugs in the past month, with psychotherapeutics used nonmedically by 0.5% of users and marijuana by 0.4%. Among older adults, the rate of past-month illicit drug use was highest for those aged 55–59, irrespective of gender. The successor to this survey, renamed the National Survey on Drug Use and Health, found higher rates ranging from 1.9% to 3.4% from 2002 to 2006 among those aged 55–59 (SAMHSA, 2007).

Since excessive use of any harmful substance lowers life expectancy, a selective process in which heavy drug users are literally eliminated may occur so that on average, those with a lower average level of use are more likely to survive. It is also possible for health concerns related to aging to motivate many users to reduce their use of illicit drugs as they age. They may switch to alcohol or prescription drugs, which are less expensive, and they may have fewer contacts and sources in relation to illicit drugs. In some cases, they may have received effective therapy and counseling so that they are no longer dependent on drugs.

AGE, COHORT, AND PERIOD EFFECTS

A major problem of interpretation of age differences in alcohol and other drug use is whether they reflect a true **age effect** (i.e., differences due to aging processes) or whether they instead represent a generational difference or *cohort effect*. A cohort refers to a generational grouping such as baby boomers or Generation X. Since different age cohorts grow up under different historical circumstances, their substance use may be a reflection of differing attitudes and values toward alcohol and other drugs held in those different eras.

A hypothetical comparison of 20- and 40-year-old groups of individuals born in different years is diagrammed in Figure 10.10. For example, in any given year, we could assess age differences by a cross-sectional comparison of persons who are 20 with a different set of



persons who are 40. Alternatively, we could use a single cohort consisting of the same persons and compare them longitudinally when they were 20 versus when they were 40.

Assume that the first comparison shows a difference. Are the differences due entirely to age, or could they reflect differences between cohorts, those who were age 20 in 1990 versus those who will be age 20 in 2010? Different age groups in the year 2010 will have grown up in different social climates with different attitudes and patterns of drinking. A 40-year-old group in 2010 will have been born in 1970 and grown up during an era when drug use was peaking relative to the prior decade. Thus, members of the 40-year-old group in 2010 not only would be older than those of the 20-year-old group in 2010 but also would hold the drug attitudes and values of the 1990s when they were 20, which will not be the same as those of people who will be 20 in 2010. These generational differences or **cohort effects**, rather than age differences, could be responsible for some of the drinking differences between 20- and 40-year-old groups in a cross-sectional study. Age and cohort are inherently confounded, and it is important to examine age differences across different cohorts to obtain a more conclusive view of age effects.

Additionally, **period effects** due to social climate differences may occur. A comparison of 20- versus 40-year-olds in 1990 may yield different results for the same age comparison conducted in 2010 due to conditions in different historical periods rather than to age (see Figure 10.10). Drinking attitudes and practices during Prohibition of the 1930s were markedly different from those during the drug heyday of the 1960s. As an example, two

different longitudinal studies, one done between 1920 and 1940 and one conducted between 1990 and 2010, could each assess age effects. Any observed age differences would not be due to cohort effects since each study would use the same individuals at all of its time points. However, since the historical periods of the two studies would differ, some or all of the differences attributed to age might actually reflect a period effect.

The Normative Aging Study measured drinking as a function of age, cohort, and period (Levenson, Aldwin, & Spiro, 1998). This longitudinal study involved 2,280 men first studied in the 1960s. They received follow-up mail surveys in 1973, 1982, and 1991. A total of 1,267 men, who were primarily White, from middle and lower socioeconomic levels, from the Boston area, and between the ages of 46 and 72 years, responded to all three follow-ups. The findings about age effects varied. Only one cohort, those men born between 1919 and 1927, had a consistent decline in drinking as they aged.

In contrast, period effects were strong with all eligible cohorts showing increased drinking between the 1973 and 1982 surveys and a decline between the 1982 and 1991 surveys. Cohort effects were weak, as only the cohort born between 1928 and 1936 showed consistently higher drinking across age and period. In general, problem drinking showed the same patterns as alcohol consumption, with the exception of the 1928–1936 cohort, which had the highest problem drinking at all ages and periods, even though their consumption levels showed a decline in the 1991 survey. Both the cohort and the period are important as drinking is affected by changes in society as well as in individuals.

The relationship of age and alcohol consumption was evaluated for several cohorts over a 20-year span with data from 14,105 adults from the first National Health and Nutrition Examination Survey I (NHANES I) and its three follow-up surveys conducted between 1982 and 1992 (Moore et al., 2005). A majority, 74%, were consistent in being drinkers or abstainers over the entire period. The amount of alcohol consumption declined as age increased even after cohort and period were controlled for. A cohort effect was found, with the reduced consumption being greater for earlier cohorts.

The interpretation of any changes in alcoholism rates observed over long periods can be complicated by other factors unrelated to aging, psychological attitudes, or values. For example, if alcoholism treatment quality or availability becomes lower over these years, we might expect a rise in the number of alcoholics due to that factor alone. In contrast, if alcoholism treatment improves or becomes more available over these years so that more alcoholics receive care, we might find a lower percentage of the older population with drinking problems. Thus, age differences in prevalence of alcohol problems may reflect society's response in addition to the biological and psychological differences associated with different ages.

Summary

One's first drink is a rite of passage from adolescence into adulthood. By the time we have our first opportunity to drink, we have already learned many expectations from adults and the media about the effects of alcohol as well as of other drugs.

Early-onset drinkers differ from late-onset drinkers or abstainers even before the first drink. They are often more rebellious, undercontrolled, impulsive, and poorer in academic achievement. Because underage drinking itself is a mild form of social deviance, it is not

surprising that many early-onset drinkers also engage in a number of other behaviors that violate social norms such as use of other drugs, sexual activity, delinquency, and even criminal activities.

Attempts by adults to restrict or prohibit underage drinking may backfire by providing the added challenge to some adolescents of defying parental controls. Adolescents who have important activities and goals that would be jeopardized by excessive use of alcohol seem better able to avoid alcohol-related problems. However, those adolescents with low self-esteem and little hope of being able to achieve success may be more likely to find excessive use of alcohol and other drugs a convenient means for coping with their frustrations and failures.

The trajectory of alcohol and drug use is not the same for all adolescents, and these patterns have been useful in predicting future problems. Age of the first experience is highly related to future drinking problems, for example. This relationship has led to alcohol being dubbed as a gateway drug, as if its use “causes” the user to move on to use of illicit drugs.

Many college students, living away from home for the first time, are exposed to more peer pressure and opportunities for drinking than they might be if they lived at home. The academic pressures are more demanding and may be related to alcohol abuse as either a cause or an effect of poor academic performance. After students leave college, many return to settings where heavy alcohol use is not expected or tolerated, and drinking levels may decline. Many students who engage in heavy drinking due to participation in fraternity and sorority life, for example, may revert to lighter drinking after graduation because they are in new environments that are not conducive to excessive drinking.

At the other end of the age distribution, one might expect the transition from full-time work schedules to retirement to affect drinking opportunities. But while the demands of employment might keep drinking in control for most people, the freedom of retirement may be boring and unstructured and allow more drinking to occur without adverse work consequences.

Older persons are underrepresented in alcohol and drug abuse treatment. The reasons for this situation are diverse. Elderly persons may not perceive themselves as having abuse problems. In addition, they may face social and economic barriers to treatment access. Furthermore, societal beliefs and attitudes do not consider them to be problems for society.

Comparisons of age effects are complicated by the fact that most studies involve cross-sectional comparisons of groups of different-aged participants who also grew up with their own set of historical and cultural experiences. Since our attitudes and behaviors related to alcohol are formed by the norms that prevailed during our formative years, comparisons of the drinking of persons who differ in age are difficult to interpret because differences could be due to either physiological or sociological differences.

The majority of the findings, however, suggest that alcohol-related problems decline with age. Some of the decrease may reflect the medical complications created by drinking. Thus, if alcohol is recognized as a threat to health, older samples may voluntarily—or be advised by physicians to—cut down consumption. In addition, if alcoholism is a self-limiting disease so that the worse cases die at an earlier age, part of the decline could be due to this attrition process.

Stimulus/Response

1. Based on your own experience and observations of your friends, do you agree with the view that friends tend to have similar drug attitudes and use patterns because “birds of a feather flock together”? Or do you favor the position that one’s peer group shapes and molds the behavior of its members? Can you see how both positions could be valid as well?

2. Using your own experiences, how did your drinking attitudes and practices change after the transition from high school to college? What factors do you see as leading to these changes? Do you think your drinking will increase, decrease, or stay the same after you complete college and start a job?

3. Many previous studies suggest that children who begin drinking before age 21 are more than twice as likely to develop alcohol-related problems than those who do not start drinking until after age 21. Do you agree that this evidence warrants the conclusion that teen drinking is a major source of adult alcoholism? Can you suggest other—and possibly better—evidence to support or refute this conclusion?

4. In 2008, the presidents of 130 U.S. colleges and universities introduced the Amethyst Initiative, a proposal that it was time to consider lowering the minimum drinking age from 21 to 18 because the law was ineffective as many underage youth used alcohol. What pros and cons do you see for such a change? Suggest the design of a study that would provide evidence to answer the question of what impact such a change would have on several different outcomes such as alcohol-related accidents, interpersonal violence, drinking and driving infractions, or academic performance.

5. Some estimates indicate that underage youth purchase cigarettes successfully 70% of the time over the counter, and 90%–100% of the time through vending machines. Think of several possible methods that might have been used to obtain these estimates. For each method, how reliable and valid do you believe these estimates are?

6. What factors do you think account for the greater amount of alcohol use by members of fraternities and sororities? Do you think that these social organizations tend to attract individuals who have tendencies toward alcohol excess in the first place or that new members change their behavior in ways expected by these organizations to gain acceptance?

7. Many people curtail their alcohol and other drug use as they get older. What evidence would you need to determine the extent to which this reduction is determined by biological, psychological, and sociological factors? Some older people seem to increase their alcohol and other drug use with increased age. How do you think biological, psychological, and sociological factors produce this effect?

8. Have you noticed any change in your parents’ drinking patterns as they have gotten older? Have they increased or decreased in amount of drinks or the conditions leading to drinking? What factors do you think played important roles in creating these changes?

