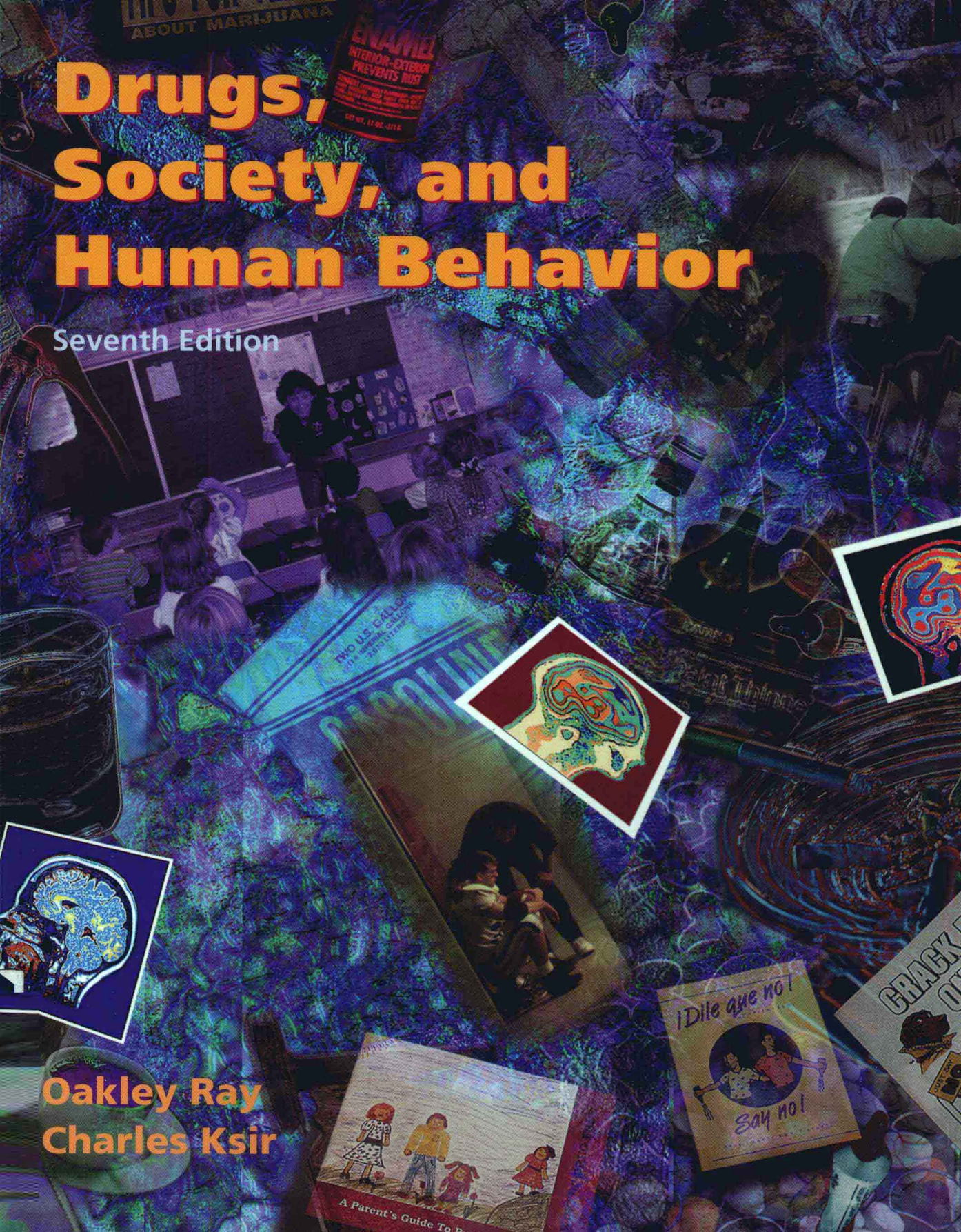


Seventh Edition

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Drugs, Society, & Human Behavior

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PREFACE

The first edition of *Drugs, Society, & Human Behavior* was published in 1972, in a time of intense curiosity about psychoactive drugs and little understanding of how they worked and how they related to society. At that time, people were most interested in LSD, marijuana, and amphetamines. This text provided students with factual, unbiased information about those and other drugs in a way that could be understood by those without a background in biology or chemistry. There was a need for such information, and *Drugs, Society & Human Behavior* met that need for thousands of students. However, perhaps the greater benefit was provided by the historical and social context in which the drug information was presented. Students learned that psychoactive drug use is neither a new nor an isolated phenomenon but rather a feature of every human society. They learned that alcohol, coffee, and cigarettes were drugs also, and they learned to compare their actions, effects, and social roles with those of the illicit drugs.

RECENT DEVELOPMENTS

Much has changed in the 20-plus years since the publication of the first edition of *Drugs, Society, & Human Behavior*. Whereas the 1970s were a period of widespread experimentation with marijuana and hallucinogens, the 1980s brought increased concern and conservatism, along with decreased use of alcohol, marijuana, and all illicit drugs. Not only has drug-using behavior changed, but so have attitudes and knowledge, and of course the particular drugs that are of immediate social concern have gone through a series of changes: LSD gave way to "angel dust," then to heroin, then cocaine, then "crack." In the 1990s, use of LSD and marijuana have increased somewhat, although not to the levels of the 1970s.

Throughout these changes, our old "standbys", alcohol and tobacco, have remained with us and remained major social issues and major social problems. Regulations have changed, new scientific information is available, new approaches to prevention and treatment are being tried, but throughout these past twenty years, these substances continue to be the most widely used drugs in our society.

SUCCESSFUL FEATURES

This text approaches drugs and drug use from a variety of perspectives (i.e., behavioral, pharmacological, historical, social, legal, and clinical). This allows the book to appeal to a wide range of students and helps them to apply the content to their own special needs.

This was the first introductory text to expand the coverage of alcohol to two chapters. In Section Four, Chapter 10 covers alcohol and physiology and Chapter 11 covers alcohol and society.

NEW IN THE SEVENTH EDITION

- New Chapter 3: "Addictions: Theory and Treatment" presents this critical information early in the text. Responding to suggestions made by users of this text, specific treatment information about alcohol, heroin, or cocaine is now included in the corresponding chapter covering that substance.

- Three chapters have been renamed: the former "Nicotine" chapter is now titled "Tobacco," to reflect a broad perspective on this complex product. The term *opiates* is now used instead of *narcotics* to refer to that group of drugs primarily because the term is more commonly used by modern researchers and is more accurate. The "Depressants" chapter was renamed "Depressants and Inhalants," to reflect increased coverage of inhalant abuse, a growing concern in our society today.

- When references are made to psychiatric diagnoses (e.g., for dependence or depression), the new criteria from the 1994 *Diagnostic and Statistical Manual*, fourth edition (DSM-IV), are used and set out in *DSM-IV* boxes.

- New topics of current interest: coverage of various theories of addiction; a new table comparing the dependence liabilities of the major types of drugs; the approval of naltrexone as a treatment for alcoholism; new comparisons of the effect of cocaine and other drugs on the developing fetus; a new table organizing the most commonly abused inhalants into groups based on chemical type and effects; recently

introduced drugs for the treatment of schizophrenia and depression; and new research on the limited effectiveness of the DARE program in preventing drug use.

- We have made a special effort, again in response to suggestions from instructors, to make the various chemical diagrams found throughout the book more visually interesting, more informative, and more consistent in their appearance by employing computer-generated ball-and-stick models.

PEDAGOGICAL AIDS

- Brief *chapter objectives* are provided as an aid at the beginning of each chapter to alert the student to what he or she will be learning in that chapter.

- *Key terms* are listed at the beginning of each chapter and boldfaced in the text for easy identification.

- *Definition boxes* define key terms and provide pronunciation guides as needed where each term is explained in the text.

- Each chapter contains *FYI*, *Up for Debate*, and *Your Turn* boxes, which provide additional content, exercises to involve the student, and information on current concerns and controversies. *DSM-IV* boxes providing the latest psychiatric diagnostic criteria are used when appropriate.

- A *chapter summary* assists students with the review process and reinforces major concepts.

- *Review questions* are provided for each chapter for review and analysis of the material presented.

- *Assess Yourself!* activities and exercises allow the students to apply some of the major concepts learned in that section.

- A comprehensive *glossary* is provided as a reference at the back of the book, listing all key terms and identifying the chapter in which the term is explained.

- *Appendices*. Appendix A provides a list of drug names, allowing for quick reference to determine the type of drug, and a cross-reference to brand and generic names for prescrip-

tion drugs. Appendix B contains a list of drug information organizations and resources, including addresses and "hot lines" the student can contact for additional information. Internet resources are now included.

SUPPLEMENTARY MATERIALS

Instructor's Manual and Test Bank

Prepared by Rustem S. Medora, Ph.D. of the University of Montana, this comprehensive, unique Instructor's Manual is available to qualified adopters of the text. It includes the following practical features:

- A Test Bank of more than 1000 examination questions, including multiple choice, true/false, matching, and essay questions
- Chapter overviews
- Chapter outlines with teaching suggestions, key terms, and relevant transparency masters noted in margins
- Student activities, exercises, and assignments, which assist the student in evaluating his or her own values regarding drug use and abuse
- Related issues, including current topics for class discussion
- Current resources lists, including annotated readings, films and journals
- Transparency masters of the most important and useful illustrations found in the text, as well as some additional illustrations that are not included in the text

ESATEST III Computerized Test Bank

This software provides a unique combination of user-friendly aids that enable the instructor to select, edit, delete, or add questions, as well as construct and print tests and answer keys. The computerized Test Bank package is available to qualified adopters of the text for the IBM DOS and Macintosh computers.

Acetate Transparency Package

Thirty overhead transparencies in four-color are provided to assist in classroom presentations of the

more difficult concepts in the text. These are available to qualified adopters of the text.

ACKNOWLEDGEMENTS

We would like to express our appreciation to the following instructors who reviewed the sixth edition and helped lay the groundwork for the improvements and changes that were needed in the seventh edition:

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Keeping up with all the changes in this field is a formidable task, one which is aided immensely by our continuing to teach courses based on the text and receiving feedback and new information from our students, from students at other institutions, and from other faculty members who use the text. We appreciate (and need!) all that input. Although we also welcome regular mail, in keeping with the information age we invite comments, questions, and criticisms to be sent by electronic mail to cksir@uwyo.edu.

Oakley Ray
Charles Ksir

Current Topics. We address issues related to drug use that have the greatest impact today.

Color Presentation. Color has been included throughout the text and in many of the photographs and artwork for a presentation that is both instructional and visually exciting. *Drugs, Society, & Human Behavior* includes tools called pedagogy to help you learn. The next pages graphically illustrate how to use these study aids to your advantage.

Depressants and Inhalants

CHAPTER 8

KEY TERMS

sedatives
hypnotics
depressants
barbiturates
inhalants
GABA
epilepsy

OBJECTIVES

After reading this chapter, you should be able to:

- Distinguish among barbiturates, benzodiazepines, alcohol, inhalants, and other classes of depressant drugs and know something of the history of each major group.
- Explain the mechanism of action of the barbiturates and the benzodiazepines in relation to some of the practical limitations of sedative-hypnotic drugs in treating anxiety, insomnia, and epilepsy.
- Describe the usefulness and some of the practical limitations of sedative-hypnotic drugs in treating anxiety, insomnia, and epilepsy.
- Discuss the ability of these drugs to produce both psychological and physical dependence and be able to describe the withdrawal syndrome.
- Discuss the ability of these drugs to produce both behavioral and physiological toxicity.
- Describe typical patterns of sedative abuse and contrast them with inhalant abuse.

owners, depressants, sedatives, hypnotics, gin-in-a-piili: known effect in the brain that can be summed up as decreased neural activity. What are the behavioral effects? As suggested by one of the proposed names, if you know what alcohol does, you know what these drugs do. They come from several different chemical classes but are grouped together because of their common psychological effects. A low dose does these drugs may be prescribed for daytime use to reduce anxiety (as sedatives). At higher doses many of the same drugs are prescribed as sleeping pills (hypnotics). This group of previously drugs is often referred to as sedative-hypnotics, part of a larger group of substances considered to be CNS depressants. The most widely depressant is alcohol, which is discussed in detail in Chapter 16.

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Chapter 5 The Nervous System 101

The diagram illustrates the biochemical pathway for the synthesis of neurotransmitters. It starts with Tyrosine, which is converted to DOPA by the enzyme tyrosine hydroxylase. DOPA is then converted to Dopamine by the enzyme DOPA decarboxylase. Finally, Dopamine is converted to Norepinephrine by the enzyme Dopamine beta oxidase. A legend indicates that black squares represent carbon, white squares represent oxygen, grey squares represent hydrogen, and blue squares represent nitrogen.

Fig. 5-7 Neurons use enzymes to synthesize the neurotransmitters dopamine and norepinephrine.

from which they will be released. This storage process also calls for recognizing the transmitter molecules and concentrating them inside the vesicles.

As an electrical signal arrives at the axon terminal, some of the vesicles fuse with the cell membrane and then open, releasing several thousand neurotransmitter molecules at once. This process of neurotransmitter release takes place within a few thousandths of a second after the electrical signal reaches the terminal.

Once the neurotransmitter molecules are released into the small synaptic space between neurons, a particular molecule may just float around briefly, or it may be one of the ones that bind to the receptor on the membrane of the other neuron (Fig. 5-3). This receptor represents the most important recognition site in the entire

process, and it is also one of the most important places for drugs to interact with the natural neurotransmitter. With thousands of neurotransmitter molecules floating freely in the synapse,

precursors: chemicals that will be acted on by enzymes to form neurotransmitters.

uptake: an energy-requiring mechanism by which selected molecules are taken into cells.

synthesis: the forming of a neurotransmitter by the action of enzymes on precursors.

enzyme: a large molecule that assists in either the synthesis or metabolism of another molecule.

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FYI boxes present related information and studies about drug and alcohol abuse.


Your Turn boxes provide situations with real-life applications.

288 Section Five Familiar Drugs

FYI Young Children and Cigarette Advertising

In 1992 a flurry of editorial writing and reactions from advertising agencies and cigarette companies were generated by an interesting and unusual experiment. A sample of 229 children, aged 3 through 6, were shown various advertising logos, including the Disney Channel's mouse ear, the Chevrolet and Ford symbols, and the Nike athletic shoe symbol. They were then allowed to match each logo with product symbols, such as a car, shoe, television, etc. The inclusion of Camel cigarettes' Old Joe the Camel revealed that 30% of the 3-year-olds and 91% of the 5-year-olds correctly matched the cigarette advertising. This indicates that it includes a 'character' perhaps especially if it includes a 'cartoon character such as Old Joe, does have a major impact on young children. Various proposals have been raised for additional advertising reform, including renewed calls for total bans on advertising and promotion of tobacco products.

JOE CAMEL THE LATER YEARS



Some of them are smoking again. Some of the programs that combine multiple approaches seem to have better success, with up to 40% remaining abstinent for 1 year.²⁹

If nicotine is the critical thing, why not provide nicotine without the tars and carbon monoxide? Prescription nicotine chewing gum became available in 1984, after carefully controlled studies showed it to be a useful adjunct to smoking cessation programs. In 1991, several companies marketed nicotine skin patches that allow slow release of nicotine to be absorbed.

Chapter 3 Addictions: Theory and Treatment 47

DSM-IV Psychiatric Diagnosis of Substance Disorders

Diagnostic Criteria for Substance Dependence

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:

- (1) Tolerance, as defined by either of the following:
 - (a) A need for markedly increased amounts of the substance to achieve intoxication or desired effect.
 - (b) Markedly diminished effect with continued use of the same amount of the substance.
- (2) Withdrawal, as manifested by either of the following:
 - (a) The characteristic withdrawal syndrome for the substance.
 - (b) The same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms.
- (3) The substance is often taken in larger amounts or over a longer period than was intended.
- (4) There is a persistent desire or unsuccessful efforts to cut down or control substance use.
- (5) A great deal of time is spent in activities necessary to obtain the substance.
- (6) Important social, occupational, or recreational activities are given up or reduced because of substance use.
- (7) The substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.

Diagnostic Criteria for Substance Abuse

A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period:

- (1) Recurrent substance use resulting in failure to fulfill major role obligations at work, school, or home.
- (2) Recurrent substance-related legal problems.
- (3) Recurrent substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance.
- (4) Continued substance use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance.


B. The symptoms have never met the criteria for Substance Dependence for this class of substance.

DSM-IV boxes contain the latest psychiatric diagnostic criteria.

72 Section One Drug Use in Modern Society

What Are Your Rights?

Do you know what your own rights and liabilities are under the laws in your area? Suppose you are driving and a police officer stops you for driving erratically. Smelling no alcohol, she suspects some other chemical agent. Can she search your car for drugs? Just the passenger compartment or the trunk as well? Can she search the people in the car? If she finds marijuana in your car, will you be charged? What if the marijuana is found on the person of a passenger in your car? If you don't know the answer to these questions, it might be interesting to find out. You could invite a member of the police force to meet with a group of classmates to talk about this and other issues of drug enforcement. Another idea would be to interview someone from the police force regarding this issue and then write a small article for the campus newspaper.



worth spending a bit of time to try to understand this table because you can learn a lot about how much you can probably drink to avoid going above a specified BAC.

First, Table 10-3 makes the simplifying assumption that all of the alcohol is absorbed quickly and "in one hour," so that there is little opportunity for metabolism. If the 150-pound female had a tank of about 100 pounds (12.5 gallons or 45 liters) of water and just dumped 1 ounce (28.3 g) into it and stirred it up, the concentration would be about 0.6 g/liter, or 0.06 g/100 ml (0.06%). Fig. 10-3 shows a schematic of such a tank. The 150-pound average male has a "tank" with more water in it, so his alcohol concentration after 1 ounce is about 0.05%. The major factor determining individual differences in BAC is the volume of distribution, so find your own weight on this chart and estimate how many drinks could be poured into your "tank" to obtain a BAC of 0.05%.

Second, notice that several beverages are equated to 1/2 ounce of absolute alcohol. A 12-ounce can or bottle of beer at about 4.2% alcohol contains $12 \times 0.042 = 1/2$ ounce of alcohol. This same amount is found in a glass of wine containing about 4 ounces of 12% alcohol, 1 ounce of 100-proof spirits, or 1.25 ounces of 80-proof spirits. Each of these can be equated as a standard "drink."

We have not yet taken metabolism into account, but we can do so with one more simple calculation. As we already know, alcohol is removed by the liver at essentially a constant rate of 0.25 to 0.3 ounce of ethanol per hour. There are some individual differences in this rate, but most people fall within this range no matter what their body size or drinking experience, unless they have consumed so much alcohol that their liver is damaged. To be on the safe side, estimate that you can metabolize about 0.25 ounce per hour, and note that this is one half of one of our standard drinks (one beer, one shot, or one glass of wine). Over the course of an evening, if your rate of intake equals your rate of metabolism, you will maintain a stable

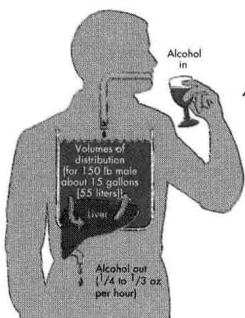


Fig. 10-3 The relationship between blood alcohol concentration and alcohol intake.

BAC. If you drink faster than one drink every 2 hours, your BAC will climb. The extra drinks, those over the one every 2 hours, will be added to your tank. Let's take an example from the chart: a 150-pound male goes to the bar at 8 pm and consumes six beers before midnight. During that 4 hours his liver metabolized the alcohol from two of the beers, so he still has four drinks, or 2 ounces of ethanol, in his system. His BAC at midnight should be about 0.10%, making him legally intoxicated and unfit to drive home. If he had had two fewer beers (four over the 4-hour period), his BAC would be about 0.05%. In other words, once

Instructional full-color illustrations and photos enhance learning with an exciting visual appearance.

ASSESS YOURSELF! exercises allow you to evaluate your understanding with a variety of activities and inventories.

Should Beer Labels Describe Alcohol Content?

It may seem strange in the era of nutrition labels on everything, but what is perhaps the most important ingredient in beer has remained a mystery to most consumers. Since the Prohibition era, it has been illegal to put alcohol content on a beer's label. In 1992 a federal judge overthrew that regulation, apparently paving the way for alcohol content labels. In 1993, Anheuser-Busch, the nation's largest brewer, announced on its website that it would begin putting alcohol content on its beer labels. However, the ATF wasn't so certain that this was a good idea.

What the ATF folks were concerned about was that people would begin picking beers for higher alcohol content, "stronger" beer, and that this would cause the manufacturers to advertise their new, "stronger" beer. The ATF also seems to be justified in its concerns. Canada's Molson brand, began just such an advertising campaign for its new Molson Ice beer, which has a higher alcohol content than their regular beer. The

ATF Bureau threatened action, and Miller backed down in early 1994. Later in 1994 the Alcohol Control Company brought the issue of alcohol content on beer labels to the U.S. Supreme Court, hoping for a final ruling.

There are really two intertwined issues: Should the companies be allowed or even required to put alcohol content on the labels in order to inform consumers? Should the companies be allowed to refer to higher alcohol content in their advertising? Although both contentions have had alcohol content, the companies have had alcohol content with both high and lower content, and the consumer has no way of knowing. So, beer marketers seem ready to challenge the prospect of advertising alcohol content and the pressures causing groups as well as the government. What do you think would happen if labeling and advertising alcohol content were allowed? What is the proper role of the regulatory agency, in your opinion?

motor tests showed disruption of performance at an average BAC of 0.05% in abstainers, 0.07% in moderate drinkers, and 0.1% in heavy drinkers.¹⁰ These results show clearly that behavioral and CNS tolerance to alcohol does develop. They also indicate that the heavy drinker after equal amounts of alcohol develops a tolerance to alcohol that does not exist in the moderate drinker. It is established that neural tissue becomes tolerant to alcohol, and tolerance can apparently develop even when the alcohol intake is well spaced in time.

A partial explanation might be that the heavy drinker is better motivated to conceal the alcohol-induced impairment and probably has had more practice. Performance differences may only reflect the extent to which the two groups have learned to overcome the disruption of nervous system functioning. Another explanation may be that the CNS in the heavy drinker develops a tolerance to alcohol that does not exist in the moderate drinker. It is established that neural tissue becomes tolerant to alcohol, and tolerance can apparently develop even when the alcohol intake is well spaced in time.

ASSESS YOURSELF!

Chapter 14 Over-the-Counter Drugs 333

OTC Products

The following "product labels" include the actual list of ingredients from some OTC products. Your job is to figure out what each product is used for (hint: none of them is a laxative, acne medication, or contraceptive).

Use for:

Use for:

Use for:

Use for:

Use for:

Use for:

Up for Debate boxes present controversial and timely topics for further discussion.

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Drug Use in Modern Society

The interaction between drugs and behavior can be approached from two overall perspectives. Certain drugs, the ones we call psychoactive, have profound effects of behavior. So part of what a book on this topic should do is describe the effects of these drugs *on behavior*, and later chapters do that in some detail. Another perspective, however, views drugs as *behavior*. The psychologist sees drug-taking behaviors as interesting examples of human behavior that are influenced by many psychological, social, and cultural variables. In the first section of this text, we focus on drug taking as behavior that can be studied in the same way that other behaviors, such as aggression, learning, or human sexuality, may be studied. ■

Chapter 1 Drug Use: An Overview

Which drugs are being used and why?

2 Drug Use as a Social Problem

Why does our society want to regulate drug use?

3 Addictions: Theory and Treatment

What are the differences among the various approaches to treating alcoholism, opiate addiction, cocaine use, and others? How well do these programs work?

4 Drug Regulations

What are the regulations and what is their effect?