

Affecting Price of Substances

Increasing the price of tobacco and alcohol decreases their use. Policies affecting cost also may be relevant to influencing other adolescent behaviors, though research is generally lacking.

Economists assess the effect of price on consumption in terms of *price elasticity*. Price elasticity is a measure of change in demand relative to changes in price. As price increases, demand declines, and vice versa. Economists typically measure elasticity as the percentage of change in demand per 1% change in price. For example, if price increases 10% and the price elasticity is -1.00 , then demand will decline by 10%. Zero elasticity would mean no change in demand as price changes.

Tobacco Use

Table 6.1 summarizes studies of the effects of price on adolescent smoking. Except for the Wasserman study (Wasserman, Manning, Newhouse, & Winkler, 1991), these studies looked separately at the effect of price on adolescents taking up smoking (participation) and on the number of cigarettes they consume (amount smoked). More than half of the effect of price was on whether or not adolescents took up smoking.

In a recent analysis, Chaloupka, Tauras, and Grossman (1997) concluded that a conservative estimate of the effect of cigarette prices on adolescent price elasticity is -1.0 . That is, for every percent increase in the price one can expect a corresponding percent decrease in adolescent demand. They also concluded that price affected high school students' demand for smokeless tobacco. The total price elasticity was -0.6 (-0.4 for taking up chewing and -0.2 for amount consumed).

In a recent study (not included in Table 6.1), Chaloupka and Pacula (2000) used nationally representative data from the 1994 *Monitoring the Future* study surveys of students in grades 8, 10, and 12 and paired each student's self-reported tobacco use with information about his or her state's tobacco-control laws. Using advanced statistical modeling techniques and controlling for other variables, they found evidence of substantial price elasticity. However, the effects of price varied according to gender and race. Males were significantly more responsive to price than females were and black males were more responsive to price than any other group was.

Thus, the best available data suggest that increases in price reduce the number of new smokers as well as the rate at which teens who already smoke use tobacco. Furthermore, price elasticity is greater for adolescents than for adults (Lewit & Coate, 1982).

TABLE 6.1. Studies of Price Elasticity That Included Adolescents

Study	Methods	Age group	Price elasticity
Lewit, Coate, & Grossman (1981)	1966-1970 U.S. Health Exam Survey data, linear	Teens 12-19 years	-1.44; -1.2 P
Wasserman, Manning, Newhouse, & Winkler (1991)	1970-1985 National Health Interview Survey data, poisson	Adults Teens	-0.23 -0.89, NS
Chaloupka & Wechsler (1997)	1993 college survey	College students	-1.11; -0.53 P
Chaloupka & Grossman (1996)	1992-1994 <i>Monitoring the Future</i> project, log, two-part models	8th, 10th, and 12th graders	-1.3; -0.67 P
Evans & Farrelly (1997)	1987 National Interview Survey data, probit and ordinary least squares, two-part models	18-24 years 25-39 years 40+ years	-0.58 P; NS; A -0.43 P; -0.33 A NS; P; -0.50 A
Chaloupka, Grossman, & Tauras (1997)	1992-1994 <i>Monitoring the Future</i> project, log, two-part models, smokeless tobacco	8th, 10th, and 12th graders	-0.59; -0.43 P
Lewit, Hyland, Kerrebrock, & Cummings (1997)	1990, 1992 Community Intervention Trial, logistic regression	9th graders	-0.87 P
Chaloupka et al. (1997)	1994 <i>Monitoring the Future</i> project, log, two-part models	8th, 10th, and 12th graders	-1.19; -0.62 P; -0.57 A
Evans & Huang (1998)	1977-1992 <i>Monitoring the Future</i> project, log, two-part models	12th graders	-0.20 to -0.50

Note. NS, not significant; NR, not relevant (not included in the equation or not reported); P, elasticity for participation; A, elasticity for the amount smoked per smoker.

Alcohol Use and Alcohol-Related Problems

Numerous studies show that raising the cost of alcohol has beneficial effects (Cook & Tauchen, 1982; Levy & Sheflin, 1983; Ornstein & Levy, 1983; Saffer & Grossman, 1987a, 1987b). Coate and Grossman (1988) found that as the price of beer went up, the frequency of adolescent beer consumption went down. Other studies have found similar relationships (Grossman & Chaloupka, 1997; Grossman, Chaloupka, Saffer, & Laixuthai, 1995; Grossman, Coate, & Arluck, 1987). As described with tobacco, the effect of price on consumption is greater for young people than it is for adults.

Even more important, youth who drink weekly or are heavy drinkers (typically defined as five or more drinks per occasion) are *more* price-sensitive than are other youth (Coate & Grossman, 1988), suggesting that price may particularly affect multiproblem youth. The differential price sensitivity of youth and of heavy drinking youth makes sense because youth have less disposable income than adults and heavier-drinking youth must advance more of their disposable income to purchase alcohol when the price rises.

Laixuthai and Chaloupka (1993) estimated that if the price of beer (the beverage of choice of youth) were indexed to inflation, then overall youthful drinking over any past year would have been reduced by 9% and youthful heavy drinking would have been reduced by 20%. Pacula's (1998) analysis of data from the U.S. National Longitudinal Survey of Youth indicated that doubling the tax on beer would reduce alcohol consumption among young people between three and six percent.

Other policy factors influence the effect of price on consumption, however. For example, Malmquist (1948) and Huitfeld and Jorner (1972) showed that in Sweden, when restrictions on the availability of alcohol increased, the influence of changes in prices and income on consumption decreased. Gruenewald, Ponicki, and Holder (1993) replicated this finding with U.S. data.

Alcohol price also affects drunk driving and alcohol-related crashes and fatalities. Several studies examined the impact of higher alcoholic beverage taxes or prices on drinking and driving among youth and/or young adults (Chaloupka & Laixuthai, 1997; Chaloupka, Saffer, & Grossman, 1993; Dee, 1999; Kenkel, 1993; Ruhm, 1996; Saffer & Grossman, 1987a, 1987b). As with the research on consumption, these studies generally, but not always, conclude that tax- or price-induced reductions in drinking and driving among younger populations would be larger than those inducements would be among adults. For example, Kenkel (1993) used data from the 1985 National Health Interview survey to estimate the impact of alcoholic beverage prices on self-reported

drinking and driving. His estimates imply that a 10% increase in the price of alcoholic beverages would reduce the probability of drinking and driving by over 7% among all men and by over 8% among all women, but that there would be a reductions of almost 13% among young men and over 21% among young women.

Cook (1981) investigated the short-term effects of changes in liquor taxes on the auto accident death rates and found that fatalities declined as taxes increased. Similarly, Saffer and Grossman (1987a) estimate that a 100% increase in the real beer tax (approximately \$1.50 per case) would reduce highway mortality by 27% among 18- to 20-year-old drivers. Other estimates suggest that a 15% decline in traffic fatalities among this age group would result from simply increasing the excise tax on alcohol at the rate of inflation (Saffer & Grossman, 1987a).

Increasing the cost of alcohol products also may have an effect on violent and nonviolent crime among all age groups (Cook, 1981; Markowitz, 2000a, 2000b, 2000c; Sloan, Reilly, & Schenzler, 1994). Using data from the Core Alcohol and Drug Surveys of College Students, Grossman and Markowitz (in press) concluded that higher beer prices could make significant reductions in several areas. It could reduce the number of college students (1) getting in trouble with the police or college authorities, (2) damaging property or pulling a fire alarm, (3) getting into an argument or a fight, and (4) being a victim or perpetrator of sexual coercion. Similarly, Markowitz (2000b) examined the impact of beer prices on violent behavior among teens using data from the YRBS and concluded that higher beer taxes would reduce the likelihood of teens getting into fights. Evidence also suggests that higher alcoholic beverage taxes and prices would lower child abuse and other violence toward children—problems that contribute to the development of adolescent problem behaviors (Markowitz, 2000b; Markowitz & Grossman, 1998).

Consumption of Other Drugs

Just as it does with alcohol and cigarettes, retail price affects the demand for other drugs. Pacula, Grossman, Chaloupka, O'Malley, and Johnston (2001) provide evidence from *Monitoring the Future* that the price of marijuana affects adolescent marijuana consumption. They obtained data on marijuana prices and potency from the Drug Enforcement Administration for local communities and related it to the prevalence in those communities of youth marijuana use. They estimated that the price elasticity for use of marijuana in the last 30 days ranged from -0.002 to -0.69 . This means that a 10% increase in the cost of marijuana could produce as much as a 6.9% decrease in the number of youth who used

in the last month. The study did not indicate whether the effect was more or less strong depending on how many other problem behaviors the young person was engaging in.

Because drugs are illegal, the only current means to increase price is by reducing the supply. Rydell and Everingham (1994) present a model-based policy analysis of alternative methods of controlling cocaine use in the United States. The study focuses on ways to intervene in the supply and demand processes to mitigate the cocaine problem. They note that the proportion of people who use cocaine has gone down in recent years. However, the total consumption of cocaine has not declined. They attribute this to a reduction in the number of occasional users and an increase in heavy users who consume cocaine at a rate approximately eight times that of light users. Thus, the trend in consumption by heavy users roughly cancels the downward trend in consumption by light users.

Rydell and Everingham (1994) examined the value of four interventions: source-country control, interdiction, domestic enforcement, and treatment of heavy users. The first three programs focus on supply control and the fourth is a demand control program. They concluded that money spent on supply control programs increases the cost to producers of supplying the cocaine. Further, they found that supply costs increase as producers replace seized product and assets, compensate drug traffickers for the risk of arrest and imprisonment, and devote resources to avoiding seizures and arrests. The producers and suppliers pass these price increases on to consumers, who then decrease consumption.

Summary

The strong and consistent findings regarding the effects of price on tobacco, alcohol, and other drug use are in keeping with numerous other studies showing the effect of various kinds of costs on human behavior. Increasing taxes on these products is an important method for reducing consumption of these products and the associated problems substance use produces. Efforts to increase the price of illicit drugs through interdiction would appear to affect their use, although it is not clear that this will affect drug abuse. These efforts may affect only occasional users.

Systematic examination of ways to influence other desirable and undesirable behaviors through manipulation of prices is called for in light of the evidence just reviewed. Further research could examine whether increasing the costs of undesirable behaviors *and* decreasing the costs of desirable behaviors will influence the frequency of those behaviors and the number of young people who engage in them. For example, decreasing the cost of condoms may increase their use. Decreasing the cost of recreational activities that promote prosocial behavior should increase

participation in them. Increasing the cost of weapons should decrease the number of young people who carry them.

Affecting Availability and Opportunity

A behavior is more likely to occur when the means to engage in it are readily available and opportunities for doing so are abundant. Reducing the availability of tobacco and alcohol clearly reduces the opportunities to consume them. Although some evidence suggests that policies limiting opportunity can prevent other problems, less research is available.

Access to Tobacco

Until recently, cigarettes and smokeless tobacco have been readily available to young people in the United States, despite the fact that sales to those under 18 are illegal in all 50 states and in the District of Columbia. In survey data, most youths say they can easily obtain cigarettes if they choose (Cummings, Sciandra, Pechacek, Orlandi, & Lynn, 1992). Researchers who study the success of purchase attempts reach the same conclusions. Jason, Ji, Anes, and Birkhead (1991) surveyed Woodbridge, Illinois tobacco outlets and found that between 60 and 80% of underage purchase attempts were successful. Forster, Hourigan, and McGovern (1992) found in Minnesota that 12- to 15-year-old male and female confederates could purchase cigarettes in 53% of over-the-counter attempts and 79% of attempts to purchase from vending machines. DiFranza and Tye (1990) estimated that in 1988, more than 3 million Americans under 18 consumed almost 1 billion packs of cigarettes and 26 million containers of smokeless tobacco, generating approximately 3% of tobacco industry profits in that year.

Boys and younger adolescents may have more difficulty than girls and older adolescents do in purchasing tobacco over the counter (CDC, 1996; Forster, Hourigan, & McGovern, 1992; Forster et al., 1997; O'Grady, Asbridge, & Abernathy, 1999). Younger smokers are more likely than older smokers are to cite vending machines as their primary source of cigarettes (CDC, 1996; Forster et al., 1997). Retail outlets with self-service displays are more likely to sell cigarettes to underage youth than outlets keeping tobacco behind the counter (Cummings, Hyland, Saunders-Martin, & Perla, 1997; Wildey, Woodruff, Pampalone, & Conway, 1995).

Researchers have evaluated several strategies for reducing illegal sales of tobacco to young people. Attempts to simply educate merchants about the law have limited impact (Feighery, Altman, & Shaffer, 1991). Similarly, vendors participating in voluntary industry-sponsored pro-

Helping Adolescents at Risk

Prevention of Multiple Problem Behaviors

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