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THE CURRENT STATUS OF RESEARCH IN FORENSIC PSYCHOPHYSIOLOGY AND ITS APPLICATION IN THE PSYCHOPHYSIOLOGICAL DETECTION OF DECEPTION

By

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Since 1986 there have been unparalleled advances in the psychophysiological detection of deception (PDD) processes and procedures. This paper traces the emergence of a new emphasis in PDD research; the development of forensic psychophysiology in an academic discipline; provides an overview of computerized polygraphs now in use for collecting physiological data; introduces statistical algorithms for analyzing physiological data; identifies new sensors and transducers currently under study; and describes a new instrument now under development.

The period between 1986 and the present has been one of unparalleled advances in the psychophysiological detection of deception testing procedures and processes. "Contrary to the general assumption that technology is an offshoot of science, the primacy is really the other way around. Great advances in science tend to occur after technological innovation has given the mind access to a broader range of information."[1] And so it is with the psychophysiological detection of deception (PDD). More sensitive sensors; more efficient transducers; improved means of digitizing and recording physiological data; digitizing analog data at increasingly high sample rates; and algorithms to evaluate physiological data in an unlimited fashion, all represent technical innovations that will enhance the advancement of the new and evolving science of forensic psychophysiology.

This same period has seen a sharp increase in attention to research and to the education and training of the examiner. This focus was brought about by the Defense Authorization Act of 1986 in which the Secretary of Defense was directed to carry out research in PDD testing; and by DoD Director 5210.78, which established the Department of Defense Polygraph Institute as a higher education and research facility.[2] The mission to complete the Congressionally mandated research was assigned to the Department of Defense Polygraph Institute.

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The focus of attention on the professional development of the examiner is clearly illustrated in the knowledge content of a Master's Degree level curriculum in Forensic Psychophysiology, which has been implemented at the Institute.[3] All students are required to complete the first semester and the internship portion of this curriculum before they can be certified by their agencies to become unsupervised examiners. This academic curriculum provides a basis for a thorough understanding of the scientific psychological, physiological, and psychophysiological concepts, systems, processes, and applications involved; as well as the scientific bases for test development, standardized test administration, research methodology, statistics and ethics. This curriculum has been reviewed and recommended for implementation by the DoDPI's Advisory Committee;[4] by the Deputy Under Secretary of Defense for Security Policy [DUSD(SP)];[5] the Deputy Assistant Secretary of Defense for Counterintelligence and Security Countermeasures [DASD(CI&SCM)];[6] and the Curriculum and Research Guidance Committee.[7]

The focus on research is expected to produce significant changes in PDD test formats, physiological data collection processes, physiological data analysis, diagnostic procedures, and the recognition and identification of countermeasures. The use of computer algorithms, which will be discussed later, to analyze physiological data collected during PDD tests appears to be a promising method of determining the validity and reliability of a variety of PDD tests, and will enhance the accuracy of PDD testing.

Forensic Psychophysiology and PDD Tests

Psychophysiology is a science involving the presentation of stimuli to one or more of the human senses to determine the effects of those stimuli, when psychologically processed and evaluated, on selected physiological activities.[8] Psychophysiological detection of deception tests[1] also involve the presentation of stimuli to one or more of the human senses, normally in the form of verbal questions, to determine the effects of the questions, when psychologically processed and evaluated, on selected physiological activities. Since most PDD tests are conducted to provide information to assist in the resolution of crimes, whether the crime be murder or espionage, the process falls, like other forensic tests, within the criminal justice system. As such, PDD tests can be called forensic tests.

Since the preponderance of principles, concepts, systems, and processes applied in PDD testing are drawn from the discipline of psychophysiology; and since nearly all PDD tests can be categorized as forensic tests, it is logical and appropriate to define "forensic psychophysiology" as a science that deals with the relationship and applications of PDD tests to the legal system.[9]

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[1] For years the word *psychophysiology* and the term *psychophysiological detection of deception* have been associated with the detection of deception by scientists and others.

The use of the modifier *forensic* in forensic psychophysiology delineates and delimits the scope of the broader science of psychophysiological to legal system applications. These include those systems, processes and applications that are an integral and functional part of the psychophysiological detection of deception. Similarly, the modifier *forensic* delineates and delimits the discipline forensic psychology from the broader discipline of psychology; the discipline forensic psychiatry from the broader discipline of psychiatry; the discipline forensic odontology from the broader discipline of dentistry.[9] Forensic psychophysiology is the discipline that provides the student, the practitioner and the researcher, with the theoretical and applied psychological, physiological and psychophysiological fundamentals for understanding and conducting PDD examinations.

Computers and PDD Tests--Exploratory Phase

The use of computers in the process of conducting PDD tests has been in the developmental stages since 1962 and have progressed through several phases. Kubis[10], Yankee[11], and Burch[12] studied and assessed various potential computer applications and feasibility considerations. In the second phase, investigators McGuigan[13], Podlesny[14], James[15], Kircher and Raskin[16,17], Honts[18], Giles and Yankee[19] and Timm[20] used a variety of means to collect, quantify and evaluate physiological data collected with laboratory or traditional polygraphs. It was during this phase that Kircher and Raskin[21] produced the first computer assisted polygraph system (CAPS) and, of major significance, developed the first algorithm to be used for diagnostic purposes.

The current phase has provided three American computerized polygraphs that stand alone and need not be interfaced with traditional or laboratory polygraphs. The three systems are: the Axciton[22], the Computer Polygraph System(CPS)[23], and the Lafayette (LX-2000-101 and 105)[24]. Each system has its own hardware and software to sample physiological data at higher rats than ever before; and, each can be provided with algorithms to evaluate the physiological data for diagnostic purposes. The first two systems use IBM or compatible computers while the latter uses MacIntosh computers.

Computerized polygraphs have several advantages over traditional polygraphs. Traditional polygraphs require more time to learn how to operate and collect good interpretable physiological data; will distort or lose data when pens enter mechanical pen stops; and they require frequent calibration. Computerized polygraphs, on the other hand, are easy to learn how to use; are not subject to pen stop distortions of the data; allow for editing data for easier and more objective visual analysis without altering the original information; provide word processing and data base functions for more efficient test administration processing; and can store data on disks and simultaneously (or later) print out hard copies of the data. The major advantage, however, is that the computerized polygraph can convert the analog physiological signals into digital signals which are necessary for algorithm developments.

All polygraphs used in PDD testing, traditional and computerized, continue, with minor exceptions, to collect cardiovascular, electrodermal and respiratory information with the same

sensors and transducers that have been used for over fifty years. However, the CPS and the Lafayette LX-20001-101 and 105 have provided input devices for increasing the number of recordings that can be collected. The Axciton is being modified to do the same. These modifications may allow the collection of physiological data using one or more of the sensors or transducers now under study. These will be discussed later.

Computers and PDD Tests--Data Analysis Developments

The initial steps in computerizing the PDD process have progressed rather slowly over the years. As mentioned earlier, Kircher and Raskin were the first to produce an algorithm that could process and analyze physiological responses to test questions and assess the probability that the questions were answered truthfully. Although developed later, the Axciton and the Lafayette LX-2000-101 and 105 computerized polygraphs have similar capabilities.

The CPS

The data base for the CPS algorithm was collected from 40 subjects, who had participated in a mock theft scenario, to create a standardization sample[16]. Test data were used to develop a discriminate function for electrodermal, cardiovascular and respiration measures. The distribution of discriminate scores were used to derive Bayesian assessments of the probability of truthfulness. Dichotomous computer classification of subjects in the standardization sample were 93% correct, while blind numerical evaluations of the same data by a human interpreter were 89% correct. On cross validation with data from another group of 48 subjects, computer outcomes were 94% correct and human interpretations were 92% correct.

In a similar study, using physiological data collected during tests involving field criminal cases, Raskin *et al.*[17] reported that decisions made by the original examiners on individual relevant questions ranged from 91 to 95% correct on confirmed truthful answers and 85 to 95% correct on confirmed deceptive answers. The computer interpretation of the data were higher and ranged from 95 to 96% on confirmed truthful subjects and 84 to 96% on confirmed deceptive subjects.

The Kircher and Raskin algorithm is proprietary and functional with the CAPS and the CPS. Its diagnostic capability is limited to "control question" type tests. The CAPS and the CPS have been used by field PDD examiners, particularly the U.S. Secret Service, for over a decade. There are no recent studies regarding the effectiveness of the algorithm, as a diagnostic tool, from laboratories or from field applications.

The Axciton

This was the first totally computerized polygraph, and has been used for laboratory and field applications for several years. Although the Axciton has an algorithm for rank order scoring of physiological data associated with responses to questions, it is rather rudimentary, and cannot be recommended for diagnostic decision making.

In 1993 the Applied Physics Laboratory, Johns Hopkins University, completed an algorithm to score zone comparison control question PDD tests from PDD field test data collected on Axciton computerized polygraphs. The Polygraph Automated Scoring System (PASS), Version 2.1[25] software was in service for a very brief period and was replaced by Polyscore, Version 2.3. The Polyscore 2.3 software uses a sophisticated mathematical algorithm to analyze the data, then displays a probability to indicate deception, no deception, or inconclusive. Polyscore 3.0 is expected to be out in the fall of 1994.

The Polyscore 2.3 data base was established by using 539 PDD field criminal examinations. Of the 539 PDD examinations, 162 were confirmed cases. The other 377 were included in the data base if the decisions made by the field examiners were agreed upon by two different examiners or if verified by independent means. Of the 162 confirmed cases, 142 were called correctly and 20 were called inconclusive by the original examiners. The algorithm diagnosed 150 of the 162 correctly, identified 11 as inconclusive, and produced one error.[26] Thus, the algorithm reduced the inconclusives by nine and increased the number of correct calls from 142 to 150.

Lafayette LX-2000-101 and 105

This computerized polygraph can perform many of the same functions as the CPS and the Axciton as regards data collection, storage, editing and printing functions. This Lafayette system does not have an algorithm for data analysis but is expected to use Polyscore, Version 2.3, after the algorithm is converted to a MacIntosh compatible language.[27]

Computers and PDD Tests--Assessment

Although there are three computer polygraph systems on the market and in field use, there are only two algorithms--the CPS and the Polyscore 2.3. These algorithms are designed to analyze data collected from one type of test--the Control Question Test. Physiological data can be collected for other types of tests by all three computer polygraphs, however, data from those tests must be analyzed by traditional human interpretation. Currently, algorithms for the Modified General Question Test (MGQT) and the Test for Espionage and Sabotage (TES) are being developed by the Applied Physics Laboratory at the Johns Hopkins University.

Since the difference between the accuracy rates for examiners using traditional scoring systems and the algorithms is not statistically significant, most field examiners are using the algorithm as a "back-up" and as a "second opinion." This will probably continued to be the value of the algorithm until more sophisticated systems, capitalizing on broader data bases and including a broader range of test formats, can be developed that will significantly surpass human evaluation capabilities. In addition, when new means for collecting physiological data that are not amenable to human interpretation, such as systolic time intervals, are developed, the algorithm approach will be the only method capable of making a diagnosis.

There is no danger in overestimating the importance of computers in the advancement of PDD testing and procedures. However, all aspects of computerized PDD operations are still in the developmental stages. Consequently, cautious, intelligence scrutiny, and careful evaluation of new advances must be a constant guide in determining the degree of reliance one can place on these systems.

The Electroencephalography (EEG) and PDD Tests

One of the new approaches to PDD testing involves the use of Event Related Brain Potentials (ERP) recorded with an electroencephalograph (EEG) polygraph. The application of ERP to lie detection is novel in two ways: (1) recorded cortical activity is the sole physiological indicator; and (2) the electroencephalographic signal examined is hypothesized to represent the cognitive (versus emotional) process of recognition.[28] The wave form used to identify a reaction to an "oddball" stimulus among other stimuli (for example, a particular gun used in a crime among other guns), is the P-300 wave, a positive inflection in the EEG signal that occurs 300 or so milliseconds after the stimulus is presented.

Laboratory studies report accuracy rates for identifying guilty knowledge or concealed information in a range from 87% to 100%. Rosenfeld *et al.*[28] used a GKT paradigm and correctly identified nine of ten subjects (90%). In another study Rosenfeld *et al.*[29] used a modified CQT and reported 89% accuracy. Farwell *et al.*[30] used a GKT paradigm with 40 subjects and reported five as inconclusive and 35 decisions as accurate. Johnson *et al.*[31] using a pre-employment type test paradigm of 31 subjects reported an accuracy rate of 87%.

One field study[32] using the ERP procedure in conjunction with a traditional polygraph and a GKT test format reported a 44% overall accuracy rate with the ERP as compared to 100% accuracy with the traditional polygraph.

There are two serious limitations to this approach to lie detection: (1) there are a limited number of forensic investigation cases where ERP tests using a GKT format could be used[33], consequently the value of forensic PDD tests in resolving cases would be diminished as compared to the robust utility of CQT's and (2) the results of the one field study was not very promising as compared to the higher accuracy rates obtained in the laboratory studies. It should be noted, nonetheless, that the use of ERPs to detect deception is relatively new and may become more practical and useful as different tests formats are studied.

New Physiological Equipment--Sensors and Transducers

One of the three dependent measures in PDD testing is the cardiovascular response recorded from a blood pressure cuff placed on the arm. The cuff, when properly attached and inflated, will partially occlude the blood flow in the brachial artery, and retard the return of venial blood. After a few minutes, this will become uncomfortable for some individuals and painful for others. Research is currently underway to test noninvasive sensors and transducers to replace the blood pressure cuff, eliminate discomfort, and provide cardiovascular data that is easier to

quantify. Instruments and techniques being investigated include the Finapres, the Cortronic, the Impedance Cardiograph, one type of Systolic Time Interval (STI), Pulse Wave Velocity (PWV), Thumb Cuff, Plethysmograph, and the Cardio Activity Monitor (CAM).

The Finapres is a tranducer that is applied to a finger and responds to changes in blood volume in the arterioles and capillaries. As these changes are monitored and processed through an algorithm, the information serves as the basis for inferring systolic pressure, diastolic pressure, and heart rate.[34] The Finapres can be used to monitor cardiovascular activity, for hours or days, without discomfort to the individual.

The Cortronic transducer, unlike the Finapres, uses a standard, occlusive blood pressure cuff technique. The traditional cuff requires more pressure than the Cortronic. Like the Finapres, the Cortronic device uses less pressure and can be applied for longer periods of time than the traditional blood pressure cuff, without discomfort to the individual.

The Impedance Cardiograph (ZCG) provides a noninvasive but relatively comfortable means for recording cardiovascular activity. Application of a high frequency (20 to 200 kHz) constant-current electrical signal across the thoracic cavity causes a surface impedance which can be measured between the two electrodes. This will vary as a function of the volume of the contained region.[35] ZCG can be used to estimate many of the whole body cardiovascular parameters such as heart rate.[36]

Systolic Time Intervals (STI) are derived from standard ECG recordings. Systolic and diastolic blood pressure can be evaluated as a series of selected intervals within the cardiac cycle. Because these intervals are precise time measures, quantification is relatively straight forward. There are various STI's but the one currently under investigation is the R Wave Peak Carotid Incisura (RWPCI).[37]

The Pulse Wave Velocity (PWV) is obtained by placing strain gauge transducers at the brachial and radial arteries of the arm and measuring the time it takes for the pressure pulse to pass through the two locations.[38] These time measures will be converted to voltages and plotted as an amplitude wave form which has been shown to be highly correlated with mean arterial pressure.[39]

While PDD research has been completed using the plethysmograph, the thumb cuff and the CAM, the results have not been definitive. Further work needs to be done, with these sensors as well as those mentioned earlier, before a decision can be made regarding the most effective way to record cardiovascular activity for PDD purposes.

All of these devices have advantages and disadvantages, however, if the results of any one of these studies clearly demonstrate that a particular device is superior to the others and to the traditional blood pressure cuff, it will undoubtedly be adapted.

Another development in sensors and transducers, unrelated to cardiovascular recordings, is the use of s Shure 570S lavaliere microphone to record oral, 'yes' or 'no' responses to questions asked during a mock PDD examination. The voice responses will be digitized and analyzed using Canadian Speech Research Environment (CSRE) spectrum analysis software, and customized spectrum analysis software written by Dr. Victor Cestaro.[40] This approach to voice spectrum analysis for PDD testing should not be confused with vocal stress analysis systems which examine traces recorded from laryngeal microtremors and thought to be associated with stress, and the stress in turn, with lying.[41] The latter has been a stand-alone method for detecting deception, while the former is far more complex in its analytical approach and is intended to supplement traditional recordings obtained during a PDD examination rather than supplant them.

Algorithms/Statistical Approaches

As reported earlier in this paper, there are only two diagnostic algorithms currently being used in the field: the CPS and the Polyscore, Version 2.3. Both are designed to evaluate physiological data collected during Zone Comparison Control Question tests. Algorithms that are compatible with other types of test formats are needed.

Several research projects using different statistical approaches to improve diagnostic decision are under way. Angus and Castelaz[42] of Claremont Graduate School investigated the use of artificial neural networks (ANN) to classify physiological data from field PDD examinations as indicating deception or non-deception. They designed and trained an ANN and coupled that with a cellular automaton (CA) feature extractor to classify the data. The CA classifier could classify 87% of the deceptive and 95% of the non-deceptive subjects correctly with no inconclusive results. Coupled with an ANN classifier, the combined algorithm correctly classified 100% of the deceptive and nondeceptive subjects with no inconclusives. The database was small (41 confirmed deceptive and 15 confirmed nondeceptive); therefore, no cross validation was possible. Consequently, caution is needed regarding interpretation of these findings, and cross validation with a larger database is essential. Currently, Angus and Castelaz are evaluating data from a new test procedure that uses event related control questions (ERC). The data is being collected in an analog study[43] involving a mock espionage scenario and 160 subjects. One hundred of the 160 will be used to train an ANN and 60 will be used for cross validation.

Using MGQT data sets from field examinations, Knapp, at San Jose State University, San Jose, California, is applying "fuzzy logic" (FL) as a statistical tool to develop a diagnostic algorithm. Fuzzy Logic purports that "... signals can be generally classified into three categories: deterministic, probabilistic and possibilistic (fuzzy events). In the case of biological data, the patterns are probabilistic or possibilistic because they generally contain a large random component ..." Computer scoring of physiological data from PDD tests relies on probabilistic discrimination functions and an arbitrary threshold to classify the data.[44] Using a fuzzy logic algorithm, the investigator analyzed the physiological data from 200 confirmed MGQT field tests of which 150 were guilty and 50 innocent. They divided the guilty cases into three sets of data

and combined each set with the 50 innocent. The algorithm was able to accurately diagnose one set at 85%, another set at 88% and the third set at 91%.

Honts[45}, at the University of North Dakota, compared the accuracy of conventional human numerical evaluations of PDD data with two statistical approaches to decision making: discrimination analysis and bootstrapping. The results of analyses, using a data base of 100 innocent and 100 guilty subjects from a mock crime, were statistically equivalent (bootstrapping, 78%; human evaluation, 82%; and discriminant analysis, 84%) for the three approaches. Honts reports that, as compared to discriminant analysis, the bootstrap may be more useful since it avoids retroactive, non-theoretical assumptions and is likely to be widely generalizable.

Which of these statistical systems--discriminant analysis; artificial neural networks; fuzzy logic; or bootstrapping--if any, will eventually provide a flexible, generalizable and highly accurate diagnostic algorithms for a variety of test formats should be determined within the next year or two.

Other work underway is the development of an algorithm to detect mental countermeasures. Countermeasures are deliberate attempts by the examinee to distort or interfere with test procedures by using physical (for example, biting lip); mental (for example, disassociation); and/or pharmacological (for example, drug use) techniques to suppress or augment physiological activity. Preliminary results indicate that countermeasures, for forced responses, can be discriminated from real responses.[46] This work will continue since finding methods for detecting countermeasures is critical to the validity and reliability of PDD tests.

A New Polygraph: Autonomic Response Indicator System (ARIS)

The ARIS is a new concept in polygraph design. The physiological and neural processes to be extracted and recorded will be based on knowledge derived in recent years from academic disciplines within the neurosciences. It is expected that the first phase of instrumentation will be used in PDD studies during 1994. To date, no PDD research has been conducted that incorporates the current knowledge of the homeostatic communication between brain structures and peripheral physiology. ARIS will extract measures of neural control from measures of peripheral physiology based on patented procedures developed by Dr. Stephen Porges.[47] It is his position that the central nervous system (CNS) regulates the peripheral physiology and that neural control regulates homeostatic processes. Thus, he hypothesizes that deception will result in a transient disruption of these homeostatic processes. ARIS will be designed to measure, quantify and detect these disruptions.

Upon completion of the other phases of ARIS, the algorithm will consist of five input systems: ECG, respiration, blood pressure, movement, and electrodermal activity. It will derive more than twenty variables from the five physiological measures.

Summary

The emergence of forensic psychophysiology as an academic discipline and the application of computer technology to PDD testing procedures has essentially ushered out an era that began with Lombroso in the late 1800s[48] and has stimulated an avalanche of change for current and future research.

The current thrust of research is now directed toward the evaluation of new sensors and transducers; new means of digitizing physiological data, while it is being recorded; means of analyzing data on-line; new diagnostic approaches with specifically designed algorithms for various test formats; and algorithms to identify the presence of countermeasure tactics during PDD tests. This research will enhance the scientific evaluation of existing PDD tests and will facilitate the introduction of totally new PDD test types and formats.

The increase in PDD research activity will not only provide new and better PDD tests and diagnostic procedures, but will provide new knowledge that will enhance the evolution of forensic psychophysiology as an academic discipline.

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[4] The Advisory Committee is a requirement of DoD Directive 5210.78, dated September 18, 1991, and consists of the Program Managers for PDD Operations within the Department of Defense. Members of this Committee include: Mr. Gale Ahern, Air Force Office of Special Investigations; Mr. Jim Morrison/Mr. Bruce Thomson, Office of the Secretary of the Air Force; Mr. Wilbur Hardy, Army Crime Records Center; Mr. Roger Thurber, Army Intelligence and Security Command; Mr. Timothy Schroeder, Defense Criminal Investigative Service; Mr. Thomas Ewald, Defense Investigative Service; Mr. Jerry Craig, Defense Intelligence Agency; MSgt Earl Jones, Headquarters, U.S. Marine Corps; Mr. Jim Lucas, National Security Agency; Mr. Al Billington, Naval Criminal Investigative Service. Program Managers from the Federal Agencies

such as the FBI, Secret Service, etc. are invited and participate in all Advisory Meetings. This Committee's purpose is to advise the DoDPI Director on curriculum and research matters.

[5] Deputy Under Secretary of Defense for Security Policy [DUSD(SP)], Mr. Craig Alderman, was responsible for the DoDPI development from 1986 to 1991.

[6] Deputy Assistant Secretary of Defense for Counterintelligence and Security Countermeasures [DASD(CI&SCM), Ms. Nina Stewart, as responsible for DoDPI development from 1991 to 1993. Deputy Assistant Secretary of Defense for Intelligence and Security [DASD(I&S)], Mr. Keith Hall is now responsible for DoDPI's operations and fully supports the Institute's direction in research and curriculum development.

[7] The DoDPI Curriculum and Research Guidance committee is represented by: Dr. William Iacono, University of Minnesota; Dr. Edward Katkin, University of New York at Stoneybrook; Dr. Christopher Patrick, Florida State University; Dr. Stephen Porges, University of Maryland; and Dr. John Furedy, University of Toronto. All are reputable psychophysiologists.

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DRUG USE AND ABUSE

Background Information for Security Personnel

By

Richards J. Heuer, Jr.

This report provides background information for investigators, polygraphers and adjudicators who make judgments relating to illegal or improper drug use by cleared employees or applicants. It will also be helpful in developing training programs, setting standards and policies, and in documenting the basis for security concern with drug use. The report may be useful to counsellors in employee assistance programs.

This is the sixth in a series of studies of behaviors that raise questions about personnel security and suitability. Previous studies dealt with alcohol use and abuse, financial irresponsibility, compulsive gambling, crime, and sexual behavior. These reports are part of the research agenda recommended by the 1985 Stilwell Commission Report, *Keeping the Nation's Secrets: A Report to the Secretary of Defense by the commission to Review DoD Security Policies and Practices.*

This review and synthesis of the unclassified research literature does not make policy recommendations, nor does it necessarily represent the views of the U.S. Government. Individual managers and supervisors should judge the significance of the information for their activities and communicate appropriate guidance to their personnel.

Richard J. Heuer, Jr. is a retired CIA employee. This report was written for the U.S. Government at the Defense Personnel Security Research Center in Monterey, California. Four earlier reports in this series were published in *Polygraph* (1993) 22(1) "Alcohol Use and Abuse," 17-45, "Financial Irresponsibility," 46-79, "Compulsive Gambling," 80-119; and *Polygraph* (1994) 23(1) "Crime and Security Risk," 24-60. All were by Richards J. Heuer, Jr. Reprints are available from the author at PERSEREC, 99 Pacific Street, Bldg. 455 St. E, Monterey, CA 93940.

Executive Summary

Whether or not they admit it, a high percentage of individuals processed for security clearance will have some history of past drug use. In 1992, almost 61% of Americans age 26 to 34 had used an illegal drug at some time during their lives. This presents a dilemma for clearance adjudicators. if clearance standards are too lax, security may not be protected. If standards are too strict, many well-adjusted, adventuresome, and creative employees may be screened out.

Drug use may weaken judgment and affect ability to protect classified information. Some types of drug use reflect a tendency toward irresponsible or high risk behavior. Users of illegal drugs may be susceptible to blackmail, as exposure could cause loss of job. Drug use degrades work performance and increases an organization's personnel and health care costs. Drug-abusing employees are absent from work two to three times as much as nonabusing employees, use three times the normal level of sick benefits, are five times more likely to file a worker's compensation claim, and are involved in accidents more than three times as often as nonabusing employees.

Executive Order 12564, dated September 15, 1986, declares that "persons who use illegal drugs are not suitable for Federal employment." Any drug use at all by a current employee is a violation of this order; it is a security concern because it is a breach of trust and shows unwillingness or inability to abide by the rules.

The significance of past drug use depends upon a) the likelihood that drug use will continue or recur after security clearance is granted, or b) the extent to which past drug use indicates underlying psychological or emotional problems of security concern.

Our understanding of drug abuse is evolving as scientists learn more about this complex phenomenon. The traditional view, in perhaps oversimplified terms, is that peer influence and curiosity lead to initial experimentation, and that the addictive power of drugs then leads to continued use and abuse. Escalation from experimentation and occasional recreational use to abuse and dependence is seen as depending primarily on exposure variables such as frequency of use, type and dosage of drug, and how long it is used.

Evidence accumulated over the past decade now suggests that drug abuse is more complex than this traditional view. While psychoactive drugs do have potent addictive properties, addiction does not follow automatically from their use. Most people who experiment with drugs or even use them regularly for a while do not become abusers or develop dependence. Characteristics of the individual, rather than of the drug, are now seen as playing a dominant role in vulnerability to drug abuse. The social and psychological maladjustment that characterizes most frequent drug abusers *precedes* the first drug use. Personality differences between those who later in life abstained from drugs, experimented with drugs, or abused drugs have been documented as early as age 7.

Drug use is a symptom, not a cause, of personal and social maladjustment. Poorly adjusted individuals who do not become involved with illegal drugs will often become involved with some other non-drug additive behavior that fills the same psychological void. Although there are a number of useful indicators of the significance of previous drug use, the likelihood that drug use has stopped for good, or will stop if given a clearance or a second chance, can be fully understood only in the context of the individual's entire personality and life experiences.

Some experimentation with drugs is not abnormal as adolescents mature, explore new roles and identities, and test their boundaries. Indicators that experimentation may lead to abuse and dependence include mental or emotional problems such as antisocial personality, aggression impulsivity, sensation seeking, hyperactivity, or attention deficit disorder; childhood behavior problems; criminal behavior; difficulties in coping with one's life, social isolation, or interpersonal difficulties; traumatic experiences such as childhood physical or sexual abuse; and a family history of substance abuse, antisocial behavior, or mental or emotional problems.

Inferences that past drug use may continue or recur in the future may also be drawn from the circumstances of drug use. Weekly or daily use is habitual use and is predictive of continued future use. Increasing frequency or dosage over time suggests tolerance or physiological or psychological dependence. Use of more than one drug at a time suggests that drug use is well advanced and may stem from underlying psychological problems. Use of the more addictive drugs such as heroin and cocaine is more likely to be a continuing problem than occasional marijuana use.

Those whose drug use started before high school (age 14 or younger) are atypical and are more vulnerable to drug problems later in life than those who started u sing drugs in high school or college. Continuation of peak usage after college (or age 23) is atypical and predicts future problems. Increased maturity and lifestyle changes that usually accompany employment, marriage, or the birth of children often lead to reduction or cessation of drug use. Continuation of the same social environment in which past drug use occurred suggests that use many continue.

Solitary drug use is more predictive of future use than is social use. Use of drugs to relax *prior* to a social event is more predictive of future use than is use *at* social events. Purchase of drugs from a stranger may indicate as much about an individual's dependence upon drugs as growing one's own. Being given drugs is less predictive than buying from a friend. Regarding motivation for drug use, peer pressure and sociability are the least predictive of future drug use. If drugs are used to reduce stress or build self-esteem, this indicates underlying psychological problems that may persist and cause continued drug use or other problems. Rebelliousness as motivation may not predict future drug use, but it may predict other antisocial behavior.

For those with a history of experimental or infrequent recreational use, one drug-free year may be sufficient to demonstrate both intent and ability to remain drug free. If there is a history of drug abuse or dependence, three drug-free years may be required to provide reasonable assurance against relapse.

There was a strong trend toward *reduced* drug use from 1981 to 1992, but this trend may have reversed in 1993. Lifetime illicit drug use was down from a peak of 65/6% of high school seniors in 1981 to 40.7% in the graduating class of 1992, but increased to 42.9% in 1993. Lifetime marijuana use among high school seniors peaked in 1979 at over 60%, hit a low of 32.6% in 1992, then went back up to 35.3% in 1993. Current marijuana use (within 30 days prior to the survey) was down from about 37% in 1978 to 11.9% in 1992, but increased sharply to 15.5% in 1993. These trends in high school drug use predict the prevalence of previous drug use by future job applicants. As recent high school graduates move through college and into the job market, one can expect the incidence of past and current drug use among applicants processed for security clearance to be substantially lower than, say, 10 years ago.

This report provides extensive statistics on the prevalence of drug use, showing how it has changed over time, and how it varies for different drugs and for various age and demographic groups. Most of this information is in Appendix A, which describes the major drugs, discusses their effects and risks, presents data on their prevalence, and comments on treatment for their abuse. This Appendix comprises more than half of the report.

Drug testing is highly reliable only if test procedures follow the Technical and Scientific Guidelines issued by the U.S. Department of Health and Human Services. Although the test procedure yields accurate results when done properly, pre-employment drug screening generally detects only the careless user or the strongly dependent person. For most drugs, evidence of drug use at levels detectable by the initial screening remains in the system for only two to three days. One can avoid detection by abstaining from drug use prior to the test. Unscheduled random testing has only a small chance of detecting the occasional user.

Despite recent advances in drug abuse treatment, relapse is common and repeated treatment is often required. Chances of relapse are influenced by the same biological, psychological, behavioral, social and environmental risk factors that influence the onset of drug use and abuse.

Introduction

Investigators and adjudicators must deal with a fundamental contradiction: On the one hand, a majority of American youth and young adults have broken the law by using an illicit drug; on the other hand, drug use is incompatible with employment in the federal government and with holding a security clearance. Drug use is by far the most common issue faced by adjudicators dealing with all categories of personnel--federal civilian, military, and contractor.[1]

Analysis of issues that arose in 7,232 Special Background Investigations adjudicated by 14 different federal agencies found that drug use was the most important issue in 59% of the issue cases at agencies that use a lifestyle polygraph examination as part of the clearance procedure. It was the most important issue in 29% of the issue cases adjudicated by other federal agencies.[2] In addition to showing the significance of drug issues, this documents the value of

the lifestyle polygraph in surfacing drug use that escapes identification by other investigative tools.

This report is intended to help investigators, adjudicators and policy makers gain a better understanding of drug use, abuse, and dependence and how these phenomena relate to personnel security. It discusses the security concerns relating to drug use, causes of drug abuse, and variables relevant to judging the security significance of past drug use. It also provides data on prevalence of drug use, reliability of drug testing, and effectiveness of treatment for drug abuse. Appendix A offers background information on many specific drugs.

When categorizing extent of drugs involvement, this reports employs the terms use, abuse, and dependence. The relationships among these terms are shown in the following graphic. Everyone who has taken a substance at least once is classified as a user. Some users abuse drugs, and some of the abusers also develop dependence upon them.

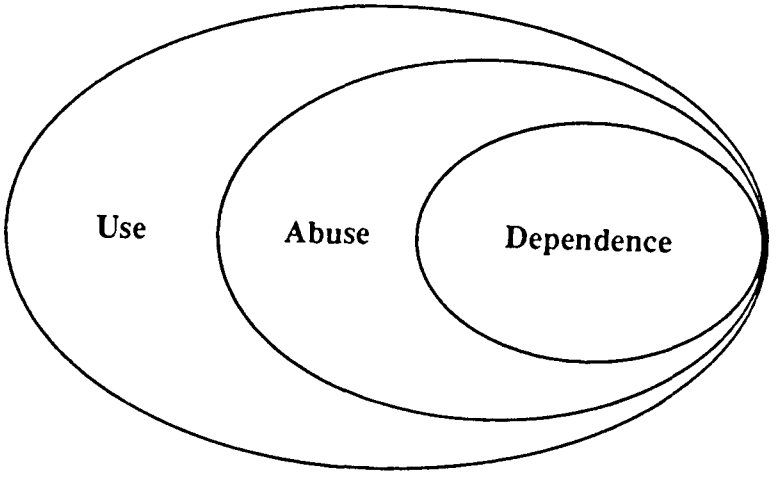

Figure 1

As used in this report, these terms are defined as follows:

Use: Any taking of a psychoactive substance. The term *simple use* us sometimes used to distinguish experimentation or occasional recreational use that does not reach the point of abuse or dependence. Note: The distinction between use and abuse in this study is not meant to imply

that simple use is benign or that there is any level of drug involvement that is not potentially dangerous.

Abuse: Use becomes abuse when it continues despite persistent or recurrent social, occupational, psychological or physical problems causes by or made worse by this use. Use before driving a car or engaging in other activities that are dangerous when under the influence of a psychoactive substance also qualifies as abuse. The transition from use to abuse is often gradual, and there is no clear threshold for defining the point at which occasional use becomes abuse. Frequency and quantity of use are important considerations, as is the extent to which drug use has become a regular feature of one's lifestyle.

Dependence: Habitual, compulsive use of a substance over a prolonged period of time. The substance may be taken in large amounts or over a longer period than intended. Increased amounts of the substance may be needed to achieve the desired effect. There may have been unsuccessful efforts to cut down on the amount of use. A great deal of time may be spent in obtaining the substance or recovering from its effects. There may be a significant impact on one's work, home or social life, or mental or physical health.

Abuse and dependence are both medical diagnoses that require certain criteria to be met before they are applied.[3] The diagnosis should be made by a physician or other qualified substance abuse treatment professional.

Drug Use and Personnel Security

This section discusses why drug use is both a security and suitability issue. There is little hard data to document a direct, *causal* relationship between drug use and espionage or other security compromise, but there are many logical reasons for security concern. There is hard evidence to document the significance of drug use as a suitability issue.

A recent study based on in-depth interviews of 24 Americans serving jail terms for espionage found that six claimed no drug use at all, eight had experimented with drugs, and 10 reported repetitive use. One had sold drugs for a living. However, most drug use occurred among subjects who never had a clearance, before the clearance was granted or after the subject left the position that required a clearance. Only one reported that drug use had a negative impact on his performance while holding a clearance. Only two reported their drug use increased during the period they committed their crimes, and one of these was an uncleared outsider.[4]

This study of espionage offenders concluded that:

> In no case did an individual indicate that drugs or the need for drugs drove him to the act of espionage, nor did any commit espionage to support their habit. However, the drug-dealer advised that he was so besotted by drugs that he was rendered insensitive to the enormity of his espionage acts.[5]

No hard data are available on cases in which drug use led to *inadvertent* compromise or leaking of classified information.

There are, nonetheless, substantial logical reasons for concluding that psychoactive drug use is a security concern. Specifically:

- Use of an illegal drug indicates an unwillingness or inability to abide by the law. Cleared employees must respect security regulations whether they agree with them or not. Similarly, they should respect the rules on use of psychoactive substances whether they agree with these rules or not.

- Drug use weakens judgment. When under the influence of a psychoactive substance, an individual may be unable to exercise the care and discretion required to protect classified information.

- Some types of drug use reflect a tendency toward irresponsible or high risk behavior. These traits cast doubt upon an individual's judgment and ability to protect classified information even when not under the influence of drugs.

- Drug abuse or dependence often indicates the presence of broad psychological or emotional problems of security concern.

- Users of illegal drugs may be susceptible to blackmail, especially if exposure of drug use could cost them their job. Police and security services actively monitor drug distribution networks. Procurement of illegal drugs while traveling abroad or carrying drugs across national boundaries risks attracting the attention of foreign services or of individuals who may seek to exploit this vulnerability. Any habitual behavior that places an individual in a compromising position exploitable by others is a serious security concern.

- Drug abuse is closely associated with other behaviors of security concern--crimes against persons and property, financial irresponsibility, personality disorders, and alcohol abuse.

Drug use is relevant to judgments of employee suitability as well as security. Drug use is associated with degraded performance, greater absenteeism, and increased health care costs. It is also associated with more accidents in the workplace, loss of trained personnel, and theft, and entails costs for prevention, treatment, and deterrence programs. Increased employee turnover leads to increased costs for recruitment and training. These high costs of drug use have

been documented in a number of studies, although the cost of illicit drug use is much less than the cost of alcohol abuse.[6]

One study found that drug-abusing employees are late three times as often as nonabusing employees, request early dismissal or time off work over 2.2 times as often, have 2.5 times as many absences of 8 days or more, use three times the normal level of sick benefits, are five times more likely to file a worker's compensation claim, and are involved in accidents almost 3.6 times more often.[7]

A study of 2,500 U.S. Postal Service workers who were hired despite having tested positive for marijuana on their preemployment urinalysis test found that they were:

- 1.6 times as likely as nonusers to quit their jobs or be fired.
- 1.5 times as likely to have had an accident and nearly twice as likely to have been injured.
- 1.5 times as likely to have been disciplined by a supervisor.
- 1.8 times as likely to be absent from work.[8]

Executive Order 12564, dated September 15, 1986, established the U.S. government as a drug-free workplace. It declares that "persons who use illegal drugs are not suitable for Federal employment."[9] Therefore:

- Any drug use at all by a current employee is a violation of this presidential order and a breach of trust.
- Drug use by an applicant *after* deciding to apply for a government position, especially one requiring a security clearance, indicates poor judgment and raises questions about the individual's ability or willingness to abstain from illegal drug use after being hired.
- Significance of *past* drug use depends upon a) the likelihood that drug use will continue or recur after security clearance is granted, or b) the extent to which past drug use indicates underlying psychological or emotional problems of security concern. These factors are discussed below in the section entitled Judging Significance of Past Drug Use.

Experimenting With Drugs Is Not Abnormal

Inevitably, a high percentage of job applicants will have some history of drug use. In 1992, almost 61% of Americans age 26 to 34 admitted to having used an illegal drug at some time during their lives.[10] Given these figures, some experimentation with drugs, especially marijuana, cannot be considered deviant behavior among younger Americans at this time.

Adolescence is a time when young people face the task of differentiating themselves from parents and family and forging independent identities. Experimenting with values and beliefs, exploring new roles and identities, and testing limits and personal boundaries are normal behaviors during adolescence, and such experimentation contributes to personal growth and adjustment.

A study that tracked development of 101 children from age 3 through age 18 found that high school students who experimented with drugs but limit their use to less than once a week are better adjusted than either those who abstain or those who progress to weekly or greater drug use.[11] The study describes the experimenters, abstainers and frequent users as follows:

- The experimenters, as distinct from the abstainers, were found to be more inquisitive, adventuresome and self-confident. They tended to be warm, responsive, and open to new experiences. They differed from frequent users by not needing drugs as an outlet for emotional distress or to compensate for lack of meaningful human relationships.

- Abstainers were more anxious, overcontrolled, emotionally limited, and had fewer social skills as compared with the experimenters; they were not necessarily maladjusted, but their potential remained unfulfilled.

- Frequent drug users were alienated and impulsive and showed pervasive indications of social and psychological maladjustment. Drugs were used to numb out feelings of isolation and inadequacy; drugs offered transient gratification to individuals who lacked deeper and more meaningful gratifications.

If clearance standards are too strict, they may screen out many well-adjusted, adventuresome, and creative employees. The above findings are supported by several previous studies.[12] They also parallel studies many years ago that found moderate drinkers of alcohol to be psychologically healthier than either abstainers or problem drinkers.[13] One important finding of this recent study of drug use was that the personality differences between those who later experimented with drugs and those who abstained or became frequent users were clearly observable as early as age 7, long before the start of any drug use.

These findings should not be misinterpreted as indicating that experimentation with drugs might somehow *improve* an adolescent's psychological health. They indicate only that psychologically healthy adolescents are not adversely affected by some drug experimentation. For others who are less well adjusted, "experimentation with drugs is highly destructive because drugs easily become part of a broader [pre-existing] pathological syndrome."[14]

Causes of Drug Abuse

In setting adjudicative standards and making adjudicative judgments, we are saying that because an individual has behaved in a certain manner in the past, we either can or cannot count on that individual to obey certain rules and regulations in the future. Such judgments about possible future behavior will be facilitated by better understanding not only of what causes initial drug use, but also what causes the transition from use to abuse and dependence, why people cease using drugs, and why they relapse?

Understanding of drug abuse is evolving as scientists learn more about this complex phenomenon. The traditional view, in perhaps oversimplified terms, is that peer influence leads to initial experimentation with psychoactive drugs, and that the addictive properties of these drugs then lead to continued use and abuse. Therefore, virtually any use of illegal drugs by anyone carries significant risks of addiction and abuse. Escalation from experimentation and occasional recreational use to abuse and dependence depends primarily on exposure variables such as frequency of use, type and dosage of drug, and how long it is used. Treatment should concentrate on alleviating physiological dependence on drugs and removing the abuser from the influence of drug-using peers.

Scientific evidence accumulated over the past decade now suggests that drug abuse is more complex than this traditional view.[15] While psychoactive drugs do have potent addictive properties, addiction does not follow automatically from their use. Exposure to drugs is a necessary but not a sufficient condition for escalation to drug dependence. Most people who experiment with drugs or even use them regularly for a while do not become abusers or develop dependence. Characteristics of the individual, rather than of the drug, are now seen as playing a dominant role in vulnerability to drug abuse. The social and psychological maladjustment that characterizes most frequent drug abusers precedes the first drug use and, as already noted, has been documented as early as age 7.[16] Treatment needs to be directed not just at the drug abuse, but at the psychological problems that cause an individual to be vulnerable.

Initial low-level involvement with drugs may be the result of peer pressure, drug availability and other environmental risk factors, but escalation to and maintenance of higher levels of drug use is likely to result from biological, psychological or psychiatric characteristics of the individual user. In some cases, vulnerability may be inherited in the form of heightened susceptibility to a certain type of drug. In most cases, however, escalation will be caused by psychological traits or psychiatric conditions, some of which may also be inherited.

If high risk individuals do not become involved with illegal drugs, they will often become involved in some other form of addiction (alcohol abuse, compulsive gambling, sexual addiction, bulimia, etc.) that fills the same psychological void, and they will manifest considerable dysfunctional or maladaptive behavior. Drug use is seen as a symptom, not a cause, of personal and social maladjustment.

Adjudication standards draw heavily on the traditional view of what causes drug abuse. Whether clearance is granted depends upon frequency of use, type and circumstances of use, and time elapsed since last use. In the newer view, frequency and circumstances of drug use and time elapsed since last use remain relevant variables. In many cases, however, the significance of an individual's drug use, and the likelihood that it has stopped for good, or will stop if given a clearance, can be fully understood only in the context of the individual's entire personality and life experiences.

The following paragraphs discuss risk factors for initial drug use and escalation of use.[17]

Initial Use

First drug use and moderate continuing recreational use appear to be a function of social and peer factors. Risk factors include friends using drugs, drug availability, unconventionality or rebelliousness, low involvement with traditional value-oriented institutions (family, church, school), poor academic achievement, poor relationship with parents, and having parents with problems. These risk factors are based on probabilities; there are always individuals who beat the odds.

Protective factors that offset risk factors also play a role. A protective factor may be the polar opposite of a risk factor. For example, strong school achievement and commitment to family and religion seem to reduce the chances of drug use.

The finding that youths with high educational aspirations are more likely to use marijuana stands out as an apparent anomaly. It suggests there may be two quite different groups of young people who start experimenting with illicit drugs.

> One group would consist of those who experiment as part of an adolescent search for new experiences but who have sufficient stake in society not to progress to potentially harmful patterns of use. A second group, more delinquent and less committed to education and academic pursuits, would consist of those who go on to more regular and harmful patterns of use.[18]

When environment influences are changed for the better, drug use often abates or stops entirely. For example, heroin use was widespread among U.S. military personnel in Vietnam, but most servicemen discontinued drug use upon return to the U.S.[19]

Similarly, drug use is affected by role requirements. It is often discontinued as one moves from school into adult roles involving work, marriage and children. Conversely, serious drug users tend to postpone the transition to marriage and parenthood. The relationships between role transitions and transitions to or from drug use or abuse has been identified as an area that needs considerable additional research.[20]

Transition to Abuse and Dependence

Risk factors for the transition from occasional use to abuse are not the same as the risk factors for initial use. While environmental factors continue to play a role, abuse and dependence seem to be more a function of biological and psychological processes. Specific risk factors for abuse and dependence include mental or emotional problems such as antisocial personality, aggression, impulsivity, sensation seeking, hyperactivity, or attention deficit disorder; childhood behavior problems; criminal behavior; difficulties in coping with one's life, social isolation, or interpersonal difficulties; traumatic experiences such as childhood physical or sexual abuse; and a family history of substance abuse, antisocial behavior, or mental or emotional problems.

Judging Significance of Past Drug Use

Past drug use is significant if it a) indicates that drug use may continue or recur in the future, or b) suggests the presence of underlying psychological or emotional problems. This section identifies specific variables to be considered when judging the significance of past drug use.

Which Drug Is Used

The more dangerous the drug, the more the drug use indicates about an individual's judgment, propensity for irresponsible or high risk behavior, tendency to rebel against social norms, alienation, or emotional maladjustment. The addictive nature of a drug is one aspect of its dangerousness. All abused drugs also have adverse health and behavioral consequences, the nature and severity of which differ greatly from one drug to another. The most dangerous are cocaine, heroin, PCP, and LSD.

The more addictive the drug, or the more severe the past dependence, the more likely that past drug use will recur. Drug dependence can develop through either physical or psychological processes. Physical dependence occurs when the body adjusts to the presence of a drug, so that physical symptoms usually involving discomfort and pain occur when the drug is withdrawn. The addict craves more drugs in order to avoid or alleviate the pain. Psychological dependence is characterized by emotional and mental preoccupation with the drug's pleasurable effects. One craves more to regain the stimulation, elation, sense of well-being, or other psychological pleasures from the drug. Behavioral dependence occurs when one develops a lifestyle that depends upon drug use.

Cocaine is one of the most powerfully addictive drugs of abuse. Psychological dependence on cocaine, especially crack cocaine, occurs quite rapidly and physical dependence follows. Narcotics (heroin, opium, morphine) create the strongest physical dependence. Addiction occurs more slowly than with cocaine, but withdrawal is more difficult and painful. Amphetamines also have a high risk of dependence. Marijuana is only mildly addictive, although regular users can develop psychological dependence on the role while marijuana plays in their lives. LSD is not physically addictive but is especially dangerous because of its health consequences.

Because of its illegality, use of any illegal drug is generally more significant than a comparable amount of misuse of legal substances such as prescription drugs, inhalants, or steroids.

Past LSD use has been a special concern because it may be followed by flashbacks. A flashback is a sudden, involuntary recurrence of a previous drug-induced hallucination. LSD flashbacks are predominantly *visual* distortions, things that one *sees*.[21] We found no evidence that an individual suffering a flashback is likely to *talk* about classified information or programs. Reduced conscious control during a flashback could, however, lead to loss of physical control over classified material. Someone who must carry classified information outside of a secure area, such as a courier, and who is vulnerable to flashbacks, might be a security risk. The risks associated with flashbacks are similar to those associated with epilepsy, where an individual may also experienced reduced ability to exercise physical control over classified information. For additional information on flashbacks, see the section on LSD in Appendix A.

Extent of Drug Use

Frequency of use is significant as it relates to the likelihood of psychological or physiological dependency. Weekly or daily use is habitual use and is predictive of continued future use. Increasing the frequency or dosage over time suggests tolerance or physiological or psychological dependence. Use on average once a month qualifies as occasional use and is less predictive. Use of more than one drug at a time is predictive of future use; it suggests that drug use is well advanced and may stem from underlying psychological problems.

Past abuse or dependence, as previously defined, indicates a possible character disorder. When a person continues drug use despite problems it is causing, or when one's lifestyle is organized around drug use or it affects one's behavior, this is generally prompted by underlying psychological or emotional problems. Although the drug use may stop, the underlying problems may remain and find expression in other ways. Medical and psychological evaluation is required to determine if the underlying problems have been resolved. If not, stress or other circumstances may trigger recurrence of drug use or other undesirable behavior.

When Drug Use Occurs

Among people born since 1950, initiation of drug use between age 15 and 18 is common. Those whose drug use started before high school (age 14 or younger) are atypical and are more vulnerable to drug problems later in life than those who started using drugs in high school or college. In fact, early initiation of drug use is one of the best predictors of future drug abuse and dependence. Drug use usually peaks during the senior year in high school or in college (age 17 to 23). Continuation of peak usage after college (or age 23) is atypical and predicts future problems.[22] Increased maturity and lifestyle changes that usually accompany employment, marriage, or the birth of children may lead to reduction or cessation of drug use. Continuation of the same social environment in which past drug use occurred suggests that use may continue.

Time elapsed since the last drug use is another important consideration. Recent experimental or infrequent recreational use is not necessarily predictive of future use, and one drug-free year may be sufficient to demonstrate both intent and ability to remain drug free. For someone with a history of drug abuse or dependence (as previously defined), three or more drug-free years may be required to provide reasonable assurance against relapse.

Circumstances of Drug Use[23]

Solitary drug use is more predictive of future use than is social use. Use of drugs to relax *prior* to a social event is more predictive of future use than is use *at* social events.

Means of acquiring drugs is also indicative. Purchase from a stranger may indicate as much about an individual's need for and dependence upon drugs as growing one's own. Being given drugs is less predictive than buying from a friend. Few people admit to buying or selling drugs; almost everyone says they share or split. Asking what was given or shared in return for the drug may help distinguish a purchase in kind from a true gift.

Regarding motivation for drug use, peer pressure and sociability are the least predictive of future drug use. If drugs are used to reduce stress or build self-esteem, this indicates underlying psychological problems that may persist and cause continued drug use or other problems. Rebelliousness as motivation may not predict future drug use, but it may predict other antisocial behavior. If drug use is associated with traffic violations, pranks, shoplifting, fights, etc., it is part of a larger pattern of antisocial behavior.

Likelihood of Relapse

The greater the number of risk factors, as discussed above, the greater the chances of future drug problems. For further discussion of relapse likelihood, see the section on Treatment.

Questioning Subjects About Drug Use

Because drug use is illegal and a potential cause of disqualification for security clearance, many subjects of security investigation do not admit to drug use unless subjected to polygraph examination. They may be more willing to talk about their friends' attitudes toward drugs, or their perceptions about the harmfulness of drugs, and this may provide useful indicators to guide investigators in cases where the polygraph is not used or is limited to CI questions.

One type of honesty test commonly used today to screen applicants for retail jobs in the private sector is based on the theory that people tend to assume other people are much like themselves. That is, the dishonest person is likely to believe that dishonesty is common, to know people who are dishonest, and to believe that petty dishonesty does not deserve severe punishment. Accordingly, these honesty tests ask questions about a subject's perception of the behavior of others rather than about the subject's own behavior.

Similarly, drug use by one's peers is among the most predictive indicators of drug use. People who use drugs are likely to associate with others who use drugs, to believe that drug use is more common than it really is, to believe that drugs are less harmful than they really are, and to believe that much drug use should be legalized. Subjects who are unwilling to talk about their own drug use may nevertheless be willing to express honest views about these other subjects.

Tables 26 to 28 in Appendix B show how respondents in four different age groups answered questions about how many of their friends use drugs, their friends' attitudes toward drug use, and about their perceptions of the harmfulness of drugs.[24] For example, Table 27 shows that in 1992, 75.3% of respondents age 23 to 26 said their close friends would disapprove if they smoked marijuana occasionally, while 93.8 would disapprove of occasional cocaine use. It seems likely that those whose friends would disapprove do not in fact use marijuana, while those who said their friends would not disapprove are among those who do smoke it frequently or at least occasionally. The tables show how disapproval of drug use has increased over the past 12 years.

The tables in Appendix B may be used to develop questions about drug use, and then to draw inferences from the responses by comparing them with responses from the national sample.

Prevalence of Drug Use

The two principle sources of information on the prevalence of drug use are the National Household Survey on Drug Abuse and the Monitoring the Future survey of drug use by high school seniors, both sponsored by the National Institute on Drug Abuse. Among U.S. military personnel, a principal source is the periodic Worldwide Survey of Substance Abuse and Health Behaviors Among Military Personnel.

The National Household Survey is based on a national probability sample of persons age 12 and older living in U.S. households. The 1992 survey, which interviewed 28,832 individuals,

was the twelfth such national survey in a series that started in 1971. Survey results are broken down by type of drug, recency of use, age, sex and race/ethnicity of user, region of the country, population density of the area in which the user lives, and employment status.[25]

The Monitoring the Future survey has been conducted annually since 1975. In 1992, 16,251 high school seniors in public and private schools were interviewed. the survey includes annual follow-up questionnaires mailed to a representative sample of about 1,200 previous participants from each high school graduating class starting with the Class of 1976. In other words, the 1992 survey tracks changes in drug use through age 33.[26] Only a brief summary of 1993 survey results was available at the time this report was written.[27]

The Worldwide Survey on Substance Abuse and Health Behaviors Among Military Personnel has been conducted five times since 1980. the 1992 survey used a sample of approximately 25,000 active duty military personnel selected from 63 geographical locations worldwide.[28]

This section reports overall statistics from these three large surveys. Other than a few highlights, most of these data are presented only in tables and not discussed in the text. Additional information is presented in the appropriate section of the Appendix dealing with individual drugs.

Several cautions are appropriate when dealing with these statistics.

~ All three surveys are based on self-reports by drug users during personal interviews. Although interview procedures are carefully designed to obtain the most valid possible responses, some under-reporting of illicit drug use must be expected. Therefore, actual drug use is probably higher than shown in these surveys.

~ National statistics mask widely divergent local patterns, and these local patterns are changing constantly. Which drugs are preferred at any given time and place, and whether they are administered by sniffing, smoking or intravenously, depends upon changes in cost, availability, purity, and local rumors about safety or effectiveness.

~ Statistics that apply to the overall population, as reported here, will generally be higher than frequency rates found in a select and pre-screening pool of persons undergoing security processing.

~ Statistical frequency should not be used as a basis for judging the acceptability of behavior. Behavior should be judged on the basis of its relevance to security and work performance, not on the grounds that "lots of people are doing it."

There was a strong trend toward reduced drug use from 1981 to 1992, as shown most clearly by the Monitoring the Future survey.[29] In 1993, however, this trend may have reversed. Lifetime illicit drug use was down from a peak of 65.6% of high school seniors in 1981 to 40.7%

in the graduating class of 1992, but it increased to 42.9% in 1993. Lifetime marijuana use among high school seniors peaked in 1979 at over 60%, hit a low of 32.6% in 1992, but went up to 35.3% in 1993. Current marijuana use (within 30 days prior to the survey) was down from about 37% in 1978 to 11.9% in 1992, but increased significantly to 15.5% in 1993. Lifetime cocaine use among seniors was down from a peak of 17.3% in the class of 1985 to 6.1% in 1992, while current use was down from about 7% to less than 2%; cocaine use remained unchanged during 1993. (For data on the *frequency* of marijuana and cocaine use, see discussion under those drugs in Appendix A.)

Figure 2 charts the lifetime, past year, and past month use of marijuana and cocaine by high school seniors from 1975 to 1992. These trends predict the prevalence of previous drug use by future job applicants. As the 1992 high school graduates move through college and into the job market, one can expect to see a reduced incidence of both past and current drug use.

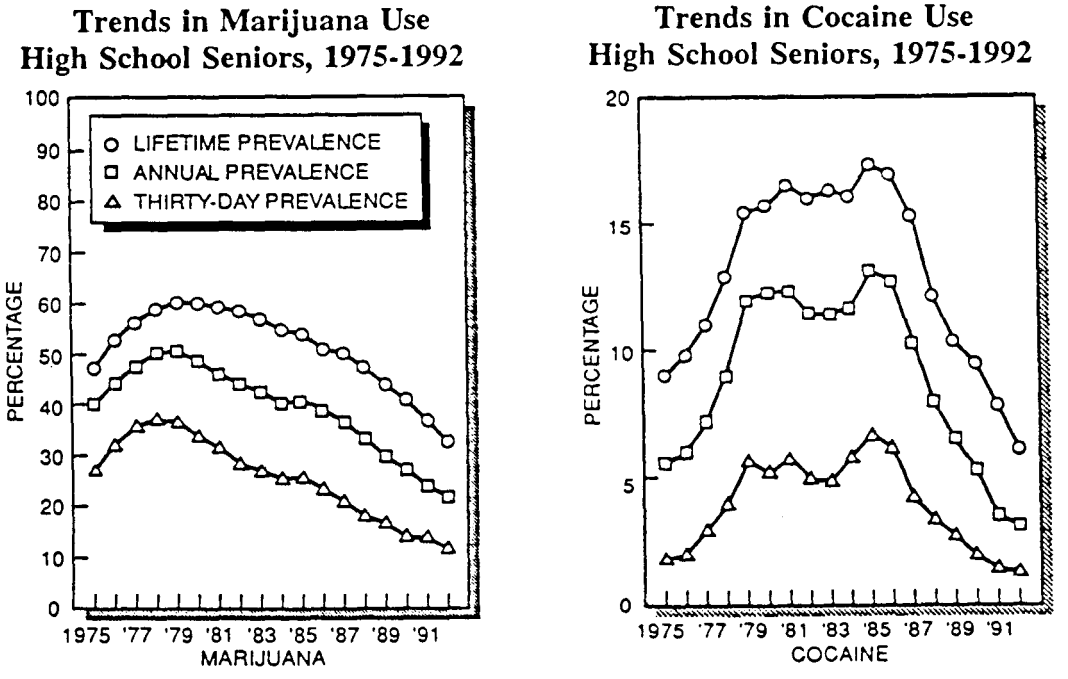

Figure 2

Current drug use tends to diminish as individuals mature. Employment, marriage and children are all associated with reduction or cessation of drug use. Table 1 shows the percentage using any illicit drug during the past month for four different age groups, as determined by the 1992 National Household Survey. It shows a drug from a high of 13% for those in the 18-25

age group to 2.2% for those age 35 and older. This trend is not the same for all types of drugs, however.

Table 1

Current Use of Any Illicit Drug

By Age, 1992

Age 12-17	6.1%
Age 18-25	13.0%
Age 26-34	10.1%
Age 35 and over	2.2%

Tables 2 through 5 are also taken from the 1992 National Household Survey on Drug Abuse. Tables 2 to 4 cover three different age groups: 18 to 25, 26 to 34, and 35 and older. Each shows the percentage of the U.S. population in the designated age groups that has used a variety of drugs, including alcohol and tobacco, in their lifetime, the past year and the past month. Table 5 shows the percentages, by age group, who have used any illicit drug during the previous month, and it breaks the data down by race/ethnicity, sex, population density, region, education, and employment. It shows how these demographic variables affect drug use in general.

Tables 6 and 7 are based on the 1990 National Household Survey, but they apply only to the Washington, D.C. metropolitan area.[30] They show lifetime, past year and past month use for a variety of drugs. Table 6 shows that percentages of use are generally similar to percentages for the U.S. as a whole and for other large metropolitan areas. Table 7 compares the District of Columbia, Maryland and Virginia sections of the metropolitan area.

Table 2
Percentages of U.S. Household Residents Age 18 to 25 Reporting Lifetime, Past Year, and Past Month Drug Use

Drug	TIME PERIOD											
	Lifetime				Past Year				Past Month			
	1988	1990	1991	1992	1988	1990	1991	1992	1988	1990	1991	1992
Any Illicit Drug[1]	58.9[b]	55.8	54.7	51.7	31.9[b]	28.7	29.1	26.4	17.8[b]	14.9	15.4[a]	13.0
Marijuana and Hashish	56.4[b]	52.2	50.5	48.1	27.9[b]	24.6	24.5	22.7	15.5[b]	12.7	13.0[a]	11.0
Cocaine	19.7[a]	19.4	17.9	15.8	12.1[b]	7.5	7.7	6.3	4.5[b]	2.2	2.0	1.8
Crack	3.4	2.8	3.8	3.2	1.9	1.4	1.0	1.1	0.8	0.7	0.4	0.4
Inhalants	12.5[a]	10.4	10.9	9.8	4.1	3.0	3.5[a]	2.3	1.7	1.2	1.5[a]	0.8
Hallucinogens	13.8	12.0	13.1	13.4	5.6	3.9	4.7	4.8	1.9	0.8	1.2	1.3
PCP	4.4	3.9	4.2	4.6	0.7	0.5	0.7	1.0	0.1	0.1	0.1	0.2
Heroin	0.3[b]	0.6	0.8	1.3	0.3	0.5	0.3	0.5	0.1	0.1	0.1	0.2
Nonmedical Use of Any Psychotherapeutic[2]	17.6	15.6	17.9[a]	15.4	11.3[b]	7.0	8.6	7.7	3.8[a]	2.6	2.7	2.3
Stimulants	11.3[b]	9.0	9.4[b]	6.8	6.4[b]	3.4	3.3[a]	2.3	2.4[b]	1.2	0.8	0.7
Sedatives	5.5[a]	4.0	4.3[a]	3.2	3.3[a]	2.0	1.9	1.7	0.9	0.7	0.7	0.6
Tranquilizers	7.8	5.9	7.4	6.8	4.6	2.4	2.6	3.0	1.0	0.5	0.6	0.6
Analgesics	9.4	8.1	10.2	8.7	5.5	4.1	5.3	4.8	1.5	1.2	1.4	1.2
Any Illicit Drug other than Marijuana[3]	30.9	31.3	32.0[a]	28.8	19.2[b]	14.9	16.0[a]	13.7	8.3[b]	5.7	6.1	5.2
Alcohol	90.3[b]	88.2	90.2[b]	86.3	81.7[a]	80.2	82.8[b]	77.7	65.3[b]	63.3	63.6[b]	59.2
Cigarettes	74.9[b]	70.5	71.2	68.7	44.7	39.7	41.2	41.1	35.2	31.5	32.2	31.9
Smokeless Tobacco	23.5	21.7	21.9	21.7	8.9	9.2	8.6	9.2	6.2	6.0	5.8	6.0
Anabolic Steroids	--	--	1.3[a]	0.7	--	--	0.4	0.1	--	--	0.1	0.0

*Low precision; no estimate reported.
-- Not available.

[1]Nonmedical use of marijuana or hashish, cocaine (including crack), inhalants, hallucinogens (including PCP), heroin or psychotherapeutics at least once.
[2]Nonmedical use of any prescription-type stimulant, sedative, tranquilizer, or analgesic; does not include over-the-counter drugs.
[3]Nonmedical use of cocaine (including crack), inhalants, hallucinogens (including PCP), heroin or psychotherapeutics at least once; includes marijuana users who also have used any of these listed drugs; does not include users of marijuana only.

[a]Difference between estimate in this cell and corresponding estimate for 1992 is statistically significant at the .05 level. (The differences between 1990 and 1992 estimates were not tested for statistical significance.)
[b]Difference between estimate in this cell and corresponding estimate for 1992 is statistically significant at the .01 level. (The differences between 1990 and 1992 estimates were not tested for statistical significance.)

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse.

Table 3
Percentages of U.S. Household Residents Age 26 to 34 Reporting Lifetime, Past Year, and Past Month Drug Use

Drug	TIME PERIOD											
	Lifetime				Past Year				Past Month			
	1988	1990	1991	1992	1988	1990	1991	1992	1988	1990	1991	1992
Any Illicit Drug[1]	64.2	62.6	61.8	60.8	22.6[a]	21.9	18.4	18.3	13.0[a]	9.8	9.0	10.1
Marijuana and Hashish	62.1	60.8	59.5	58.6	17.6[a]	18.0	14.4	14.3	10.8[a]	8.6	7.0	8.2
Cocaine	26.5	25.6	25.8	25.2	8.0[b]	6.8	5.1	4.9	2.6[a]	1.7	1.8	1.4
Crack	2.9	3.1	3.7	3.3	0.7	1.0	0.8	0.9	0.3	0.6	0.4	0.4
Inhalants	9.8	7.2	9.2	9.2	1.2	0.6	0.9	1.1	0.6	0.3	0.5	0.4
Hallucinogens	17.7	15.7	15.5	15.6	1.7	1.0	1.1	1.4	0.1	0.2	0.2	0.1
PCP	8.3	6.6	8.0	8.7	0.1	*	0.1	0.1	*	*	0.1	0.0
Heroin	2.1	1.4	1.8	1.6	0.5	0.2	0.3	0.2	*	0.0	0.1	0.0
Nonmedical Use of Any Psychotherapeutic[2]	22.1	19.6	20.0	19.5	9.8[b]	5.7	6.1	5.9	2.7	1.6	2.2	2.4
Stimulants	15.4[b]	13.4	12.2	11.9	4.9[b]	2.7	1.9	1.8	0.9	0.7	0.5	0.4
Sedatives	7.9	7.0	7.5	6.3	2.0[a]	1.0	1.2	1.0	0.6	0.1	0.4	0.6
Tranquilizers	9.3	8.2	10.0	9.0	3.7[b]	2.1	2.4	2.0	1.2	0.5	0.7	0.5
Analgesics	9.7	8.1	9.8	10.0	4.1	2.8	3.6	3.6	0.9	0.7	1.0	1.4
Any Illicit Drug other than Marijuana[3]	38.8[a]	34.2	35.0	34.3	15.1[b]	10.4	10.0	9.9	4.7	3.2	4.0	3.8
Alcohol	93.3	92.0	92.4	91.7	80.5	78.8	80.9	79.0	64.2	63.3	61.7	61.2
Cigarettes	80.8[b]	79.8	76.3	74.8	42.8[a]	43.5	38.1	38.8	37.1[a]	37.5	32.9	33.7
Smokeless Tobacco	14.7[a]	17.1	16.5[a]	18.6	4.7	5.7	5.1	5.4	2.8	3.9	3.6	3.9
Anabolic Steroids	--	--	0.6	0.6	--	--	0.1	0.0	--	--	0.0	*

*Low precision; no estimate reported.
-- Not available.

[1]Nonmedical use of marijuana or hashish, cocaine (including crack), inhalants, hallucinogens (including PCP), heroin or psychotherapeutics at least once.
[2]Nonmedical use of any prescription-type stimulant, sedative, tranquilizer, or analgesic; does not include over-the-counter drugs.
[3]Nonmedical use of cocaine (including crack), inhalants, hallucinogens (including PCP), heroin or psychotherapeutics at least once; includes marijuana users who also have used any of these listed drugs; does not include users of marijuana only.

[a]Difference between estimate in this cell and corresponding estimate for 1992 is statistically significant at the .05 level. (The differences between 1990 and 1992 estimates were not tested for statistical significance.)
[b]Difference between estimate in this cell and corresponding estimate for 1992 is statistically significant at the .01 level. (The differences between 1990 and 1992 estimates were not tested for statistical significance.)

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse.

Table 4

Percentage of U.S. Household Residents Age 35 and Older Reporting Lifetime, Past Year, and Past Month Drug Use

	TIME PERIOD											
	Lifetime				Past Year				Past Month			
Drug	1988	1990	1991	1992	1988	1990	1991	1992	1988	1990	1991	1992
Any Illicit Drug[1]	23.0[b]	25.9	27.3	28.0	5.8	6.0	6.4[a]	5.1	2.1	2.8	3.1[a]	2.2
Marijuana and Hashish	19.6[b]	21.9	23.7	24.8	3.2	3.6	4.0	3.3	1.4	1.9	2.1	1.6
Cocaine	4.0[b]	5.9	6.8	6.9	0.9	0.9	1.4	0.9	0.3	0.2	0.5[a]	0.2
Crack	0.2[a]	0.5	1.0[b]	0.4	0.1	0.1	0.3	0.1	0.1	0.0	0.2	0.0
Inhalants	1.8	2.6	2.5	2.0	0.2	0.4	0.4	0.2	0.0	0.3	0.2	0.1
Hallucinogens	2.7[b]	4.5	5.2	5.2	0.2	0.2	0.2	0.1	*	0.0	0.1	0.0
PCP	1.3[b]	1.8	2.4	2.9	*	*	*	0.0	*	*	*	*
Heroin	0.8	0.7	1.5[b]	0.7	0.2	0.1	0.1	0.1	0.0	*	0.0	0.0
Nonmedical Use of Any Psychotherapeutic[2]	7.5	8.7	9.6	9.2	2.9	2.6	2.8	2.2	0.7	0.8	1.1	0.7
Stimulants	3.6[a]	4.6	5.4	5.0	0.5	0.4	0.5	0.3	0.4	0.1	0.1	0.1
Sedatives	1.7[b]	2.6	3.5	2.9	0.9	0.7	0.7	0.6	0.2	0.1	0.3	0.2
Tranquilizers	2.9[a]	2.9	4.2	4.1	1.2	0.7	1.2	1.0	0.3	0.1	0.5	0.3
Analgesics	2.6	4.1	4.1	3.5	1.4	1.6	1.3	1.4	0.2	0.6	0.4	0.4
Any Illicit Drug other than Marijuana[3]	10.9[b]	13.0	13.9	14.0	3.5	3.3	3.8	3.0	1.1	1.1	1.6[a]	0.9
Alcohol	87.0	85.0	87.4	87.0	64.4	62.5	64.9	62.6	51.5[a]	48.6	49.5	46.5
Cigarettes	79.2	77.4	78.0	76.8	30.4	27.9	30.0	28.8	27.3	24.3	26.6	25.3
Smokeless Tobacco	12.6	11.5	11.7	12.6	3.8	3.3	3.4	3.8	3.1	2.7	2.8	3.2
Anabolic Steroids	--	--	0.3	0.2	--	--	0.1	0.0	--	--	0.0	*

*Low precision; no estimate reported.
-- Not available.

[1]Nonmedical use of marijuana or hashish, cocaine (including crack), inhalants, hallucinogens (including PCP), heroin or psychotherapeutics at least once.
[2]Nonmedical use of any prescription-type stimulant, sedative, tranquilizer, or analgesic; does not include over-the-counter drugs.
[3]Nonmedical use of cocaine (including crack), inhalants, hallucinogens (including PCP), heroin or psychotherapeutics at least once; includes marijuana users who also have used any of these listed drugs; does not include users of marijuana only.

[a]Difference between estimate in this cell and corresponding estimate for 1992 is statistically significant at the .05 level. (The differences between 1990 and 1992 estimates were not tested for statistical significance.)
[b]Difference between estimate in this cell and corresponding estimate for 1992 is statistically significant at the .01 level. (The differences between 1990 and 1992 estimates were not tested for statistical significance.)

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse.

Table 5

Past Month Drug Use by Age and Demographics

Demographic Characteristic	AGE GROUP																					
	12-17				18-25				26-34				35 and Older				TOTAL					
	1988	1990	1991	1992	1988	1990	1991	1992	1988	1990	1991	1992	1988	1990	1991	1992	1988	1990	1991	1992		
TOTAL	9.2[b]	8.1	6.8	6.1	17.8[b]	14.9	15.4[a]	13.0	13.0[a]	9.8	9.0	10.1	2.1	2.8	3.1[a]	2.2	7.3[b]	6.4	6.3[a]	5.5		
RACE/ ETHNICITY																						
White	10.0[b]	8.9	6.6	6.1	18.0[a]	16.0	16.0	13.7	13.3	9.5	8.7[a]	10.6	1.8	2.5	2.7	2.2	7.0[a]	6.2	5.9	5.5		
Black	6.2	6.7	7.0	6.1	16.9	13.7	16.9[b]	12.1	11.2	13.7	13.7[a]	10.3	3.3	5.1	5.8[b]	3.5	7.8	8.6	9.4[b]	6.6		
Hispanic	7.3	6.5	7.9	7.1	16.8[b]	11.4	11.6	10.2	11.8	9.4	5.9	7.8	2.2	3.0	3.8[b]	1.3	8.2[b]	6.6	6.3	5.3		
Other	•	•	4.3	4.2	•	•	9.2	11.2	•	•	7.5	6.2	•	•	•	•	13.4[a]	3.0	5.4	3.6		
SEX																						
Male	9.5[b]	8.6	7.1	5.7	21.8[a]	18.9	17.6	16.7	16.4	11.0	11.3	12.6	2.5	3.7	3.8	3.2	9.0[a]	7.9	7.6	7.1		
Female	8.9[a]	7.6	6.4	6.5	14.1[b]	11.0	13.3[b]	9.5	9.6	8.6	6.6	7.6	1.8	2.1	2.5[b]	1.4	5.8[b]	5.1	5.2[b]	4.1		
POPULATION DENSITY[1]																						
Large Metro	9.5	6.4	6.5	5.7	23.3[b]	16.8	15.2	14.8	15.6[b]	11.2	10.6	9.7	2.3	3.2	3.8	2.7	8.9[b]	7.3	7.0[a]	6.0		
Small Metro	9.2	9.5	6.8	7.0	15.4[a]	15.3	16.6[b]	10.1	10.0	8.8	8.3[a]	11.1	1.9	2.5	2.7	1.6	6.2	6.1	6.2	5.1		
Nonmetro	8.8	9.2	7.1	5.7	10.7	9.9	13.9	13.8	11.9	7.9	6.2[a]	9.5	1.9	2.5	2.4	2.1	5.8	5.3	5.2	5.3		
REGION																						
Northeast	8.8[b]	6.6	5.0	4.1	20.3	16.8	15.5	15.6	10.9	12.0	8.4	11.4	1.2	2.7	3.5[b]	1.1	6.3	6.4	6.2	5.1		
North Central	9.4	10.8	7.3	6.3	20.7[b]	14.5	14.3	11.0	16.9[b]	10.8	9.1	6.9	1.1	2.4	2.7	2.1	7.9[b]	6.9	5.9[a]	4.5		
South	9.2[a]	8.4	6.4	5.9	13.8	12.3	14.1	12.3	10.3	8.7	7.3[a]	9.9	1.4	2.2	2.5	1.7	5.9	5.6	5.5	5.2		
West	9.4	5.7	8.6	7.9	19.8	18.1	19.1[a]	14.2	15.1	8.5	11.9	12.5	5.6	4.5	4.3	4.4	10.1	7.3	8.3	7.7		
ADULT EDUCATION[2,3]																						
< High School	N/A	N/A	N/A	N/A	20.5	17.7	19.4	16.7	16.7	16.3	13.8	11.9	1.0[a]	2.2	2.0	2.2	5.8	6.5	6.4	5.6		
High School Grad	N/A	N/A	N/A	N/A	19.9[b]	14.0	15.1	13.5	13.3	9.6	10.2	10.3	2.1	2.4	3.8[a]	2.1	8.5[b]	6.1	7.0[a]	5.7		
Some College	N/A	N/A	N/A	N/A	11.7	17.0	14.2	12.3	12.7	9.9	8.8	11.2	3.4	4.5	3.9[a]	1.8	7.0	8.5	7.3	6.1		
College Graduate	N/A	N/A	N/A	N/A	18.0[a]	7.1	11.4[a]	6.3	10.5	5.5	4.7[a]	7.6	2.8	2.9	2.7	2.8	6.4	4.0	3.8	4.3		
CURRENT EMPLOYMENT[2,3]																						
Full-time	N/A	N/A	N/A	N/A	18.7[b]	14.2	13.1	12.2	12.9	8.5	8.3	9.8	2.4	4.1	3.9[a]	2.6	8.2[b]	7.0	6.3	5.8		
Part-time	N/A	N/A	N/A	N/A	16.7	15.9	16.4[a]	11.7	13.0	14.2	8.8	10.1	3.6	2.0	3.7	1.6	8.9	8.0	8.5[a]	6.2		
Unemployed	N/A	N/A	N/A	N/A	28.2	19.3	20.8	23.3	24.8	22.8	21.9	18.1	4.8	5.7	11.0	5.8	17.4	14.0	16.7	13.8		
Other[4]	N/A	N/A	N/A	N/A	11.8	13.2	15.8[b]	10.6	9.1	8.1	5.7	6.8	1.2	1.3	1.0	1.4	3.1	3.1	3.4	3.0		

N/A: Not applicable.
[a]Low precision; no estimate reported.
NOTE: Any illicit drug is defined as nonmedical use of marijuana or hashish, cocaine (including crack), inhalants, hallucinogens (including PCP), heroin or psychotherapeutics at least once.

[1]For all years 1988-1992 in these tables, population density is based on 1984 MSA classifications and their 1990 Census of Population counts. For 1988 and 1990 estimates reported elsewhere before October 1991, population density used 1980 Census counts for the SMSA classifications in effect in 1980. The estimates reported here for 1988 and 1990 may therefore differ from and are not strictly comparable to similarly-labeled earlier estimates.
[2]Data on adult education not applicable for persons aged 12-17. Totals are for those aged ≥18 (unweighted N=3690 (1988), 7082 (1990), 24589 (1991), and 21578 (1992)).
[3]In 1988, data were missing for 10 persons aged 18-25, 6 persons aged 26-34, and 13 persons aged ≥35. Missing data for 1990, 1991, and 1992 were imputed.
[4]Data on current employment not applicable for persons aged 12-17. Totals are for those aged ≥18 (unweighted N=3705 (1988), 7092 (1990), 24589 (1991), and 21578 (1992)).
[5]In 1988, data were missing for 6 persons aged 18-25, 3 persons aged 26-34, and 5 persons aged ≥35. Missing data for 1990, 1991, and 1992 were imputed.
[6]Retired, disabled, homemaker, student, or "other."

[a]Difference between estimate in this cell and corresponding estimate for 1992 is statistically significant at the .05 level. (The difference between 1990 and 1992 estimates were not tested for statistical significance.)
[b]Difference between estimate in this cell and corresponding estimate for 1992 is statistically significant at the .01 level. (The difference between 1990 and 1992 estimates were not tested for statistical significance.)

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse.

Table 6

Comparison of Washington DC Metropolitan Area With Other Large Metropolitan Areas, 1990

Drug	Period of Use: Lifetime — Total DC MSA	Lifetime — Other Large SMSAs[1]	Lifetime — Total U.S.	Past Year — Total DC MSA	Past Year — Other Large SMSAs[1]	Past Year — Total U.S.	Past Month — Total DC MSA	Past Month — Other Large SMSAs[1]	Past Month — Total U.S.
Any Illicit Drug Use[2]	36.5	39.8	37.0	12.2	15.1	13.3	6.8	7.3	6.4
Marijuana/hashish	33.5	35.5	33.1	9.3	11.2	10.2	5.2	5.6	5.1
Cocaine	12.9	13.2	11.3	4.0	3.8	3.1	1.1	1.0	0.8
Crack	2.9	1.8	1.4	0.9	0.7	0.5	0.5	0.3	0.2
Inhalants	7.0	5.1	5.1	1.4	1.0	1.2	0.6	0.4	0.6
Hallucinogens	9.3	8.3	7.6	1.8	1.2	1.1	0.4	0.3	0.3
PCP	4.7	3.4	3.0	0.6	0.2+	0.2	0.1	**	**
Heroin	1.5	1.1	0.8	0.5	0.3	0.2	**	**	**
Nonmedical Use of Any Psychotherapeutics[3]	11.4	12.4	11.9	3.7	4.8	4.3	1.5	1.7	1.4
Stimulants	7.0	6.5	6.9	0.9	1.3	1.5	0.2	0.5+	0.5
Sedatives	4.2	3.9	3.7	0.8	1.3	1.1	0.3	0.3	0.3
Tranquilizers	4.9	4.4	4.3	1.0	1.5	1.3	0.3	0.4	0.3
Analgesics	6.2	6.3	5.7	2.8	3.0	2.5	1.0	0.9	0.8
Alcohol	87.0	86.0	83.2	73.9	70.8	66.0	60.8	56.3	51.2
Cigarettes	74.1	71.8	73.2	32.0	30.1	32.0	27.5	24.4	26.7
Smokeless Tobacco	10.7	8.9	14.1	2.6	2.3	4.9	2.0	1.4	3.5

**Estimate rounds to zero.

[1]Other large SMSAs are Standard Metropolitan Statistical Areas with a 1980 population of 1 million or more as defined by the U.S. Bureau of the Census, excluding the DC MSA.

[2]Nonmedical use of marijuana or hashish, cocaine (including crack), inhalants, hallucinogens (including PCP), heroin, or psychotherapeutics at least once.

[3]Nonmedical use of any prescription-type stimulant, sedative, tranquilizer, or analgesic; does not include over-the-counter drugs.

+Difference between the total DC MSA and other large SMSAs statistically significant at the .05 level.

Table 7
Comparison of DC, MD, and VA Sections
Of Washington DC Metropolitan Area

Drug	Period of Use/Location								
	Lifetime			Past Year			Past Month		
	DC	MD	VA	DC	MD	VA	DC	MD	VA
Any Illicit Drug Use[1]	34.7	35.9	38.0	15.0	11.9	11.4	9.5	6.2	6.3
Marijuana/hashish	32.3	33.0	34.8	12.3	9.5	7.7	8.5	5.0	4.1
Cocaine	11.4	12.8	13.7	3.7	3.1	5.1	1.5	0.7	1.5
Crack	3.3	3.1	2.6	1.6	0.6	1.0	*	0.2	0.6
Inhalants	6.7	6.5	7.7	1.9	1.3	1.4	0.9	0.4	0.7
Hallucinogens	8.5	9.1	10.1	2.3	1.9	1.6	0.3	0.7	0.2
PCP	3.8	5.6	4.1	0.3	0.9	0.3	*	0.1	**
Heroin	1.2	2.0	1.1	*	0.7	**	*	**	**
Nonmedical Use of Any Psychotherapeutics[2]	11.6	11.1	11.6	4.6	3.2	3.8	2.0	0.8	2.0
Stimulants	6.1	6.8	7.5	0.8	0.8	1.0	0.3	**	0.3
Sedatives	3.2	4.5	4.3	1.0	0.8	0.8	0.7	0.2	0.4
Tranquilizers	4.5	5.1	4.9	2.2	0.6	1.1	0.3	0.1	*
Analgesics	5.4	6.4	6.5	2.7	2.6	2.9	1.5	0.7	1.1
Alcohol	78.7	87.1++	90.4+++	63.2	73.2+	79.3+++	54.2	59.4	65.1
Cigarettes	70.4	73.8	76.0+	32.6	30.8	33.3	29.4	24.7	30.0
Smokeless Tobacco	6.6	10.2	12.9	1.2	2.1	3.8	1.0	1.3	3.4

Note: The DC MSA includes the District of Columbia; the Maryland counties of Calvert, Charles, Frederick, Montgomery, and Prince George's; the Virginia counties of Arlington, Fairfax, Loudoun, Prince William, and Stafford; and the Virginia cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park.

*Low precision; no estimate reported.
**Estimate rounds to zero.

[1]Nonmedical use of marijuana or hashish, cocaine (including crack), inhalants, hallucinogens (including PCP), heroin, or psychotherapeutics at least once.

[2]Nonmedical use of any prescription-type stimulant, sedative, tranquilizer, or analgesic; does not include over-the-counter drugs.

+Difference between DC and Maryland or Virginia statistically significant at the .05 level.

++Difference between DC and Maryland or Virginia statistically significant at the .01 level.

+++Difference between DC and Maryland or Virginia statistically significant at the .001 level.

Table 8 shows the sharp decline in drug use by military personnel during the past year and past 30 days from 1980 to 1992.[31] It shows, for example, that current (during the past 30 days) drug use declined from 27.6% of the military force in 1980 to 3.4% in 1992.

Over 80% of U.S. military personnel are in the 17-35 age group that is at greatest risk for drug use. A stringent military policy of zero tolerance for drug use initiated in 1980, coupled with urinalysis testing starting in 1981 to monitor and deter drug use, has apparently been effective in reducing drug use among military personnel. Drug use among the military has declined much more rapidly than use among the civilian population of similar age and demographic characteristics. After adjusting for differences in demographics, drug use among military males is about one-third that of drug use among their civilian counterparts of the same age; drug use among military females is about one-fourth that among civilian females of comparable age.

Marijuana, cocaine, analgesics and LSD are the drugs most commonly used by military personnel. Drug use is concentrated in the lowest pay grades. There was a striking difference in drug use in the lower pay grades between the Air Force and the other services, with only 1.8% of Air Force E1 to E3 personnel using in the past month compared with over 10% in each of the other services. This is explained in part by differences in demographic characteristics of the services.[32]

For further information on prevalence of specific drugs, see the discussion of individual drugs in Appendix A.

Table 8

Trends in Military Drug Use,

Past 30 Days and Past 12 Months, 1980-1992

Any Drug Use	**1980**	**1982**	**1985**	**1988**	**1992**
Past 30 Days	27.6	19.0	8.9	4.8	3.4
Past 12 Months	36.7	26.6	13.4	8.9	6.2

Drug Abuse and Mental Illness

Psychiatric disorders frequently occur in conjunction with drug dependence. A study based on a sample of 20,291 individuals drawn from the community at large found that more than half of those identified as drug abusers also suffered from one or more mental disorders during their lifetime, including 28% with anxiety disorders, 26% with mood disorders (depression), 18% with antisocial personality disorder, and 7% with schizophrenia. Some had multiple disorders. The prevalence of mental disorders varied with the drug being abused, ranging from 50% of marijuana abusers to 76% of those who abused cocaine. Almost half of the drug abusers also suffered from alcohol abuse at some point during their lifetime.[33]

Individuals who suffer from a psychiatric disorder as well as drug abuse often respond poorly to treatment and have extremely high relapse rates after treatment. Treatment response is directly related to severity of the psychiatric disorder; the more severe the psychiatric problem the lower the chances for successful treatment. Treatment is particularly ineffective with drug abusers who also suffer from antisocial personality disorder.[34]

Reliability of Drug Testing

Testing a urine sample is the standard means to determine current use of an illegal drug. A 1981 study by the Centers for Disease Control found significant weaknesses in the performance of drug-testing laboratories.[35] In 1987, the U.S. Department of Health and Human Services issued Technical and Scientific Guidelines for federal drug testing programs.[36] The National Institute on Drug Abuse has also established standards for accreditation of urine drug testing laboratories.

These initiatives have greatly improved the reliability of drug testing. To assess the possibility of error with any drug test, it is essential to know whether the test followed the Technical and Scientific Guidelines for federal drug testing programs. Requirements of these guidelines include:[37}

~ Strict controls over the chain of custody of urine specimens, so that there is documentary evidence that the test report applies to the individual from whom the sample was taken.

~ Federal certification of the laboratory.

~ When initial screening shows the presence of an illegal drug, a confirmatory test using gas chromatography/mass spectrometry (GC/MS) techniques is required.

~ A Medical Review Officer must review any positive test result with the employee to determine whether alternative medical factors could account for the result. This review must occur prior to transmission of test results to agency administrative officials.

The standard procedure used in mass drug screening programs is an immunoassay test, of which there are a number of different versions. The great advantage of immunoassay urinalysis technologies is that they are quick and not too expensive. The weakness is that 1% to 2% of negative urine specimens will test positive. And many positive urine specimens will test negative, as the procedure is not as sensitive to low concentrations of drugs in the urine as one might prefer.[38]

The only way to ensure full reliability is to conduct a second confirmatory test, using the more time consuming and expensive GC/MS technique, as required by the Technical and Scientific Guidelines. The GC/MS technique is extremely accurate and sensitive to relatively small traces of drug use. There is almost no chance of error with a GC/MS test as long as the test is conducted and interpreted properly.[39]

The evidence does still need to be interpreted by a qualified medical professional. A positive drug test does not automatically identify a person as a user of illegal drugs. Legitimate medical treatment, and even some foods such as poppy seeds, can lead to detectable levels of drugs in urine during an initial drug screening; the confirmatory GC/MS test can generally identify the specific substance involved.

A positive drug test shows only that a substance or some of its residue was present in a person's body. It does not provide any information about the frequency of use or whether the individual is an abuser or drug dependent, and it does not prove intoxication or impaired on-the-job performance.

Although the test procedure yields accurate results when done properly, pre-employment drug screening generally detects only the careless user or the strongly dependent person. This is because one can avoid detection simply by abstaining from drug use prior to the test. For most drugs, evidence at levels detectable by the initial screening remains in the system for only two to three days, although heavy marijuana use can be detected up to three weeks later. The length of time that detectable evidence of drug use remains in the urine depends upon which drug is used, amount taken of the drug, the individual's physical condition and metabolism, fluid intake since taking the drug, and the sensitivity of the drug test.[40]

Unscheduled random testing has a better chance of detecting the occasional user than pre-employment screening, but even random testing has limitations that are more or less severe, depending upon how it is conducted. For example, current U.S. Navy policy directs all commands to test approximately 10% to 20% of their personnel each month.[41] (Army and Air Force testing is less extensive.) If a randomly selected sample of 10% of personnel is tested once a month, on a randomly selected day, a user with drugs in his or her system 6 days of the month has only a 2% chance of detection during any given month. Even this low probability is greatly reduced if drug users refrain from drug use until after the monthly test. If only 1% of personnel were to be tested on each of 10 randomly selected days each month, the statistical probability of detection would be marginally reduced, but the deterrent value of testing would be greatly

enhanced, as it would become more difficult to plan drug use around the monthly test schedule.[42]

Drug testing programs vary in the number of drugs that each urine sample is tested for. For example, Navy policy is to test each urine sample for five drugs, with the fifth drug in the test rotated among several possibilities. Army and Air Force test each urine sample for only three drugs--marijuana and cocaine, with third drug rotated among heroin, amphetamine, LSD, etc.[43]

Treatment Effectiveness

Drug abuse treatment includes detoxification, management of drug dependence, and prevention of relapse. Since drug abuse is a complex disorder with multiple causes, there are also multiple treatment methods that are more or less effective with, or acceptable to, different patients. Ideally, assessment of the drug abuse history and personal characteristics of individual patients would permit matching the patient with the treatment method most likely to be successful for that person. This is not possible with the present state of knowledge, however, so treatment programs are varied and usually multifaceted.

Treatment methods are of two general types: administering drugs that affect physiological processes, and therapies that aim to modify behavior. Prescribed drug medications may provide a substitute drug that has similar physiological effects (*i.e.*, methadone treatment of heroin addiction and nicotine chewing gum for treatment of tobacco dependence); may block the physiological effects of the bused drug; or may treat the symptoms of the abused drug (*i.e.*, reduce the craving or treat the insomnia and anxiety often associated with withdrawal from drug use).

Treatments that aim to change behavior include a variety of counseling and psychotherapy approaches based primarily on talking; peer support self-help groups modeled after Alcoholics Anonymous; behavioral conditioning to alter one's response to drug stimuli; skill development (*i.e.*, teaching job or social skills, assertiveness, or relaxation/stress management); or relatively long term (typically 6 months or longer) treatment in a closed residential setting emphasizing drug abstinence and learning of new attitudes and behaviors.[44]

The most comprehensive study of the effectiveness of drug abuse treatment is the Treatment Outcome Prospective Study (TOPS) sponsored by the National Institute of Drug Abuse. This study collected data on 10,000 patients who entered drug treatment in 1979, 1980, or 1981 and followed a sample of these patients for five years after completion of their treatment.[45] There have been advances in treatment methods during the past decade, but the general findings of the TOPS study are still considered valid. At the time of the TOPS study, cocaine abuse, which presents special problems for treatment, was not nearly as prevalent as it is today.

TOPS and many other studies show that treatment is effective, but that relapse remains common and repeated treatments are often required. It confirmed other findings that the amount of time spent in the treatment program was more important than the nature of the treatment program, and was the single most important factor in determining amount of improvement gained from the program. Six to 12 months of treatment was required to register positive outcomes, and those who remained in a program for one year were significantly less likely to return to regular drug use than those in treatment less than one year.

Of the heroin, cocaine, and prescription drug abusers, 70% to 80% significantly reduced their drug use during the year after treatment, but only 40% to 50% achieved abstinence, regardless of the type of treatment program. For marijuana, abstinence rates averaged only about 20% and improvement rates about 40% for the various treatment programs. One-year abstinence and improvement rates for marijuana were the lowest for any drug. Three to five years after treatment, about one-third of all patients continued to use marijuana regularly, while 20% were still regular users of some other drug.

The persistence of marijuana use is noteworthy. Over half the patients in the study were multiple drug users. Treatment focused on the harder drugs, with marijuana considered more benign. Treatment is considered partially successful if patients shift to less serious drugs and less complex patterns of use. Thus, marijuana may act as a substitute for harder drug use. Alcohol may also substitute for drug use; some studies have noted alcohol use increasing as drug use declines, although data on this are not consistent.

Drug abuse treatment, as well as drug abuse itself, is a recurrent phenomenon. Almost one-third of all patients returned to treatment within the first year after completing the treatment, and substantial numbers returned each year during the five-year monitoring period. An earlier study of persons treated for addiction to heroin or other opiates found that 87% had more than one treatment episode; 31% were back in treatment again as much as 12 years later.[46]

Relapse rates as reported in various studies vary depending upon the nature of the population being treated, definition of relapse that is used, methods of detecting relapse, and length of time after treatment that relapse is measured.

Treatment is most effective when dealing with abuse of opiates (heroin, opium, morphine, codeine), as methadone can be used to facilitate withdrawal. Methadone substitutes for the abused drug so the patient can cease heroin or other drug use without withdrawal symptoms. It reduces drug craving without renewed euphoria. The addict can then be gradually withdrawn from methadone or maintained on a controlled daily dose.

Methadone and other drugs designed to combat abuse of opiates are not effective in treating cocaine abuse. Cocaine is generally recognized as the most powerfully rewarding of all the abused drugs, and treatment is considerably less effective than for other illegal drugs. Extensive research is under way to better understand the physiological mechanisms involved in cocaine abuse and to develop new chemical agents for treating it.[47]

The National Institute on Drug Abuse concludes that despite recent advances in treatment, "drug abuse remains a chronic relapsing condition usually requiring prolonged or repeated treatment."[48] Chances of relapse are influenced by the same biological, psychological, behavioral, social and environmental risk factors that influence the onset of drug use and abuse. It is speculated that the number of risk factors for an individual may serve as a measure of relapse risk for that individual.[49] Conversely, a stable family, work and social environment, the absence of severe psychological problems, and strong motivation to be cured are associated with successful treatment outcomes, as is lengthily participation in a post-treatment follow-up program.

Conclusions

One cannot document a direct causal relationship between drug use and espionage or other security compromise, but drug use is symptomatic of other problems that do entail security risk--unwillingness or inability to abide by regulations and a tendency toward irresponsible, high risk, or antisocial behavior. It also raises clear suitability issues related to work performance, absenteeism, employee turnover, and health care costs.

Some drug use is not abnormal. In 1992, almost 61% of Americans age 26 to 34 had used an illegal drug at some time during their lives. Vulnerability to drug abuse, as distinct from experimentation or infrequent social use, depends more on the characteristics of the individual than on the drug that is used. The social and psychological maladjustment that characterizes most frequent drug abusers generally *precedes* the drug use. For psychologically healthy individuals, some experimentation with drugs is usually benign. For others who already have some emotional or psychological problem, drug use easily becomes part of a broad pattern of self-destructive behavior.

The significance of past drug use depends, in part, on what drug was used and how frequently, and how long ago, but other factors are also highly relevant. Initiation of drug use by age 14 or younger is more predictive of future problems than starting drug use in high school. Solitary drug use is more indicative of emotional or psychological problems than social use, as is use to relax *prior* to a social event rather than use *at* a social event. If drugs are used to reduce stress or build self-esteem, this indicates underlying psychological problems. The means of acquiring drugs is also indicative. Purchase from a stranger may indicate as much about an individual's need for and dependence upon drugs as growing one's own.

The drug abuse epidemic abated during the past decade. Lifetime illicit drug use was down from a peak of 65.6% of high school seniors in 1981 to 40.7% in the graduating class of 1992. Evidence form the 1993 survey, however, suggests this downward trend may have reversed. Nevertheless, past reduction of drug use by high school students will be reflected in the life histories of current and future applicants for positions requiring security clearance.

The amount of drug use, which drugs are favored and how they are administered are all subject to rapid change. Drug education programs, changes in public attitudes, high profile cases of drug deaths, rumors and facts regarding the dangers of specific drugs, new developments in methods for administering drugs, and changes in the cost or purity of drugs all affect the nature and extent of drug use and abuse.

APPENDIX A

INFORMATION ON SPECIFIC DRUGS

This Appendix provides background information on the more commonly abused drugs. the grouping of drugs by category follows the categories reported in the National Household Survey on Drug Abuse. Unless otherwise noted, all data on prevalence of drug use are from the 1992 National Household Survey.

Tables in the main body of this report showed lifetime, past year, and past month use for each of the drug categories, with separate tables for the three principal age groups. This Appendix expands on that information. For the most prevalent drugs, marijuana and cocaine, information focuses on frequency of use, on showing how use has changed over time, and how it is influenced by demographic variables such as age, sex, race/ethnicity, population density, region, education, and employment. For the less commonly abused drugs, the Appendix focuses only on lifetime use and how this is influenced by demographic variables. It might have been preferable to focus on past year use, but for many drugs the frequency of past year use was insufficient to break the data down by so many variables. For figures on past year and past month use for each drug, by age group, readers are referred to Tables 2 to 4 in the main body of the report.

Cannabis (Marijuana, Hashish, Hashish Oil)

Description

Marijuana, hashish and hashish oil come from a common plant (*cannabis sativa*) that grows as a weed in most parts of the world. Cannabis is a mild hallucinogen whose principal psychoactive ingredient is delta-9-THC. Increasing sophistication on the part of growers has significantly increased the concentration of delta-9-THC in marijuana, with the result that "street material currently available is, on the average, three times more potent than that which was available in the early 1970s."[50] The stronger material may increase the likelihood of undesired adverse psychological effects, particularly for the inexperienced user. Hashish is stronger than marijuana, and hashish oil stronger than hashish.

Marijuana is usually smoked in a loosely rolled cigarette or *joint*, but various forms of pipes may also be used. Its use can leave a strong odor of burnt rope on clothing, particularly

on wool outer garments. Hashish or hash is a concentrated resin usually compressed into cakes or cookie-like sheets and smoked in small brass pipes. Hashish oil is a highly potent oil of cannabis resin.

At low or moderate doses, cannabis usually induces a general feeling of well-being, relaxation, and lowered inhibitions. There may also be a wide variety of perceptual or sensory distortions, disoriented behavior or increased appetite. Effects may last two to four hours. At the high dose levels normally associated with hashish oil, the effects of cannabis approximate the effects of LSD in both kind and intensity, and adverse psychological reactions are more likely.

Alternative street names for marijuana include grass, pot, joint, weed, herb, reefer, roach, THC, Mary Jane, and tea. Varieties of marijuana are Columbian, Panama Red, Acapulco Gold, Sinsemilla, and home grown. There are also several popular names for cannabis combined with other drugs: cannabis and PCP is referred to as angel dust or supergrass; cannabis and opium as O.J. (*i.e.*, opium joint); cannabis and heroin as atom bomb.

Consequences

It is generally acknowledged that occasional use of marijuana is not ordinarily harmful to healthy adults. Even regular low-dose use (a single marijuana cigarette once or twice weekly) probably does not significantly affect normal psychological functioning, although very mild psychological dependence may develop. Users with emotional problems who turn to marijuana for relief from psychological stress are likely to gradually increase their usage. They may come to depend on marijuana instead of learning drug-free means of coping with stress. This is a psychological dependence on the role which marijuana plays in the user's life. The body can also become physically dependent upon cannabis after daily use at high doses, but withdrawal symptoms are far milder than with heroin, for example.[51]

In the short term, the most serious potential consequences of marijuana use are arrest, accident, and reduced work performance. Possession of marijuana is illegal, so users are subject to arrest. Marijuana use causes temporary mental and physical impairment that reduces quality of work performance and increases risk of accident. Judgment, coordination, reaction time, concentration, and memory are all affected while under the influence of marijuana. Of 1,023 severely injured accident victims admitted to the emergency room at a Baltimore hospital, one-third had detectable levels of marijuana in their blood, indicating use of marijuana within two to four hours prior to admission.[52] Unfortunately, individual susceptibility to marijuana is so variable that one cannot determine degree of impairment based on level of marijuana in the blood; there is nothing comparable to the blood alcohol standard for determining driving under the influence.[53]

Chronic marijuana use over a longer period or at high doses may cause significant long term problems. There is continuing concern about the effects of regular use on the motivation and the emotional and social development of children and adolescents.[54] Two studies have found that chronic exposure to marijuana destroys brain cells and causes other pathological

changes in the brain area believed to be associated with memory. The loss of cells appears similar to the loss seen with normal aging, raising a concern that long-term marijuana users may be at risk for serious or premature memory disorders as they age.[55]

A UCLA study found that daily use of 1 to 3 marijuana joints produces approximately the same lung damage and potential cancer risk as smoking 5 times as many cigarettes.[56] To facilitate absorption of the drug, the marijuana smoker normally inhales more deeply and retains the smoke in the lungs for much longer periods per puff. Marijuana smoke contains substantially more tar than strong brands of tobacco, and this tar has a higher concentration of cancer-causing agents than tobacco smoke.[57]

Prevalence

Although use of marijuana has declined substantially in recent years, it is still by far the most extensively used drug. Marijuana use peaked in 1979 when approximately 68% of civilian, noninstitutionalized Americans age 18 to 25 reported use in their lifetime, 47% during the past year, and 35% during the past month. The comparable figures for 1992 were 48%, 23%, and 11%. Survey data suggest that the steady decline in marijuana use since 1979 may have halted in 1992. Current news reports tell of a resurgence in 1993,[58] and this is reflected in preliminary results from the 1993 Monitoring the Future survey of high school seniors.[59]

Table 9 reports lifetime, past year and past month marijuana use by age, based on the 1991 household survey. Comparable data are not yet available from the 1992 survey. The highest lifetime use, 60.3%, was for the 26 to 29 age group. The highest past year and past month use (26.4% and 14%) is for those age 18 to 21. Tables 10 and 11 show the influence of demographic variables on past year and past month use. Marijuana use was higher than average among whites age 18 to 25 and among blacks age 26 and older; it was lower than average among Hispanics in all age groups. It was lower than average in rural areas but higher than average in the western region. Marijuana use is significantly lower among college graduates than among those with less education.

Of those age 18 to 34 who reported marijuana use during the past month, about 29% reported also using some drug other than marijuana during that month. This suggests that about 29% of marijuana users are multiple drug users while 71% limit their drug use to marijuana.

Table 12 expands on the analysis of past year use, as shown by the 1991 National Household Survey. It reports the frequency of that use during the previous year. it can be seen, for example, that while 27.6% of males age 18 to 25 used marijuana at least once, 15.6% used it at least 12 times during that year and 9.7% used it at least weekly.

Table 9

Percentage Reporting Marijuana Use In Their Lifetime, Past Year, or Past Month, by Age: 1991

Age Group	(Unweighted N)	Time Period		
		Lifetime	Past Year	Past Month
Total	(32,594)	33.2	9.5	4.8
12-17 Years Old	(8,005)	13.0	10.1	4.3
12-13	(2,632)	2.2	1.7	0.4
14-15	(2,659)	10.7	8.4	3.7
16-17	(2,714)	26.1	20.1	8.9
18-25 Years Old	(7,937)	50.5	24.5	13.0
18-21	(4,060)	45.0	26.4	14.0
22-25	(3,877)	56.6	22.4	12.0
26-34 Years Old	(8,126)	59.5	14.4	7.0
26-29	(3,554)	60.3	15.6	8.0
30-34	(4,572)	58.9	13.6	6.2
35 Years and Older	(8,526)	23.7	4.0	2.1
35-39	(1,862)	52.4	12.3	6.8
40-44	(1,377)	41.7	5.2	2.5
45-49	(1,026)	28.3	4.5	2.4
≥50	(4,261)	7.5	0.6	0.3

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 10

Percentage Reporting Marijuana Use in Past Year By Age Group and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	10.1	24.5	14.4	4.0	9.5
Sex					
Male	11.5	27.6	18.4	5.5	11.8
Female	8.6	21.6	10.6	2.7	7.3
Race/Ethnicity[1]					
White	10.3	26.7	14.2	3.7	9.2
Black	10.4	22.0	19.1	6.5	12.2
Hispanic	9.4	16.9	9.4	4.6	8.7
Population Density					
Large metro	8.9	24.3	16.1	4.9	10.2
Small metro	11.9	28.2	14.4	2.8	9.6
Nonmetro	9.5	19.6	10.8	4.1	8.0
Region					
Northeast	9.4	25.2	14.3	4.4	9.6
North Central	9.8	23.6	14.5	3.8	9.1
South	9.2	22.6	12.4	3.4	8.5
West	12.7	28.6	17.6	4.9	11.6
Adult Education[2]					
Less than high school	N/A	29.8	20.6	2.5	9.3
High school graduate	N/A	22.5	16.4	4.2	9.9
Some college	N/A	25.9	13.0	6.4	12.2
College graduate	N/A	17.1	9.6	3.2	5.9
Current Employment[3]					
Full-time	N/A	22.6	13.9	5.8	10.2
Part-time	N/A	23.2	11.8	2.8	10.4
Unemployed	N/A	30.9	34.3	11.4	22.9
Other[4]	N/A	26.0	8.8	1.1	5.1

N/A: Not applicable.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 11
Percentage Reporting Marijuana Use During Past Month By Age Group and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years) 12-17	18-25	26-34	≥35	Total
Total	4.3	13.0	7.0	2.1	4.8
Sex					
Male	5.0	15.7	9.5	3.0	6.3
Female	3.7	10.5	4.5	1.3	3.4
Race/Ethnicity[1]					
White	4.4	13.7	6.6	1.9	4.5
Black	4.5	14.6	11.9	3.5	7.2
Hispanic	4.6	9.1	4.2	2.3	4.3
Population Density					
Large metro	4.4	12.9	8.6	2.6	5.4
Small metro	4.7	14.5	6.2	1.8	4.8
Nonmetro	3.9	11.0	4.5	1.6	3.7
Region					
Northeast	3.7	14.7	6.2	2.8	5.2
North Central	4.6	11.5	7.6	2.0	4.6
South	3.9	12.1	5.6	1.7	4.2
West	5.5	14.8	9.2	2.3	5.8
Adult Education[2]					
Less than high school	N/A	16.0	11.7	1.3	5.1
High school graduate	N/A	13.0	8.3	2.5	5.5
Some college	N/A	12.7	6.2	3.2	6.0
College graduate	N/A	7.7	3.3	1.4	2.4
Current Employment[3]					
Full-time	N/A	11.1	6.5	3.0	5.0
Part-time	N/A	14.4	5.8	1.9	6.3
Unemployed	N/A	17.4	19.8	7.7	13.6
Other[4]	N/A	13.1	3.9	0.4	2.4

N/A: Not applicable.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 12

Frequency of Marijuana Use During the Past Year

Age	% used at at least once	% used 12 or more times	% used weekly or more
12-17	10.1	4.8	2.4
Male	11.5	5.5	3.0
Female	8.6	4.0	1.9
18-25	24.5	11.9	6.8
Male	27.6	15.6	9.7
Female	21.6	8.4	4.0
26-34	14.4	6.8	4.0
Male	18.4	9.6	5.5
Female	10.6	4.2	2.4
35+	4.0	1.8	1.0
Male	5.5	2.8	1.7
Female	2.7	0.9	0.4
Total	9.5	4.5	2.5
Male	11.8	6.2	3.7
Female	7.3	2.8	1.4

Treatment

Relatively few individuals seek treatment for marijuana alone. Those who do are generally helped by a treatment program that focuses on helping change behavior patterns. Most marijuana users who require treatment are using multiple drugs, and treatment focuses on the other, more addictive substances. For those who enter treatment for abuse of hard drugs such as heroin or cocaine, limiting use to marijuana only is often regarded as a successful outcome.

Cocaine

Description

Cocaine is a central nervous system stimulant that occurs naturally in the coca plant. It heightens the body's natural response to pleasure and creates a euphoric high. It may also cause illusions of increased strength or stamina, mental ability, and sensory awareness, and a decrease in pain, hunger, and need for sleep. It may heighten sexual desire. Cocaine comes in different forms that may be sniffed or snorted, smoked or injected.

Some of the street names for cocaine are coke, crack, rock, snow, snow bird, flake, nose candy, big C, toot, old lady, blow, girl, and wiff.

Before the mid-1980s, the most common form of cocaine sold in the United States was water soluble hydrochloride salt. It was sniffed or snorted in powdered form and absorbed by the nasal tissue, or the crystals were dissolved and injected intravenously. More recently, much cocaine hydrochloride has been processed so that it can be smoked. This was first done by a lengthy process that entailed *cooking* the cocaine and extracting the *free base* using volatile solvents such as ether. Because ether is highly flammable, this process is extremely dangerous. Currently, cocaine hydrochloride is being converted into smokable form using baking soda and water, rather than an explosive solvent. The product is called crack, and it is much simpler and safer to make. The user smokes the crack *rocks* in a glass pipe or crumbles them into tobacco or marijuana cigarettes.

When cocaine is snorted, the brain receives the drug in gradual amounts over a period of minutes. When smoked, the drug is absorbed rapidly by the lungs and transmitted to the brain in less than 10 seconds. Smoking causes the effects of cocaine to be felt almost immediately; the euphoric high may be greater, but the duration of the high is shorter. The peak high from smoking may last 5-10 minutes, while that from snorting may last 15-30 minutes, but some euphoria may continue one to two hours.

Selling crack at low cost in amounts equal to a single dose has been described as "an evil stroke of marketing genius that brought the drug into the financial grasp of virtually anyone who wants it."[60] Each rock of crack weighing about 100 milligrams was reported in January 1991

as selling on the street for $5 to $10.[61] It is typically sold in plastic vials containing one to three rocks. The reduced cost, increased safety of manufacturing, greater ease and safety of smoking versus snorting or injection, and the unusually rapid effect have contributed to a proliferation of crack abuse.

Cocaine and crack are often combined with other drugs. Cocaine abusers may use heroin, marijuana, alcohol or valium to ease the intensity of the post-cocaine crash. or they may combine cocaine with substances such as heroin or PCP and administer them together to create a different type of drug euphoria.

Consequences

Cocaine is one of the most powerfully addictive drugs of abuse, but, in contrast to narcotics, the psychological dependence is more powerful than the physical dependence. By stimulating the pleasure centers in the brain, cocaine increases the user's desire for additional cocaine. This is in contrast to heroin, which makes its users feel satiated. Many users become hooked on the feeling of euphoria produced by cocaine, and their entire being begins to revolve around the next dose. Clinicians have estimated that approximately 10% of individuals who start using the drug ostensibly for "recreation" will go on to serious, heavy use.[62]

The elevated mood obtained from cocaine is temporary and is followed by a deep depression or crash that leaves the user craving for more. The more immediate and intensive high from smoking cocaine is more addictive than snorting.[63] While regular snorting of cocaine may cause addiction in a few years, smoking cocaine can cause addiction within a few months.

Physical effects of cocaine include constricted peripheral blood vessels, dilated pupils, and increased temperature, heart rate, and blood pressure. The cardiovascular impacts of cocaine are increased significantly when cocaine is combined with either alcohol or marijuana. For example, the increase in heart rate is three to five times greater when cocaine is combined with alcohol than when either drug is taken alone. Mild exercise also increases the cardiovascular impacts of cocaine use, which may explain several cases of prominent athletes who have died from cocaine overdose.

The prevalence of cocaine in smokable form starting in the mid-1980s triggered a five-fold to six-fold increase in cocaine-related admissions to hospital emergency rooms. Problems included blockages in blood circulation, strokes, abnormalities in heart rhythm, and cardiac arrest.[64] Cocaine use increased risk of strokes in young adults age 14 to 44. Drug abusers are 6.5 times more likely to suffer a stroke than nondrug abusers, and cocaine is the drug most often identified with drug-related strokes.[65] Cocaine was involved in 56% of drug-related deaths (other than suicide) nationwide in 1991.[66]

Occasional cocaine snorting may produce nasal congestion and a runny nose, while chronic snorting may damage the mucous membrane of the nose and cause the nasal cartilage to

deteriorate.[67] Some regular users of cocaine report feelings of restlessness, irritability, and anxiety. High doses or chronic use can trigger paranoia. When some individuals stop using cocaine, they become depressed, which often leads to increased use to alleviate the depression. Withdrawal from cocaine is far less painful than withdrawal from heroin, however.

Prevalence

Table 13 reports lifetime, past year and past month cocaine use by age. The highest lifetime use, 25.8%, is for the 26 to 29 age group. The highest past year and past month use (7.7% and 2%) is for those age 18 to 21. Tables 14 and 15 show the influence of demographic variables on past year and past month use. Cocaine use is far higher among males--more than twice as prevalent in most age groups--than among females. It is higher than average among whites age 18 to 25, but in the 26 to 34 age group it is far higher among blacks than either whites or Hispanics. Cocaine use is lower than average in the south and much higher than average in the western region. Past year and past month use is very much lower among college graduates than among those with less education, even those with some college but who did not graduate.

These statistics on cocaine use include crack cocaine. Comparable statistics for crack alone were 1.9% for lifetime use, 0.5% for past year use, and 0.2% for past month use. The demographic distribution of this use was comparable to that for cocaine in general, except that crack is far more prevalent among blacks.

Table 16 expands on the analysis of past year use, based on results of the 1991 National Household Survey. It reports the frequency of that use during the previous year. It can be seen, for example, that while 9.4% of males age 18 to 25 used cocaine at least once, 2.8% used it at least 12 times during that year and 0.9% used it at least weekly.

Table 13

Percentage Reporting Cocaine Use In Their Lifetime, Past Year, and Past Month, By Age: 1991

Age Group	(Unweighted N)	Time Period		
		Lifetime	Past Year	Past Month
Total	(32,594)	11.5	3.0	0.9
12-17 Years Old	(8,005)	2.4	1.5	0.4
12-13	(2,632)	0.4	0.3	0.1
14-15	(2,659)	1.5	0.9	0.4
16-17	(2,714)	5.3	3.2	0.8
18-25 Years Old	(7,937)	17.9	7.7	2.0
18-21	(4,060)	12.8	6.7	1.7
22-25	(3,877)	23.4	8.8	2.4
26-34 Years Old	(8,126)	25.8	5.1	1.8
26-29	(3,554)	25.7	5.8	1.8
30-34	(4,572)	25.8	4.5	1.8
35 Years and Older	(8,526)	6.8	1.4	0.5
35-39	(1,862)	20.2	4.9	2.1
40-44	(1,377)	11.6	1.4	0.2
45-49	(1,026)	5.2	1.5	*
≥50	(4,261)	1.1	0.2	*

*Low precision; no estimate reported.

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 14

Percentage Reporting Cocaine Use in Past Year By Age and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	1.5	7.7	5.1	1.4	3.0
Sex					
Male	1.5	9.4	6.9	2.1	4.1
Female	1.5	6.0	3.3	0.7	2.0
Race/Ethnicity[1]					
White	1.3	8.2	4.9	1.2	2.8
Black	1.5	6.0	7.5	2.3	3.9
Hispanic	2.9	7.1	4.5	2.2	3.8
Population Density					
Large metro	1.3	8.1	5.6	1.7	3.4
Small metro	1.8	8.2	4.7	1.2	3.0
Nonmetro	1.3	6.1	4.2	1.1	2.3
Region					
Northeast	0.7	8.1	5.6	1.1	2.9
North Central	1.2	7.2	4.4	1.4	2.7
South	1.5	6.5	3.9	0.9	2.3
West	2.6	10.1	7.2	2.7	4.6
Adult Education[2]					
Less than high school	N/A	11.5	8.8	1.0	3.8
High school graduate	N/A	6.7	5.6	1.5	3.3
Some college	N/A	6.6	4.9	2.3	3.8
College graduate	N/A	6.1	2.4	0.8	1.6
Current Employment[3]					
Full-time	N/A	8.1	4.8	1.5	3.2
Part-time	N/A	6.3	3.9	1.3	3.2
Unemployed	N/A	14.9	15.4	7.8	11.8
Other[4]	N/A	4.8	2.1	0.6	1.3

N/A: Not applicable.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 15

Percentage Reporting Cocaine Use in Past Month By Age and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	0.4	2.0	1.8	0.5	0.9
Sex					
Male	0.5	2.8	2.6	0.6	1.3
Female	0.3	1.3	1.1	0.3	0.6
Race/Ethnicity[1]					
White	0.3	1.7	1.6	0.2	0.7
Black	0.5	3.1	2.7	1.3	1.8
Hispanic	1.3	2.7	2.0	1.0	1.6
Population Density					
Large metro	0.5	2.1	2.0	0.5	1.0
Small metro	0.5	2.0	1.8	0.6	1.0
Nonmetro	0.2	1.9	1.4	0.1	0.6
Region					
Northeast	0.5	1.5	2.1	0.4	0.9
North Central	*	2.1	1.7	0.6	0.9
South	0.6	1.8	1.4	0.4	0.8
West	0.4	3.0	2.4	0.6	1.3
Adult Education[2]					
Less than high school	N/A	3.8	3.0	0.6	1.4
High school graduate	N/A	2.2	2.3	0.4	1.1
Some college	N/A	1.1	1.4	0.6	0.9
College graduate	N/A	0.6	0.9	0.2	0.4
Current Employment[3]					
Full-time	N/A	2.2	1.7	0.4	1.0
Part-time	N/A	1.9	1.7	0.1	0.9
Unemployed	N/A	4.9	5.0	*	4.5
Other[4]	N/A	0.7	0.9	0.2	0.3

N/A: Not applicable.

*Low precision; no estimate reported.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 16

Frequency of Cocaine Use During the Past Year

Age	% used at at least once	% used 12 or more times	% used weekly or more
12-17	1.5	0.4	0.2
Male	1.5	0.4	0.2
Female	1.5	0.4	0.3
18-25	7.7	2.2	0.8
Male	9.4	2.8	0.9
Female	6.0	1.6	0.6
26-34	5.1	1.5	0.6
Male	6.9	1.7	0.7
Female	3.3	1.3	0.6
35+	1.4	0.4	0.1
Male	2.1	0.6	0.1
Female	0.7	0.2	0.1
Total	3.0	0.8	0.3
Male	4.1	1.1	0.4
Female	2.0	0.6	0.3

Treatment

Although several forms of medication and behavioral therapy have been used to facilitate withdrawal from cocaine addiction, there is today no medication proven effective in reducing the continued craving for cocaine or blocking its effects. Relapse is common among those who temporarily discontinue cocaine use. The major medical treatments designed to prevent relapse of drug abuse, such as methadone maintenance, were developed specifically to combat opioid abuse. They are ineffective in treating cocaine abusers. Extensive research is under way to develop therapies designed specifically for cocaine. One of the most important findings to

emerge from this research to date is that factors that influence cocaine dependence vary so greatly that treatment may have to be tailored to each affected individual.[68]

The largest national study of drug treatment outcomes found that of those who used cocaine regularly (daily or weekly) in the year prior to treatment, and who remained in treatment for at least three months, less than half (40% to 47% depending upon type of treatment) remained abstinent for the year following treatment.[69]

Heroin

Description

Heroin is a semi-synthetic product derived by chemical manipulation of either morphine or codeine. Although heroin is the most common narcotic available on the street, addicts can obtain a variety of prescription pain killers and cough suppressants that produce similar effects. These are discussed below in the section on Narcotic Analgesics. Underground chemists also produce dangerous "designer drugs" that mimic the effects of heroin but may be many times stronger. These include MPTP, MPPP, and PEPAP. This discussion is limited to heroin.

Street names for heroin include smack, horse, junk, black tar, brown sugar, and big H. New names that are currently faddish include diesel, dynamite, and white death.[70]

In pure form, heroin is a fine, white crystalline powder with a bitter taste. It is diluted for sale on the illegal market with a variety of substances such as milk sugar, dextrose, or quinine. Over 90% of heroin users dissolve the powder in water and take it by injection, but it can also be smoked. Although it can be injected into skin or muscle, intravenous injection (*mainlining*) is generally preferred as it produces the most rapid and intense response. The characteristic track marks on the skin and skin discoloration at the injection sites are caused by unsterilized needles and contaminants in the heroin.

Consequences

Narcotics cause the strongest physical addiction of all the illegal drugs. Most regular users rapidly develop tolerance to the drug. As tolerance develops, the user must gradually increase the dose to achieve the same euphoric effects, and addiction then occurs. Over time, there may be a tenfold or greater increase in dosage. Eventually, a plateau is reached where no amount of the drug is sufficient to achieve the desired intensity of pleasurable effects. When this plateau is reached, or when the user reaches the limit of what he or she can afford to buy, heroin is no longer taken for its euphoric qualities but is required daily just to stave off withdrawal sickness, which typically begins 8 to 12 hours after the last dose. For a drug high, the heroin user then depends upon other drugs, frequently barbiturates, cocaine or methamphetamine.[71]

Withdrawal symptoms begin with watering eyes, discharge of nasal mucus, yawning, and sweating, followed by an agitated sleep. Then continued agitation is accompanied by depression, loss of appetite, gooseflesh, dilated pupils, and tremor. The peak usually occurs 36 to 72 hours after the last heroin intake. It is characterized by alternating bouts of chills and shivering and excessive sweating, and a host of other unpleasant and painful symptoms. Symptoms gradually decline and disappear 7 to 10 days after the start of withdrawal sickness. All symptoms disappear quickly if a suitable amount of heroin or other narcotic is taken at any time during the withdrawal period. Even after the classical withdrawal period is completed, depression, anxiety, insomnia, loss of appetite, and a persistent craving for narcotics may continue for a long time after the last drug use.

Heroin affects that portion of the brain which controls sensations of pain and pleasure. It suppresses and stimulates feelings of pleasure. Regular heroin users crave the pleasure it produces and fear withdrawal. Because withdrawal sickness occurs so quickly after the last use, addicts are driven to organize their lives around the need for money to buy heroin, to purchase it securely, and then to administer it. This commonly leads to a highly deviant lifestyle.

Apart from physical dependence, the main adverse effects of heroin stem from use of unsterilized needles and the deviant lifestyle. Even after chronic use, the direct health consequences from the heroin itself are relatively mild; they include constipation, pupillary construction (which impairs night vision), reduced libido, menstrual irregularity, and increased probability of respiratory illnesses. However, severe overdose can cause death, usually from respiratory arrest; this may happen if the user injects heroin that is much purer than the ordinary street heroin to which one is accustomed. Deaths are also associated with combining heroin with other drugs, especially alcohol and cocaine, which is known as speedballing.

The most significant risks from unsterilized needles are AIDS and viral hepatitis. The lifestyle of heroin users often includes criminal activities to gain money for drug purchases. The lifestyle also affects health in various ways. When most money is spent maintaining the heroin habit, little is left for adequate nutrition, housing, or medical care. Heroin itself, as well as a drug-abusing lifestyle, may depress the body's ability to withstand infections. Users often avoid going to the doctor because the trackmarks clearly visible on the arms and other body parts will identify their drug habit.

Prevalence

A worldwide glut of opium in 1993 pushed heroin prices to a 30-year low, so that heroin costs about as much as crack and was much purer than in the past. According to current news reports, this is prompting a comeback in heroin use. Results of the 1992 household survey fail to show increased heroin use, but hospital emergency room visits involving heroin were up 34% in 1992 and arrests were 16% higher than in 1991.[72] This could result from increased purity/dosage levels rather than broader use.

Table 17

Percentage Reporting Heroin Use In Their Lifetime By Age and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	0.3	0.8	1.8	1.5	1.3
Sex					
Male	0.2	0.9	2.2	2.3	1.9
Female	0.3	0.7	1.4	0.7	0.8
Race/Ethnicity[1]					
White	0.2	0.8	1.7	1.3	1.2
Black	0.4	0.9	2.2	2.5	1.9
Hispanic	0.5	0.8	1.9	2.0	1.5
Population Density					
Large metro	0.3	0.9	1.8	1.7	1.5
Small metro	0.3	0.8	1.7	1.1	1.1
Nonmetro	0.3	0.5	1.9	1.5	1.3
Region					
Northeast	0.3	0.7	1.6	1.6	1.4
North Central	0.3	0.9	1.2	1.6	1.3
South	0.2	0.7	1.9	0.9	1.0
West	0.4	0.8	2.5	2.2	1.9
Adult Education[2]					
Less than high school	N/A	1.3	4.4	1.3	1.8
High school graduate	N/A	0.7	1.7	1.4	1.4
Some college	N/A	0.5	1.6	2.7	2.0
College graduate	N/A	0.7	0.7	0.5	0.6
Current Employment[3]					
Full-time	N/A	0.8	1.8	1.5	1.5
Part-time	N/A	0.5	1.2	1.7	1.3
Unemployed	N/A	2.2	3.0	7.5	4.8
Other[4]	N/A	0.2	1.5	0.7	0.7

N/A: Not applicable.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 17 shows that only 1.3% of the noninstitutionalized civilian population over age 12 had ever used heroin as of 1992. Lifetime heroin use in the Washington metropolitan area was 1.7%. Note from the table that heroin differs from all the other drugs in that use is significantly higher in the older age groups. Use by blacks and Hispanics was significantly higher than among whites in all age groups except 18 to 25. The greatest prevalence of lifetime heroin use (7.5%) was among the unemployed age 35 and over. Past year use averaged over all ages and demographic groups was only 0.2%.

Frequency of heroin use may be under-reported, as the National Household Survey does not include criminals in correctional institutions, persons in treatment centers, or most of the homeless, all of whom are far more likely than the average to have used heroin.

Treatment

A daily oral dose of methadone prevents narcotic withdrawal symptoms in most patients. It eliminates the drug hunger and associated drug-seeking behavior, facilitating gradual withdrawal without significant pain. The large national study of drug treatment effectiveness found that slightly over half of patients who used heroin daily or weekly in the year prior to treatment, and who were in treatment for at least three months, remained abstinent for the year following treatment. As with all drug abuse, however, relapse is common.[73]

Hallucinogens (LSD, PCP, etc.)

Description

Hallucinogens include a variety of dissimilar substances. The best known and most commonly abused hallucinogens are LSD (lysergic acid diethylamide) and PCP (phencyclidinie), and discussion in this section is limited to these substances. Other hallucinogens are MDMA (Ecstasy or Adam), mescaline, peyote, psilocybin (mushrooms), PMA, MDA and a host of other lesser known or less frequently abused substances. Cannabis (marijuana) is also a mild hallucinogen but has been discussed separately.

What all hallucinogens have in common is that they distort the senses to produce a variety of illusions and hallucinations. The illusions may be pleasant or frightening and may cause ecstasy or terror. The effects vary greatly among individual users and are unpredictable, as they depend upon dosage, the setting in which the drug is taken, and the attitudes, expectations, personality and emotional state of the user. Young people who use hallucinogens appear to be seeking a faster pace of life, and to regard risk-taking and adventure as fundamental components of their lifestyle.[74] Thus, LSD or PCP use may indicate a personality that is prone to thoughtless, high-risk behavior.

LSD is a semisynthetic substance derived from ergot, a fungus which grows on certain grains such as rye. It is one of the most potent mind-altering chemicals. LSD is 100 times more

powerful than cocaine, as one ounce of LSD is enough for about 300,000 doses.[75] Odorless, colorless, and tasteless, it is usually taken by mouth. Commonly referred to as acid, sugar cubes, green or red dragon, white lightening, blue heaven or microdot, LSD is sold in tablets, capsules, or occasionally in liquid form.

Currently, LSD is often sold on the street as drug-permeated blotter paper (*blotter-acid*) which is divided into small, decorated squares, with each square representing one dose and costing about $5. LSD is now usually marketed in doses of 20 to 80 micrograms, as compared with 100 to 200 microgram or greater doses that were the norm when LSD was so much in the news during the 1960s and 1970s. The smaller dose reduces the risk somewhat.[76]

The LSD user feels the first effects about 30 to 90 minutes after taking the drug, and the *trip* lasts up to 12 hours before the user returns to normal.[77]

PCP can be produced from a few readily available chemicals and with a minimum of equipment. Consequently, it is easily manufactured illicitly in a laboratory set up in a basement, van, or garage. Many substances labelled as mescaline, methamphetamine, MDA, or a variety of other drugs are actually PCP or LSD, usually the former.[78]

Street names for PCP include angel dust, hog, loveboat, lovely, peace pill, horse tranquilizer, killer weed, evil weed, and parsley.

PCP can act as both a stimulant and a depressant. It can produce hallucinations, relaxation, feelings of dissociation from one's surroundings, and sometimes intense euphoria. Its users commonly experience distortions in their perceptions of time, space and body image, as well as visual and auditory distortions. Higher dosages and long-term use may cause a wide spectrum of erratic and bizarre behavior that is frequently unpredictable and sometimes extremely violent. The PCP high lasts four to six hours, with a gradual decline of effects completed within 24 hours.[79]

Consequences

LSD and PCP are among the most dangerous illegal drugs, as their results are so unpredictable. They produce such a variety of effects that it is difficult for users to predict what they will experience from one drug episode to another, or even within a single episode. The effects of PCP are so unpredictable, and so often harmful, that PCP has received substantial negative publicity in the street-drug subculture.

Since the effects of PCP include bizarre behavior and disorientation, there is a significant risk of accidental injury or death from drowning, falling, or automobile accidents. Because PCP is an anesthetic, it produces an inability to feel pain, which can also lead to serious bodily injury. PCP users may also commit homicides under the influence of the drug. Children of mothers who use PCP during pregnancy may be seriously affected. An overdose of PCP can induce a psychotic state in many ways indistinguishable from schizophrenia.

PCP causes many more deaths than LSD. In 1991, a sample of 130 medical examiner facilities in 27 metropolitan areas reported 107 deaths involving PCP and only three involving LSD.[80] But LSD, too, entails very substantial risks. Close to 4,000 people are admitted to hospital emergency rooms each year for treatment of LSD-related problems.[81]

LSD produces profound emotional changes that often take the form of exaggerating pre-existing moods, either pleasant or fearful and depressing. The LSD user who has a "bad trip" experiences terrifying thoughts and feelings, fear of losing control, fear of insanity and death, and despair. LSD can trigger serious and long-lasting psychological problems such as schizophrenia or severe depression.

Any hallucinogen, but especially LSD, can cause flashbacks in which some aspect of the previous drug experience recurs without the user having taken the drug again. Little is known about the physiological or psychological process that causes flashbacks. They range form momentary flashes of past LSD trips to enduring perceptual distortions lasting several months or years.[82] A flashback occurs suddenly, often without warning, and may occur within a few days or several years after LSD use. Flashbacks occur principally to people with a history of extensive LSD use or who have an underlying personality problem, but they may occur in apparently normal people after first use.[83] Data are not available on the percentage of LSD users who experience flashbacks, or on the maximum time after last use that a flashback might occur. It seems reasonable to assume that if flashbacks have not occurred within three years after last use, or if three years elapsed without a recurrence of flashbacks, that the risk of future flashbacks is very small.

Chronic PCP users tend to lose some of the fine motor skills and short term memory.[84] Studies with animals strongly suggest that PCP also adversely affects ability to learn and recall information.[85] Consequently, work performance may be affected even at times when the user is not high on the drug.

LSD is not considered an addictive drug, as it does not produce compulsive drug-seeking behavior like cocaine, amphetamine, heroin, alcohol, or nicotine. As a result, most LSD users eventually decrease or stop their use of the drug voluntarily. There is no evidence of a withdrawal symptom from LSD. The drug does produce tolerance, however, so that some users who take LSD repeatedly need higher and higher doses to continue achieving the same degree of intoxication. Given the drug's unpredictability, this is an extremely dangerous practice.[86]

Evidence is unclear on the degree to which PCP users develop tolerance to the drug and become psychological or physically dependent.[87] Research on this is difficult, as individual reactions are so different and variations in purity make it so difficult to judge the dosage to which an individual has been exposed.

Prevalence

Table 18 reports lifetime use of any hallucinogen, broken down by age and demographic variables. Table 19 shows how this use is distributed among six different hallucinogens, with LSD and PCP the most common.

Prevalence of hallucinogen use was greatest in the 26 to 34 age group, with 15.5% having used such a drug at some point in their lifetime. In the 18 to 25 age group, it was 13.1%. Whites were more than twice as likely to have had experience with a hallucinogen than black or Hispanics, and westerners were almost twice as likely to have had such experience as residents of any other region. Among 12 to 17-year-olds, hallucinogen use was slightly more common among females than males, but after age 18 it was significantly more common among males.

As reported in the main body of this report, previous year use drops to 4.7% for the 18 to 25 age group, and 1.1% for the 26 to 34 group. Past month use drops to 1.2% and 0.2% for the two groups respectively. In other words, some experimentation with a hallucinogen is not unusual, but regular monthly or greater use is uncommon.

Of a group of 100 individuals who did use PCP regularly, 50% reported using it an average of at least once a week, and 40% said they used it two or more times per week. Half of high school seniors who used PCP started before entering 10th grade.[88]

There was a slow but steady decline in hallucinogen use from 1979 to 1991. Use of PCP, in particular, has declined precipitously since 1986 among 19 to 28 year olds,[889] apparently as a result of greater awareness of its dangers. The number of PCP-related deaths was down 50% from 1988 to 1991.[90]

The decline in PCP use has been more than offset by a gradual increase in popularity of LSD. The National Household Survey reported a pick-up in LSD use in 1992. Preliminary results from the 1993 Monitoring the Future survey of high school seniors show continued increase in LSD use. In 1993, 10.3% of high school seniors had tried LSD at least once in their lifetimes, and 6.8% had used it during the previous year. This is approaching a return to the peak years of LSD use during the mid 1970s.[91] The media has recently reported sharply increased LSD use in several parts of the country.[92]

These trends in hallucinogen use were also observed in the 1992 survey of U.S. military personnel. Among active duty military, past-month LSD use increased from 0.4% to 0.9%, while past-month use of PCP dropped to virtually zero.[93]

Table 18

Percentage Reporting Use of Any Hallucinogen In Their Lifetime, by Age and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	3.3	13.1	15.5	5.2	8.1
Sex					
Male	3.3	15.4	18.8	7.0	10.1
Female	3.4	11.0	12.4	3.5	6.2
Race/Ethnicity[1]					
White	3.8	15.8	18.0	5.4	8.9
Black	1.2	5.4	5.9	3.7	4.1
Hispanic	3.5	7.5	9.2	5.5	6.4
Population Density					
Large metro	2.9	14.3	16.6	5.7	8.9
Small metro	4.0	14.2	15.6	4.4	7.9
Nonmetro	3.1	9.5	13.0	5.2	6.9
Region					
Northeast	2.9	11.7	15.1	4.8	7.5
North Central	3.8	12.1	15.0	5.2	7.9
South	3.0	10.5	12.5	3.3	6.0
West	3.8	20.8	21.3	8.8	12.6
Adult Education[2]					
Less than high school	N/A	15.8	17.9	2.8	6.9
High school graduate	N/A	11.2	15.0	5.1	8.2
Some college	N/A	13.2	16.7	7.9	11.1
College graduate	N/A	14.5	13.9	5.5	8.4
Current Employment[3]					
Full-time	N/A	13.6	15.6	7.1	10.3
Part-time	N/A	14.6	15.7	5.1	9.7
Unemployed	N/A	17.4	25.3	13.8	17.7
Other[4]	N/A	9.2	10.6	1.5	3.4

N/A: Not applicable.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 19

Percentage Reporting Hallucinogen Use in Their Lifetime, By Hallucinogen Type and Age Group: 1991

	Age Group (Years)				
Hallucinogen	12-17	18-25	26-34	≥35	Total
Any Hallucinogen	3.3	13.1	15.5	5.2	8.1
LSD	2.6	9.7	10.8	3.8	5.8
Peyote	0.2	0.8	2.3	1.7	1.5
Mescaline	0.1	2.6	5.3	2.6	2.8
Psilocybin	0.5	4.0	5.9	2.1	2.9
PCP	1.1	4.2	8.0	2.4	3.6
Ecstasy	0.5	2.8	1.5	0.4	1.0

Treatment

LSD and PCP users who seek treatment are generally using multiple drugs. Treatment would generally focus on whatever other drugs are being used that are more addictive than either LSD or PCP. To the extent that an individual's hallucinogen use has caused psychological problems, or reflects the presence of pre-existing psychological problems, treatment is less likely to be successful.

Stimulants (Amphetamines, Etc.)

Description

Stimulants act on the central nervous system. The sought-after effects are euphoria, postponement of fatigue, increased energy and alertness. Because of their ability to extend the normal periods of wakefulness and endurance, they are often abused by students, athletes, and truck drivers. Low doses of amphetamines have been used to treat mild depression, to control obesity, and for several other ills, but medical use today is severely limited owing to the high potential for abuse and addiction.

The most common drugs in this class are amphetamines (Benzedrine), methamphetamine (known as speed, crank, ice, crystal meth, Methedrine, or Desoxyn), and dextroamphetamine (Dexedrine). Other street names include Bennies, crystal, eye openers, lid poppers, meth, pep pills, uppers, and wake-ups. Amphetamines are also found in combination with other drugs, including amphetamine and barbiturate (goofballs) and either methamphetamine or cocaine with heroin (speedballs).

Methamphetamine is currently the most popular and widespread amphetamine that is illegally manufactured, distributed, and abused. Owing to strict controls on legal manufacture and medical use of amphetamines, the street drugs are generally manufactured in illegal laboratories by unskilled chemists. Contamination by toxic residual reagents, solvents, and unintended by-products of the chemical reactions has been a problem.[94] Amphetamines are sold most commonly as pills or capsules, but are also available in *rock* or liquid form. The powder may be taken orally, sniffed, smoked or dissolved in liquid and injected; smoking and intravenous injection are the preferred means of administration by chronic, high-dose abusers of methamphetamine and other drugs in this class.

Effects of amphetamines last 3 to 6 hours, far longer than cocaine, so the period of impaired judgment is also far longer. Methamaphetamines are most addictive when smoked or injected intravenously. This produces a *rush* which some have suggested is akin to an intense orgasm. Many who experience this intense euphoria become regular users and prize this drug over all others.[95]

Consequences

amphetamines accelerate the actions of the central nervous system. In addition to the sought-after effects of euphoria, alertness, endurance and improved self-confidence, this produces racing thoughts, distractions, impaired judgment, impulsiveness, and risk-taking. Abusers tend to be accident-prone and are especially dangerous on the highways, as the drug's effects mask fatigue. Physical effects include increased heart rate, higher blood pressure, and more rapid breathing.

Repeated use of amphetamines leads to tolerance, so that larger doses are required to achieve the same effect. This leads to psychological dependence where craving for the drug is so intense that it causes severe distress or even feelings of panic if the drug is temporarily unavailable. Risk of dependence is considered extremely high.[96] There is also physical dependence with a characteristic withdrawal sickness, but this usually clears after several days of abstinence.

Chronic use of amphetamines can produce nervousness, irritability, unwanted suppression of appetite, sleep disorders, and psychological disturbances. At high dose levels, these drugs can produce symptoms similar to cause paranoid schizophrenia. This appears to depend upon the level of amphetamine in the blood rather than any inherent predisposition or weakness in the

user.[97] Amphetamines are commonly used together with other drugs, and multidrug dependence is quite common.

Table 20
Percentage Reporting Nonmedical Use of Any Prescription-Type Stimulant in Their Lifetime, by Age and Demographic Group: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	3.0	9.4	12.2	5.4*	7.0
Sex					
Male	2.5	9.8	14.1	6.8	8.2
Female	3.4	8.9	10.4	4.2	5.9
Race/Ethnicity[1]					
White	3.5	11.3	14.3	5.8	7.9
Black	0.8	3.2	5.0	3.3	3.3
Hispanic	2.1	5.1	6.3	4.7	4.8
Population Density					
Large metro	2.5	9.5	12.0	5.8	7.3
Small metro	3.0	9.0	13.0	5.0	6.9
Nonmetro	3.6	9.7	11.4	5.2	6.7
Region					
Northeast	1.5	5.0	7.9	3.6	4.4
North Central	3.0	10.5	10.3	4.5	6.2
South	3.5	9.1	12.6	4.5	6.5
West	3.3	13.2	17.8	10.1	11.5
Adult Education[2]					
Less than high school	N/A	12.9	15.3	4.0	7.0
High school graduate	N/A	8.7	13.0	3.9	6.7
Some college	N/A	8.5	13.3	7.2	8.9
College graduate	N/A	6.7	8.5	7.7	7.8
Current Employment[3]					
Full-time	N/A	10.2	12.0	7.0	8.8
Part-time	N/A	9.9	10.2	6.5	8.1
Unemployed	N/A	12.9	20.2	14.6	15.5
Other[4]	N/A	5.9	10.9	1.9	3.3

N/A: Not applicable.

*Low precision; no estimate reported.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

High doses of methamphetamine cause long-lasting and probably irreversible damage to dopamine- and serotonin-containing neurons in the brains of monkeys, rats, mice, guinea pigs and cats. It is reasonable to assume that similar effects occur in humans. The result would be to accelerate the aging process, but that may not be apparent until the onset of aging a decade or two after the methamphetamine abuse.[98]

Deaths resulting directly from the chemical effects of amphetamines are infrequent. However, the depression that accompanies withdrawal sometimes leads to suicide.

Prevalence

Table 20 shows that 9.4% in the 18 to 25 age group and 12.2% in the 26 to 34 age group have used a prescription-type stimulant (including methamphetamine) at some time during their lives. As with most drugs, use among males was somewhat higher than for females. Most noteworthy, use was two to three times greater among whites than among blacks or Hispanics. Use in the northeast was significantly lower than in any other part of the country, while it was significantly higher in the west. Note also that the higher the education, the less prevalent the use of stimulants.

Past year and past month use was 3.3% and 0/8% for the 18 to 25 age group and 1.9% and 0.5% for the 26 to 35 group. The rate for whites was higher than this average, while for blacks and Hispanics it was significantly lower.

Amphetamine use reached epidemic proportions between the 1950s and early 1970s. It then declined as a result of severe restrictions on medical use and police action against illicit production, which caused a decline in both quality and quantity available on the street.[99] Survey data show a sharp and continuous drop in stimulant use since 1981. Use by college students in 1992 was less than one-fifth what it was in 1981.[100]

Treatment

Dependence on injectable methamphetamine (speed) can be so profound that relapses among users who have undergone a period of sustained abstinence are the rule, so the prognosis for recovery is not good.[101]

Sedatives, Tranquilizers, Analgesics

Description and Consequences

Sedatives, tranquilizers and analgesics are legal drugs often prescribed for medical conditions, but they are also commonly abused by being taken without a doctor's prescription or in amounts or for purposes other than prescribed. Stimulants such as amphetamines are another common form of prescription drug that is subject to frequent abuse. Amphetamines are discussed

separately in this report as their abuse is so extensive. Addiction to psychotherapeutic drugs may develop unintentionally as a result of legitimate medical use; progressively stronger doses may be required to achieve the same desired effect. These drugs are also taken and abused solely for their pleasurably intoxicating side effects.

Sedatives

The most common psychotherapeutic sedatives are barbiturates, which are often taken as sleeping pills and commonly referred to as *downers*. Sedatives depress the central nervous system to induce relaxation and tranquility, but they can also have mild effects on cognitive and motor functions. In addition to be used to induce sleep, barbiturates are used to manage certain types of epileptic seizures.

The dozen or more medically prescribed barbiturates differ principally according to how quickly they act and how long the action lasts. Their trade names include Sodium Amytal, Butisol Sodium, Dalmane, Doriden, Halcion, Mathaqualone, Nembutal, Phenobarbital, Quaalude, Secobarbital, Seconal, and Sopor. Street names for illicit barbiturates include barbs, downers, goofballs, blue devils, red devils, and yellow jackets.

Barbiturates are widely abused because of their pleasurable intoxicating effects similar to alcohol. Barbiturate users can develop tolerance to the pleasurable effects within a few weeks, after which ever-higher daily doses are required to maintain the desired effects.

In larger doses, barbiturates depress the respiratory control centers in the brain. The respiratory system is much slower to develop tolerance to barbiturates than other body systems, and this can lead to fatal complications. "It means that the margin of safety between a lethal dose and a pleasure-producing dose decreases as the daily dose increases. Thus, a relatively small dose increase (*e.g.*, 100 mg) for the regular heavy user could result in death."[102] Overdoses of barbiturates have caused so many deaths by respiratory failure that these are considered to be among the most dangerous of the widely abused drugs.

Tranquilizers

Tranquilizers are among the most widely prescribed psychotherapeutic drugs. They are used to treat anxiety and tension. They are now often used in place of barbiturates, as they have a much wider margin of safety when taken in overdose quantities, the patient is less likely to become dependent upon them, and withdrawal if dependence does occur is generally easier.

The active chemical in tranquilizers is some version of benzodiazepine or, less frequently, meprobamate. Tranquilizer trade names include Valium, Librium, Ativan, Diazepam, Equanil, Miltown, Serax, and Tranxene.

At higher than therapeutic doses, tranquilizers can produce intoxication similar to barbiturates. Valium is the most frequently abused tranquilizer, as it is the only benzodiazepine

that produces mild euphoria, and it is readily available and inexpensive. Many abusers of cocaine, hallucinogens and amphetamines take tranquilizers to offset the agitation and overstimulation caused by these drugs. They are also used to treat withdrawal symptoms in recovering alcoholics.

Many patients are maintained on tranquilizers for long periods of time, so psychological dependence is probably quite common. It is not unusual for people to misuse them to cope with even the normal minor stresses of daily life.

Narcotic Analgesics

All narcotics share the common property of numbing pain, and they have long been used as medicine for this purpose. Some, such as codeine, also suppress the cough reflex and control diarrhea. This section discusses only those narcotics prescribed for medical purposes. Heroin has been discussed previously.

Morphine and codeine are produced by refining opium, which occurs naturally as an exudate from the pods of a certain type of poppy. Darvon, Percodan, Demerol, Dilaudid and Methadone are all synthetic narcotics developed for medicinal purposes and intended to be less addictive and have fewer side effects than morphine.

The euphoria produced by narcotics is a key component in their relief of pain, but also the primary reason for their abuse. The diverse narcotic analgesics differ in the extent to which they develop tolerance and dependence or entail significant health risks. Codeine is clearly the safest, while heroin and morphine are clearly the most dangerous.

Prevalence

Tables 21 to 23 report lifetime use of sedatives, tranquilizers and analgesics by age group and demographic characteristics. As with stimulants, the difference in use by males and females was somewhat less than for most other abused drugs; use by whites was far higher than for blacks or Hispanics; people in the northeast were less included to use these psychotherapeutic drugs than those in other regions; and college graduates were generally less inclined to abuse these drugs.

Past year and past month use are, as usual, much lower than lifetime use, as reported in the main body of this report. It is noteworthy that the differences for race/ethnicity, region and education tend to level out when only past month use is considered. This suggests that the percentage of regular users is similar in all demographic groups, but that certain groups are more likely to experiment with these drugs or use them only occasionally.

Table 21
Percentage Reporting Nonmedical Use of Any Prescription-Type Sedative in Their Lifetime, By Age and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years) 12-17	18-25	26-34	≥35	Total
Total	2.4	4.3	7.5	3.5	4.3
Sex					
Male	2.0	4.5	8.7	4.0	4.8
Female	2.9	4.1	6.3	3.1	3.8
Race/Ethnicity[1]					
White	2.7	5.1	8.6	3.5	4.6
Black	1.2	2.4	3.8	3.4	3.0
Hispanic	2.2	2.3	3.4	3.3	3.0
Population Density					
Large metro	2.5	3.7	7.8	4.1	4.7
Small metro	2.3	4.5	7.2	3.0	3.9
Nonmetro	2.5	5.1	7.1	3.2	4.0
Region					
Northeast	1.8	2.1	6.2	2.8	3.3
North Central	2.4	5.5	5.9	2.7	3.6
South	2.7	4.4	8.1	2.7	3.9
West	2.5	5.0	9.3	6.8	6.7
Adult Education[2]					
Less than high school	N/A	7.0	8.4	2.3	3.9
High school graduate	N/A	3.9	8.0	3.4	4.4
Some college	N/A	3.3	7.3	5.4	5.4
College graduate	N/A	3.2	6.3	3.5	4.2
Current Employment[3]					
Full-time	N/A	4.4	7.3	4.3	5.1
Part-time	N/A	3.5	6.2	4.8	4.7
Unemployed	N/A	7.0	15.7	4.7	8.1
Other[4]	N/A	3.6	5.0	2.1	2.6

N/A: Not applicable.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 22

Percentage Reporting Nonmedical Use of Any Prescription-Type Tranquilizer in Their Lifetime, By Age and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	2.1	7.4	10.0	4.2	5.6
Sex					
Male	1.8	7.5	10.9	4.6	5.9
Female	2.5	7.4	9.1	3.9	5.2
Race/Ethnicity[1]					
White	2.6	8.8	11.4	4.4	6.1
Black	1.1	3.9	5.7	2.4	3.1
Hispanic	1.0	3.7	5.4	4.2	3.9
Population Density					
Large metro	1.7	6.8	9.7	4.9	5.8
Small metro	2.1	6.5	10.3	4.0	5.4
Nonmetro	2.7	10.0	10.1	3.4	5.4
Region					
Northeast	1.4	6.2	9.2	2.5	4.2
North Central	1.9	7.8	8.5	3.2	4.7
South	2.6	7.9	11.0	3.8	5.6
West	2.0	7.6	10.7	7.9	7.9
Adult Education[2]					
Less than high school	N/A	12.0	12.8	3.1	5.9
High school graduate	N/A	6.6	10.6	4.0	5.9
Some college	N/A	5.2	10.3	5.5	6.5
College graduate	N/A	7.3	7.2	4.7	5.5
Current Employment[3]					
Full-time	N/A	7.6	9.3	4.7	6.4
Part-time	N/A	7.0	10.0	5.2	6.6
Unemployed	N/A	11.3	20.4	9.7	12.8
Other[4]	N/A	5.8	7.9	2.7	3.7

N/A: Not applicable.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 23

Percentage Reporting Nonmedical Use of Any Prescription-Type Analgesic in Their Lifetime, By Age and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	4.4	10.2	9.8	4.1	6.1
Sex					
Male	4.3	10.6	11.1	4.8	6.8
Female	4.6	9.8	8.5	3.5	5.4
Race/Ethnicity[1]					
White	4.8	11.4	11.1	4.2	6.5
Black	3.9	6.8	6.8	3.3	4.7
Hispanic	3.6	6.3	4.1	3.0	3.9
Population Density					
Large metro	3.1	8.9	9.6	4.3	5.9
Small metro	5.3	10.5	10.0	3.2	5.7
Nonmetro	5.4	11.9	9.9	5.2	7.0
Region					
Northeast	2.7	6.0	7.6	2.6	4.0
North Central	5.0	11.6	8.7	5.3	6.8
South	5.0	9.7	11.0	2.4	5.3
West	4.4	13.8	10.9	7.4	8.7
Adult Education[2]					
Less than high school	N/A	13.0	11.0	2.7	5.5
High school graduate	N/A	9.6	9.9	3.5	5.9
Some college	N/A	9.2	10.7	6.6	8.1
College graduate	N/A	8.9	8.1	4.5	5.8
Current Employment[3]					
Full-time	N/A	9.7	9.4	5.0	6.8
Part-time	N/A	10.6	7.9	6.1	7.7
Unemployed	N/A	12.8	18.9	10.6	13.3
Other[4]	N/A	9.5	8.2	1.7	3.4

N/A: Not applicable.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

As with most drug use, nonmedical use of sedatives, tranquilizers and analgesics declined during the 1980s. In 1992, college students abused these substances at less than half the rate of a zen years earlier.[103] This pattern of declining use has been far less clear among those age 35 and older.

Treatment

The national study of drug treatment outcomes found that treatment for nonmedical use of psychotherapeutic drugs was somewhat more successful than for abuse of any other drug. This study did not differentiate between the different types of psychotherapeutic drugs. Among those who abused such drugs regularly during the year prior to treatment, and who remained in treatment for at least three months, 45% to 62% remained abstinent during the following year. Another 25% decreased their frequency of use. Residential treatment was more successful than outpatient treatment. Interestingly, drug use continued to decline for at least three to five years after treatment.[104]

Inhalants[105]

Description

Inhalants are a group of diverse drugs identified by their method of administration rather than by their chemical content or effects. Inhalants are not illegal drugs, so they do not fall within the scope of Executive Order 12564 mandating a drug-free workplace. There are three general categories of abused inhalants--volatile solvents, nitrites, and medicinal anesthetics. These three types of inhalants differ in the chemistry of the active ingredient, the nature and motivation of those who use them, and in their toxic effect. The anesthetics (nitrous oxide, ether, chloroform) are not discussed here.

The solvents, commonly referred to as glue, sniff or gas, consist mainly of volatile hydrocarbons produced from petroleum or natural gas. These solvents are contained in many common commercial, industrial, and household products including glues, cements and adhesives; paint and lacquer thinners and removers, and nail polish remover; a variety of cleaning fluids and degreasers; gasoline and other fuels; and formerly, in fluorocarbon-based propellants in aerosol cans. The most significant psychoactive ingredient in most of these appears to be toluene.[106]

Solvents are sniffed directly from the container or, more commonly, emptied into a plastic or paper bag which is then held tightly over the mouth and nose (called *bagging*). Liquid solvents may be poured over a rag or other absorbent material, which is then held over the mouth and nose or placed in a bag. This is commonly done in a group. When inhaled deeply, the psychoactive substances are absorbed rapidly from the lungs into the bloodstream. The euphoric effects typically last from 15 to 45 minutes unless prolonged by additional inhalation.

Readily available, low cost and ease of use contribute to abuse of solvents and aerosols at a very young age, often by age 9. One study of students in Canada found that solvent abuse peaked in 7th grade and then diminished as students became older. Most youths outgrow solvent abuse, but there is a high probability of graduation to abuse of other drugs.

The second category of frequently abused inhalants are the nitrites, including amyl nitrite, butyl nitrite, and isobutyl nitrite. Amyl nitrite is a prescription medicine commonly used to rapidly dilate blood vessels, including those in the heart, during angina attacks. It is also used to treat cyanide poisoning. Amyl nitrite and the closely related butyl nitrite and isobutyl are abused because dilation of blood vessels in the brain produce a quick feeling of euphoria and perceptual distortion.

Most current nitrite abuse stems from the popular belief that these nitrites enhance sexual performance by prolonging penile erection and generally intensifying and prolonging the sexual experience. They have been used for this purpose since the early 1970s. They have been especially popular among homosexuals, as they also facilitate anal intercourse by relaxing the rectal muscles. Amyl nitrite was originally prescribed for angina pectoris in glass ampules called pearls. When crushed between the fingers, they made a popping sound, hence the colloquial name *poppers* or *snappers*,[107] although the vapor is now sniffed from a bottle.

Butyl nitrite and isobutyl nitrite are very similar to amyl nitrite, but they are sold as "room odorizers." Since room odorizers do not fit the definition of a food, drug, or cosmetic, they are not subject to regulation by the FDA. They are commonly sold at "head shops," record stores, pornography shops and by mail-order catalogues. Common trade names for butyl nitrite and isobutyl nitrite include Aroma of Men, Ban Apple Gas, Bang, Bolt, Bullet, Climax, Crypt Tonight, Cum, Discorama, Hardware, Heart On, Highball, Jac Aroma, Liquid Increase, Locker Room, Mama Poppers, Oz, RUSH, Satan's Scent, and Toilet Water.[108]

Consequences

Solvents contain many different chemicals, so it is difficult to sort out all the possible adverse health impacts, especially when inhalant abuse is combined with abuse of other drugs. The short-term, casual inhalation of glue or adhesives appears to be relatively harmless as long as it is done in a safe environment where intoxication is unlikely to cause an accident. Toxic effects from sniffing butane, propane, gasoline or typewriter correction fluid, on the other hand, can cause sudden death even for a first-time user.[109]

Solvent abuse is associated with violent death. Solvents can cause perceptual distortions, delusions of grandeur or bizarre behavior that leads to accidental death, suicide, and homicide. Casualties may also occur when solvents are abused in ways that are dangerous, *i.e.*, putting plastic bags over the head or spraying aerosols directly into the mouth.[110]

Long-term health effects associated with chronic solvent abuse include chronic thinking and memory dysfunctions, nerve damage, and liver, kidney, lung, heart and blood abnormalities.

In most cases, these effects are believed to be reversible with prolonged abstinence. Irreversible brain damage has been reported, but research to confirm this is inconclusive.[111]

Most chronic inhalers of solvents have significant psychological and emotional problems that would normally disqualify them for security clearance. Deviant behavior, apathy, mood swings, depression, and paranoid thinking are common, especially among those who continue such abuse as adults. Available evidence is not sufficient to conclude that the inhalant abuse causes these psychological problems, however, It is more likely that pre-existing psychological problems help cause the solvent abuse at an early age.

Regular inhalers of solvents develop tolerance to the intoxicating effects, so that increased use is required to produce the same effect. "For example, within a year's time, a glue sniffer may be using 8-10 tubes of toluene-containing plastic cement to achieve the desired intensity of effects that was initially produced by a single tube."[112] Solvent abusers become psychologically dependent upon continued use of the drugs, but it is not certain that they also develop physical dependence.

Unlike most other abused drugs, the immediate effects of inhaling solvents as well as nitrites are measured in minutes rather than hours. They need to be inhaled repeatedly to maintain the desired effects over time. For this reason, inhalants are unlikely to affect workplace performance unless they are used in the workplace or used so frequently and intensively that they lead to chronic mental dysfunction.

The principal long-term health concern with nitrite inhalants is their potential to suppress the body's immune system. They are believed to cause Kaposi's sarcoma, a form of cancer, in individuals who contract AIDS. This has caused homosexual men to reduce their sue of nitrite inhalants. Nitrites are suspected of interacting with other substances to produce compounds that are known carcinogens. They may also cause skin irritations, blood problems and problems with the cardiovascular system.[113]

Cases have been reported of individuals who continue to abuse nitrites even after they have started to cause health problems. This suggests that individuals do become psychologically dependent upon nitrite inhalants and lose control over their use. There has been relatively little scientific research on the potential for abuse or consequences of abuse of nitrite inhalants.[114] Little is known about the emotional health or use of other drugs by those who inhale nitrites to enhance sexual performance.

Prevalence

Table 24 shows lifetime inhalant use by age group and demographic characteristics, while Table 25 presents data by type of inhalant used. It is noteworthy that just two inhalants account for well over half of all inhalant use. They are amyl nitrite, which is used principally to enhance sexual performance, and nitrous oxide (laughing gas). These are the only inhalants for which use increases with age. For other inhalants such as glue, gasoline and paint, use decreases with age.

Inhalant use was significantly higher among males than females, among whites as compared with blacks or Hispanics, and in the west. Of college graduates age 25 or younger, 13.3% reported some past experience with an inhalant. Extrapolating from the ratio of male to female use, this means that about 17% of male college graduates of this age group have experimented with an inhalant.

Among the total sample of all demographic groups, only 1.3% used an inhalant during the previous year. For whites age 18 to 25, it was 4.1% during the past year and 1.7% during the past month, but this dropped to 0.8% and 0.5% for the 26 to 34 age group. It was much lower for blacks and Hispanics in both age groups. In the western region, the average for all races was 5.1% during the past year for the 18 to 25 age group, which means past year use for whites of this age in the west was probably over 10%.

Treatment

"There is no accepted treatment approach for solvent abusers."[115] Typically, they do not respond to the usual methods of drug treatment, and many drug treatment facilities refuse to accept them. The treatment facilities are not equipped to deal with the kinds and intensity of psychological and social problems commonly found in inhalant abusers.[116]

It appears that nitrite abusers are seldom referred for treatment.

Table 24

Percentage Reporting Inhalant Use in Their Lifetime, By Age and Demographic Characteristics: 1991

Demographic Characteristic	Age Group (Years)				Total
	12-17	18-25	26-34	≥35	
Total	7.0	10.9	9.2	2.5	5.4
Sex					
Male	7.0	12.3	12.1	3.8	7.0
Female	7.0	9.5	6.3	1.4	4.0
Race/Ethnicity[1]					
White	7.6	12.7	10.3	2.3	5.6
Black	5.1	4.5	4.6	2.9	3.8
Hispanic	6.6	6.5	6.3	2.6	4.8
Population Density					
Large metro	6.0	10.8	9.6	2.9	5.6
Small metro	7.5	13.0	8.8	2.2	5.5
Nonmetro	7.9	7.9	8.8	2.2	4.8
Region					
Northeast	5.1	9.8	7.7	2.2	4.5
North Central	6.8	9.7	6.6	2.2	4.5
South	7.6	9.8	9.1	1.7	4.9
West	7.9	15.3	13.5	4.7	8.3
Adult Education[2]					
Less than high school	N/A	10.8	10.8	1.3	4.1
High school graduate	N/A	9.0	7.6	2.1	4.4
Some college	N/A	12.5	9.7	4.1	7.2
College graduate	N/A	13.3	9.9	3.1	5.6
Current Employment[3]					
Full-time	N/A	10.2	10.0	3.1	5.9
Part-time	N/A	11.9	5.2	2.8	5.9
Unemployed	N/A	9.7	12.6	8.0	9.6
Other[4]	N/A	11.7	6.1	1.0	2.9

N/A: Not applicable.

*Low precision; no estimate reported.

[1]The category "other" for Race/Ethnicity is not included.

[2]Data on adult education are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[3]Data on current employment are not applicable for youth aged 12 to 17. Total refers to adults aged 18 and older (unweighted N = 24,589).

[4]Retired, disabled, homemaker, student, or "other."

Source: Office of Applied Studies, SAMHSA, National Household Survey on Drug Abuse, 1991.

Table 25

Percentage Reporting Inhalant Use in Their Lifetime, By Inhalant Type and Age: 1991

	Age Group (Years)				
Inhalant Type	12-17	18-25	26-34	≥35	Total
Any Inhalant	7.0	10.9	9.2	2.5	5.4
Gasoline	2.1	1.8	1.5	0.5	1.0
Lighter gases	0.7	0.3	0.2	0.1	0.2
Spray paints	1.4	1.1	0.4	0.1	0.4
Aerosol sprays	0.8	0.7	0.5	0.2	0.4
Glue	1.9	1.4	1.0	0.4	0.8
Lacquer thinners	0.7	0.7	0.5	0.2	0.4
Amyl nitrite	0.7	3.4	4.1	0.9	1.9
Ether	0.1	0.3	0.2	0.2	0.2
Nitrous oxide	0.9	4.8	3.1	0.5	1.6
Correction fluids	1.1	1.1	0.2	0.2	0.4

Steroids

Description

Anabolic steroids are synthetic versions of the male sex hormone testosterone. Unlike other drugs discussed in this report, steroids do not affect the mind. They are used because athletes claim they increase lean body mass, strength and aggressiveness. They are also said to reduce recovery time between workouts, which makes it possible to train harder and thereby further improve strength and endurance. Many youths who are not athletes also take steroids to increase their muscle size and strength, which they believe improves personal appearance. To be effective, steroid use should be accompanied by intensive weight training and a high protein, high calory diet.

There are many different varieties of anabolic steroids. The International Olympic Committee, for example, has banned over 17 different types of steroids and related

compounds.[117] Those who abuse steroids often take more than one type, a practice known as *stacking*. This combination is taken for anywhere from 4 to 18 weeks and is followed by a drug-free period of approximately the same length. This pattern is referred to as *cycling* and is timed so that the athlete will be drug free during any competition where drug testing is conducted.

Steroids have been used for decades to treat a number of medical ailments, but those who take steroids illicitly often take doses 10 to 100 times the therapeutic dose for which this drug was developed.[118] They may be taken in pill form or injected. A large percentage of steroids used illicitly are manufactured by foreign drug companies and smuggled into the United States, or made in the United States in makeshift laboratories that sometimes misuse the name of reputable manufacturers.[119] Trafficking in drugs that do not have FDA approval or that have not been produced with appropriate standards for purity is illegal.

Anabolic steroids are now listed in Schedule III of the Controlled Substance Act, so their sale, distribution, and possession without a prescription is illegal.[120] Steroid use is against the rules in all athletic programs. Willingness to break these rules, and to engage in a complex series of subterfuges and deceptions in order to get away with it, reveals information about an individual that is relevant to security adjudication. While the drive to win is certainly admirable, the win-at-any-cost mentality can lead to dishonest reporting or the unauthorized shortcutting of important security regulations.

Consequences

There has been little scientific research on either the benefits or the adverse health consequences of steroids at the very high dosage levels used by athletes and other steroid abusers. As a result, the evidence of both benefits and health risks is anecdotal rather than based on controlled scientific studies.

Adverse reactions associated with anabolic steroids range from minor to severe and affect virtually every body system. Steroid use has been associated with liver and kidney problems, hypertension, sexual problems in both males and females, psychiatric problems acne, physical injuries, cholesterol problems, cardiovascular problems, gallstones, male baldness, fetal damage, the risk of AIDS from needle-sharing, etc.[121] Evidence is unclear on whether steroid users develop physiological or psychological dependence,[122] but the potential for addiction helped lead to reclassification of anabolic steroids as controlled substances.[123]

Prevalence

Steroid use has not been surveyed as extensively as other drugs. The Monitoring the Future survey of high school seniors is more useful on this topic than the National Household Survey. In 1992, 2.1% of male high school seniors and 0.1% of females reported using steroids during the previous year.[124] Among 1,900 persons age 19 to 32 interviewed as part of this same survey, steroid use during the previous year was reported by only 0.6% of the males and virtually no females. Steroid use drops off sharply as young persons mature and pursue career,

marriage and family. Athletic performance and a macho image of great strength and size become less important at that time. However, older, long-time steroid users such as body builders and professional athletes tend to quit only when it seriously threatens their health.[125]

Many smaller surveys during the mid-1980s reported lifetime steroid use rates for high school males ranging from 4% to 11%, and much lower for females.[126] Rates are somewhat lower among college students, except for intercollegiate athletes for whom lifetime rates have been reported as high as 20%.

In a survey of 12th grade males in 46 high schools in 24 states reported in 1988, 6.6% reported having used steroids at some time in their life. Of those who used steroids, almost 40% reported five or more cycles of use; 38% initiated use before age 16; 44% used more than one steroid at a time, *i.e.*, stacking; 38% used injectable steroids rather than pills; and over one-third did not intend to participate in interscholastic sports.[127]

Treatment

There appears to have been little focus on treatment programs aimed specifically at steroid users.

APPENDIX B - FRIENDS USE OF AND ATTITUDES TOWARDS DRUGS[128]

TABLE 26

Trends in Percentage of Friends Using Specific Drugs, By Age Group for Young Adults

Q. How many friends would you estimate...	Age Group	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	'91-'92 change
Take any illicit drug[a]															
% saying any friends	18	87.5	85.4	86.3	82.6	81.0	82.4	82.2	81.7	79.1	76.9	71.0	69.1	67.3	-1.8
	19-22	90.2	88.0	86.8	85.0	82.3	82.9	80.5	76.7	77.2	78.4	72.7	71.5	66.8	-4.7
	23-26					83.6	82.7	80.3	80.9	74.4	73.8	65.8	63.0	67.3	+4.3
	27-30									74.8	72.9	69.6	67.1	61.5	-5.6
% saying most or all	18	32.5	29.8	26.5	23.8	20.9	22.7	21.5	18.6	15.8	15.7	11.6	11.7	12.0	+0.3
	19-22	34.9	32.8	28.1	22.4	21.9	18.2	16.2	14.0	13.5	10.9	10.5	8.8	9.0	+0.1
	23-26					19.6	15.4	16.2	11.7	9.5	9.7	9.5	7.4	6.2	-1.2
	27-30									8.6	6.4	5.9	2.9	5.8	+2.9s
Take any illicit drug[a] other than marijuana															
% saying any friends	18	62.4	63.3	64.7	61.2	61.3	61.8	63.3	62.4	56.5	56.2	50.1	46.3	47.1	+0.8
	19-22	67.9	67.8	66.7	65.2	60.8	62.1	61.0	57.3	53.5	60.8	53.4	51.5	45.3	-6.2s
	23-26					63.7	64.0	59.0	61.1	55.1	54.2	47.8	41.8	46.1	+4.3
	27-30									55.9	55.0	49.7	47.2	37.7	-9.5ss
% saying most or all	18	11.1	11.9	10.9	11.0	10.3	10.4	10.3	9.2	6.9	7.7	5.1	4.6	5.3	+0.7
	19-22	9.8	12.9	11.8	9.8	9.3	8.6	7.6	5.0	5.3	4.0	3.2	2.6	3.3	+0.7
	23-26					10.6	6.6	8.6	5.2	3.9	4.2	3.4	1.6	1.8	+0.2
	27-30									4.6	3.0	2.8	1.0	1.4	+0.4
Smoke marijuana															
% saying any friends	18	86.4	83.0	84.4	80.3	77.7	79.5	79.2	78.4	75.3	72.5	68.3	65.8	63.1	-2.7
	19-22	88.8	86.4	85.2	83.8	81.6	81.1	78.5	75.3	75.1	73.8	67.6	68.0	63.5	-4.5
	23-26					82.0	80.8	77.7	79.4	71.6	69.8	61.8	59.6	61.3	+1.7
	27-30									71.8	68.2	65.1	62.6	58.0	-4.5
% saying most or all	18	31.3	27.7	23.8	21.7	18.3	19.8	18.2	15.8	13.6	13.4	10.1	10.0	10.3	+0.3
	19-22	34.1	30.6	25.6	20.6	19.4	16.0	13.3	12.5	12.2	9.0	9.2	8.3	8.2	-0.2
	23-26					17.0	14.3	13.7	10.4	7.8	8.6	8.3	6.9	5.6	-1.3
	27-30									6.8	4.4	4.0	2.8	5.1	+2.3
Use inhalants															
% saying any friends	18	17.8	16.5	18.4	16.1	19.3	21.2	22.4	24.7	20.8	22.1	20.0	19.2	22.2	+3.0s
	19-22	11.9	13.2	13.8	12.3	11.7	9.6	10.9	12.7	10.9	11.7	13.0	12.2	12.6	+0.4
	23-26					7.7	6.7	7.2	6.1	6.2	5.9	6.1	4.4	5.1	+0.7
	27-30									4.6	3.5	2.9	2.5	3.3	+0.8
% saying most or all	18	1.2	0.9	1.3	1.1	1.1	1.5	2.0	1.9	1.2	1.9	1.0	0.7	1.8	+1.1ss
	19-22	0.5	0.4	0.7	0.3	0.5	0.6	0.7	0.7	0.7	0.4	0.6	0.2	0.8	+0.6
	23-26					0.6	0.2	0.6	0.1	0.2	0.4	0.4	0.1	0.0	-0.1
	27-30									0.3	0.0	0.2	0.2	0.0	-0.2
Use nitrites															
% saying any friends	18	19.0	17.4	17.5	14.5	15.0	15.6	18.0	18.3	13.6	13.3	10.4	8.9	9.0	+0.1
	19-22	18.4	16.0	14.2	13.8	8.9	9.9	11.7	13.2	10.2	NA	NA	NA	NA	NA
	23-26					10.8	7.8	8.0	7.9	5.2	NA	NA	NA	NA	NA
	27-30									6.6	NA	NA	NA	NA	NA
% saying most or all	18	1.3	1.2	0.9	0.7	1.2	1.0	1.2	1.3	0.7	0.9	0.6	0.4	0.7	+0.3
	19-22	0.3	0.4	0.9	0.6	0.6	0.6	0.4	0.4	0.2	NA	NA	NA	NA	NA
	23-26					0.8	0.3	0.4	0.3	0.1	NA	NA	NA	NA	NA
	27-30									0.5	NA	NA	NA	NA	NA
Take LSD															
% saying any friends	18	28.1	28.5	27.8	24.0	23.9	24.4	24.5	25.3	24.1	25.2	25.0	23.4	28.1	+4.7ss
	19-22	30.9	25.9	26.5	22.6	21.6	18.8	18.7	18.2	19.0	20.1	20.1	22.0	22.2	+0.2
	23-26					21.5	17.2	15.4	15.9	13.3	14.1	12.3	12.5	15.0	+2.5
	27-30									10.4	7.7	9.1	8.6	10.9	+2.2
% saying most or all	18	1.8	2.2	2.4	1.4	2.0	1.5	1.8	1.6	1.5	2.4	1.9	1.7	2.4	+0.7
	19-22	1.2	0.8	0.9	1.0	0.6	0.8	0.9	0.6	1.3	0.4	1.2	1.4	1.9	+0.6
	23-26					0.8	0.5	1.0	0.2	0.6	0.5	0.6	0.2	0.4	+0.2
	27-30									0.3	0.2	0.3	0.3	0.0	-0.3

(Table continued on next page)

Table 26 (continued)

Q. How many friends would you estimate...	Age Group	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	'91-'92 change
Take other psychedelics															
% saying any friends	18	28.2	26.3	25.6	22.1	21.3	22.0	22.3	21.7	17.8	18.1	15.9	15.1	17.0	+1.9
	19-22	33.4	25.5	25.1	21.0	20.2	16.6	15.8	15.0	16.1	13.9	15.3	14.2	12.0	-2.2
	23-26					20.0	16.7	13.2	13.2	11.7	9.6	8.7	8.5	9.8	+1.3
	27-30									10.6	7.4	7.1	6.8	7.9	+1.1
% saying most or all	18	2.2	2.1	1.9	1.6	1.9	1.4	1.3	1.2	0.9	1.4	1.0	0.8	1.0	+0.2
	19-22	1.5	0.9	1.1	1.2	0.7	1.0	0.7	0.6	0.9	0.2	0.5	0.8	0.7	0.0
	23-26					0.8	0.3	0.5	0.3	0.2	0.3	0.8	0.1	0.4	+0.3
	27-30									0.2	0.1	0.3	0.2	0.0	-0.2
Use PCP															
% saying any friends	18	22.2	17.2	17.3	14.2	14.2	15.9	16.1	15.5	13.5	14.7	13.0	12.0	12.7	+0.7
	19-22	24.1	15.3	15.3	12.6	9.5	8.9	10.1	9.7	10.1	NA	NA	NA	NA	NA
	23-26					11.6	6.8	7.4	6.9	5.1	NA	NA	NA	NA	NA
	27-30									6.7	NA	NA	NA	NA	NA
% saying most or all	18	1.6	0.9	0.9	1.1	1.1	1.2	1.2	1.1	0.8	1.2	0.5	0.5	0.9	+0.4
	19-22	0.5	0.3	0.3	0.5	0.7	0.7	0.2	0.1	0.3	NA	NA	NA	NA	NA
	23-26					0.6	0.0	0.4	0.0	0.2	NA	NA	NA	NA	NA
	27-30									0.4	NA	NA	NA	NA	NA
Take cocaine															
% saying any friends	18	41.6	40.1	40.7	37.6	38.9	43.8	45.6	43.7	37.7	37.4	31.7	26.8	26.3	-0.5
	19-22	51.0	48.9	49.8	46.5	47.6	45.9	48.3	45.7	42.0	42.7	33.2	29.7	22.8	-6.9ss
	23-26					52.4	53.2	51.6	50.7	47.1	40.8	34.8	29.0	28.8	-0.2
	27-30									47.9	43.3	38.3	35.7	29.9	-5.7
% saying most or all	18	6.1	6.3	4.9	5.1	5.1	5.8	6.2	5.1	3.4	3.7	2.1	1.5	1.5	0.0
	19-22	7.0	8.6	7.8	6.1	6.3	6.1	6.1	3.3	3.5	2.1	1.2	1.1	1.0	-0.1
	23-26					9.1	5.3	7.0	4.1	3.1	2.7	2.1	0.6	0.9	+0.3
	27-30									3.8	2.0	2.3	0.9	1.2	+0.3
Take crack															
% saying any friends	18								27.4	25.4	26.1	19.2	17.6	17.8	+0.2
	19-22								23.8	21.8	20.6	14.6	14.3	11.8	-2.5
	23-26								26.4	22.4	19.8	14.4	10.8	10.8	0.0
	27-30									22.1	18.4	16.6	11.6	10.3	-1.4
% saying most or all	18								2.2	1.1	2.1	0.6	0.6	0.7	+0.1
	19-22								0.7	0.8	1.0	0.6	0.2	0.1	-0.1
	23-26								0.8	0.9	0.8	0.5	0.1	0.1	0.0
	27-30									1.2	0.9	0.9	0.3	0.0	-0.3
Take MDMA ("ecstasy")															
% saying any friends	18											12.4	11.9	10.7	-1.2
	19-22										16.3	14.3	12.0	12.9	+0.9
	23-26										7.6	9.0	9.5	11.0	+1.5
	27-30										5.6	6.3	5.4	4.6	-0.8
% saying most or all	18											2.2	1.7	2.1	+0.4
	19-22										0.4	0.7	0.2	0.7	+0.6
	23-26										0.5	0.2	0.1	0.1	0.0
	27-30										0.5	0.3	0.0	0.1	+0.1
Take heroin															
% saying any friends	18	13.0	12.5	13.2	12.0	13.0	14.5	15.3	13.9	12.4	14.0	11.4	11.4	13.2	+1.8
	19-22	11.0	8.1	9.4	7.5	7.1	6.5	8.5	8.5	7.8	6.8	6.5	6.1	4.7	-1.4
	23-26					6.1	4.4	4.3	6.5	3.6	5.2	4.2	3.6	3.8	+0.2
	27-30									3.8	2.8	4.5	2.7	3.1	+0.5
% saying most or all	18	1.0	0.5	0.7	0.8	0.8	0.9	1.1	0.9	0.7	1.1	0.4	0.4	0.7	+0.3
	19-22	0.3	0.5	0.1	0.2	0.4	0.6	0.2	0.3	0.2	0.2	0.3	0.2	0.1	-0.1
	23-26					0.4	0.2	0.2	0.0	0.2	0.4	0.2	0.3	0.4	+0.1
	27-30									0.2	0.1	0.2	0.2	0.0	-0.2

(Table continued on next page)

Table 26 (continued)

Q. How many friends would you estimate...	Age Group	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	'91-'92 change
Take other narcotics															
% saying any friends	18	22.4	23.1	23.9	20.8	21.4	22.8	21.8	23.2	19.2	19.2	17.2	13.7	14.9	+1.2
	19-22	22.8	20.4	21.9	17.9	17.4	16.9	14.6	15.4	14.1	15.0	12.9	14.1	10.8	-3.2
	23-26					16.0	14.9	14.0	13.0	10.6	10.8	10.5	8.5	8.4	-0.1
	27-30									12.1	8.6	9.1	9.3	7.5	-1.8
% saying most or all	18	1.7	1.5	1.4	1.4	1.6	1.4	1.8	1.4	1.2	1.4	0.9	0.5	1.1	+0.6
	19-22	0.9	0.7	0.6	0.5	0.8	1.0	0.5	0.4	0.9	0.1	0.6	0.4	0.5	+0.1
	23-26					0.4	0.3	0.7	0.0	0.3	0.2	0.2	0.0	0.0	0.0
	27-30									0.3	0.0	0.2	0.2	0.1	-0.1
Take amphetamines															
% saying any friends	18	43.9	48.8	50.6	46.1	45.1	43.3	41.8	39.5	33.4	33.5	28.7	24.3	24.3	0.0
	19-22	54.1	52.2	51.3	49.7	46.1	42.1	38.5	34.5	26.8	29.6	23.3	26.2	19.5	-6.7ss
	23-26					45.6	40.1	33.5	32.1	28.4	23.1	20.6	17.1	15.1	-1.9
	27-30									26.1	21.6	19.3	17.0	15.3	-1.8
% saying most or all	18	4.8	6.4	5.4	5.1	4.5	3.4	3.4	2.6	1.9	2.6	1.9	1.3	1.3	0.0
	19-22	3.8	5.7	4.6	3.8	3.3	2.9	1.3	1.9	1.4	0.7	1.0	0.6	0.9	+0.3
	23-26					1.9	1.8	1.7	1.2	0.3	0.6	0.7	0.8	0.4	-0.4
	27-30									0.6	0.4	0.5	0.5	0.1	-0.4
Take barbiturates															
% saying any friends	18	30.5	31.1	31.3	28.3	26.6	27.1	25.6	24.3	19.7	20.3	17.4	14.8	16.4	+1.6
	19-22	33.2	27.9	27.7	23.6	22.0	17.2	18.8	15.5	14.0	14.1	11.9	12.8	10.7	-2.2
	23-26					22.2	18.7	16.3	14.1	11.2	10.4	8.9	8.3	8.7	+0.4
	27-30									12.0	8.5	8.8	7.1	6.6	-0.5
% saying most or all	18	2.6	2.1	1.8	1.7	1.7	1.6	1.4	1.1	1.1	1.4	0.6	0.5	0.6	+0.1
	19-22	1.1	1.3	1.0	0.8	0.8	0.5	0.3	0.4	0.8	0.1	0.2	0.3	0.1	-0.2
	23-26					0.4	0.3	0.3	0.3	0.1	0.2	0.2	0.1	0.1	0.0
	27-30									0.2	0.0	0.4	0.2	0.2	0.0
Take quaaludes															
% saying any friends	18	32.5	35.0	35.5	29.7	26.1	26.0	23.5	22.0	17.1	16.6	14.3	12.0	13.1	+1.1
	19-22	38.3	36.2	35.4	30.5	24.6	19.9	20.3	16.9	12.5	10.9	10.0	10.6	9.2	-1.4
	23-26					25.7	21.0	17.4	15.0	12.1	10.3	8.6	5.9	6.4	+0.5
	27-30									11.8	7.9	8.2	7.0	7.1	+0.1
% saying most or all	18	3.6	3.6	2.6	2.6	1.7	1.3	1.6	1.0	1.0	1.3	0.8	0.5	0.8	+0.3
	19-22	1.9	2.7	1.2	1.3	1.2	0.6	0.2	0.4	0.4	0.2	0.6	0.2	0.1	-0.1
	23-26					0.6	0.3	0.7	0.2	0.2	0.4	0.2	0.1	0.2	+0.1
	27-30									0.5	0.2	0.2	0.2	0.0	-0.2
Take tranquilizers															
% saying any friends	18	29.7	29.5	29.9	26.7	26.6	25.8	24.2	23.3	19.9	18.0	14.9	13.5	14.6	+1.1
	19-22	37.5	33.9	28.7	22.9	22.0	19.7	20.6	18.0	16.4	14.8	13.4	13.0	11.3	-1.7
	23-26					29.3	26.3	22.3	20.8	15.5	13.1	14.8	12.1	12.5	+0.4
	27-30									20.1	16.6	16.9	14.9	12.0	-2.9
% saying most or all	18	1.9	1.4	1.1	1.2	1.5	1.2	1.3	1.0	0.7	1.5	0.5	0.4	0.7	+0.3
	19-22	0.7	0.9	0.5	0.8	0.3	0.7	0.3	0.6	0.4	0.1	0.4	0.5	0.1	-0.4
	23-26					0.4	0.3	0.5	0.0	0.3	0.4	0.2	0.3	0.1	-0.2
	27-30									0.5	0.3	0.4	0.2	0.1	-0.1
Take steroids															
% saying any friends	18											25.9	24.7	21.5	-3.2s
	19-22										23.4	21.5	22.2	19.7	-2.5
	23-26										15.3	15.0	12.3	14.5	+2.1
	27-30										9.9	10.5	7.5	8.0	+0.5
% saying most or all	18											1.8	1.0	1.7	+0.7
	19-22										0.2	0.6	0.0	0.1	+0.1
	23-26										0.4	0.0	0.0	0.2	+0.2
	27-30										0.5	0.0	0.0	0.0	0.0
Approximate Weighted N =	18	2987	3307	3303	3095	2945	2971	2798	2948	2961	2587	2361	2339	2373	
	19-22	576	592	564	579	543	554	579	572	562	579	556	526	510	
	23-26					527	534	546	528	528	506	510	507	516	
	27-30									516	507	499	476	478	

NOTES: Level of significance of difference between the two most recent years:

s = .05, ss = .01, sss = .001.

Any apparent inconsistency between the change estimate and the prevalence estimates for the two most recent years is due to rounding.

Table 27

Trends in Percentage of Friends Disapproving of Drug Use, By Age Group for Young Adults

Q. *How do you think your close friends feel (or would feel) about you...*	Age Group	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	'91-'92 change
Trying marijuana once or twice	18	42.6	46.4	50.3	52.0	54.1	54.7	56.7	58.0	62.9	63.7	70.3	69.7	73.1	+3.4s
	19-22	41.0	40.6	46.9	47.1	51.6	54.5	55.2	54.7	58.7	63.0	63.6	64.7	64.7	+0.0
	23-26					47.7	47.0	49.1	53.9	58.2	62.6	61.3	64.5	65.6	+1.1
	27-30									58.6	58.7	61.4	64.6	63.5	-1.1
Smoking marijuana occasionally	18	50.6	55.9	57.4	59.9	62.9	64.2	64.4	67.0	72.1	71.1	76.4	75.8	79.2	+3.4s
	19-22	50.9	49.2	54.0	57.9	59.4	64.6	64.4	65.1	69.8	71.5	74.1	73.9	74.3	+0.5
	23-26					54.3	56.4	57.1	63.1	68.1	73.2	71.8	72.5	75.3	+2.7
	27-30									67.8	69.4	71.9	73.7	76.0	+2.3
Smoking marijuana regularly	18	72.0	75.0	74.7	77.6	79.2	81.0	82.3	82.9	85.5	84.9	86.7	85.9	88.0	+2.1
	19-22	70.3	75.2	75.7	79.5	80.0	82.7	83.5	84.8	86.9	87.5	89.1	88.4	89.1	+0.8
	23-26					77.8	78.4	80.9	82.0	85.8	89.2	88.1	87.9	90.3	+2.4
	27-30									85.4	86.0	88.4	89.2	88.7	-0.4
Trying LSD once or twice	18	87.4	86.5	87.8	87.8	87.6	88.6	89.0	87.9	89.5	88.4	87.9	87.9	87.3	-0.6
	19-22	87.4	90.5	88.0	89.3	89.3	91.1	90.5	91.8	90.8	91.2	89.1	89.9	87.2	-2.7
	23-26					87.4	90.8	88.6	89.8	88.9	91.0	90.1	92.4	88.9	-3.5
	27-30									88.8	89.7	92.3	91.1	91.4	+0.3
Trying cocaine once or twice	18	NA	NA	NA	NA	NA	NA	79.6	83.9	88.1	88.9	90.5	91.8	92.2	+0.4
	19-22	NA	NA	NA	NA	NA	NA	76.4	NA	84.8	87.7	89.2	92.3	91.9	-0.4
	23-26					NA	NA	70.8	NA	81.4	84.5	84.1	86.7	87.4	+0.7
	27-30									81.8	81.1	83.7	83.5	84.4	+0.9
Taking cocaine occasionally	18	NA	NA	NA	NA	NA	NA	87.3	89.7	92.1	92.1	94.2	94.7	94.4	-0.3
	19-22	NA	NA	NA	NA	NA	NA	84.9	NA	91.0	93.8	94.2	95.6	95.9	+0.3
	23-26					NA	NA	81.7	NA	88.2	91.5	92.4	94.1	93.8	-0.2
	27-30									87.7	89.5	90.0	92.2	92.3	+0.1
Trying an amphetamine once or twice	18	78.9	74.4	75.7	76.8	77.0	77.0	79.4	80.0	82.3	84.1	84.2	85.3	85.7	+0.4
	19-22	75.8	76.7	75.3	74.3	77.0	79.7	81.5	81.3	83.0	83.5	84.5	86.5	83.8	-2.7
	23-26					78.4	79.1	76.7	81.7	83.0	85.6	84.3	85.0	83.6	-1.4
	27-30									82.7	84.1	84.9	84.6	84.7	+0.0
Taking one or two drinks nearly every day	18	70.5	69.5	71.9	71.7	73.6	75.4	75.9	71.8	74.9	76.4	79.0	76.6	77.9	+1.3
	19-22	71.9	72.1	68.6	73.5	71.6	72.2	72.7	70.2	73.9	77.1	73.3	73.7	74.0	+0.2
	23-26					63.6	66.8	67.7	68.3	69.2	70.8	72.7	72.5	72.1	-0.3
	27-30									71.0	68.0	70.4	71.9	68.8	-3.0
Taking four or five drinks nearly every day	18	87.9	86.4	86.6	86.0	86.1	88.2	87.4	85.6	87.1	87.2	88.2	86.4	87.4	+1.0
	19-22	93.7	91.7	89.9	91.9	91.7	92.5	91.5	90.8	90.4	92.5	89.9	91.7	92.6	+0.9
	23-26					90.8	90.2	92.5	92.8	93.7	92.1	92.1	92.4	91.1	-1.3
	27-30									92.8	92.0	92.9	92.7	92.7	-0.0
Having five or more drinks once or twice each weekend	18	50.6	50.3	51.2	50.6	51.3	55.9	54.9	52.4	54.0	56.4	59.0	58.1	60.8	+2.7
	19-22	53.5	51.7	51.7	53.3	50.8	53.3	47.0	49.4	50.5	56.8	53.1	51.4	53.6	+2.2
	23-26					53.8	57.3	61.0	57.2	58.8	57.5	55.1	56.8	58.4	+1.6
	27-30									61.9	65.1	66.3	68.2	66.2	-1.9
Smoking one or more packs of cigarettes per day	18	74.4	73.8	70.3	72.2	73.9	73.7	76.2	74.2	76.4	74.4	75.3	74.0	76.2	+2.2
	19-22	75.6	75.1	75.4	78.5	76.2	79.7	77.7	78.6	80.2	78.4	77.5	78.3	79.0	+0.6
	23-26					73.9	77.3	80.3	80.5	79.5	80.5	78.5	83.3	82.3	-1.0
	27-30									81.2	80.9	82.9	84.5	83.1	-1.4
Approximate Weighted N =	18	2766	3120	3024	2722	2721	2688	2639	2815	2778	2400	2184	2160	2229	
	19-22	569	597	580	577	582	556	577	595	584	555	559	537	520	
	23-26					510	548	549	540	510	513	516	516	507	
	27-30									483	518	479	480	451	

NOTES: Level of significance of difference between the two most recent years:

s = .05, ss = .01, sss = .001.

Any apparent inconsistency between the change estimate and the prevalence estimates for the two most recent years is due to rounding.

[a]Answer alternatives were: (1) Don't disapprove, (2) Disapprove, and (3) Strongly disapprove. Percentages are shown for categories (2) and (3) combined.

Table 27

Trends in Percentage of Friends Disapproving of Drug Use, By Age Group for Young Adults

Q. How do you think your close friends feel (or would feel) about you...	Age Group	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	'91-'92 change
Trying marijuana once or twice	18	42.6	46.4	50.3	52.0	54.1	54.7	56.7	58.0	62.9	63.7	70.3	69.7	73.1	+3.4s
	19-22	41.0	40.6	46.9	47.1	51.6	54.5	55.2	54.7	58.7	63.0	63.6	64.7	64.7	+0.0
	23-26					47.7	47.0	49.1	53.9	58.2	62.6	61.3	64.5	65.6	+1.1
	27-30									58.6	58.7	61.4	64.6	63.5	-1.1
Smoking marijuana occasionally	18	50.6	55.9	57.4	59.9	62.9	64.2	64.4	67.0	72.1	71.1	76.4	75.8	79.2	+3.4s
	19-22	50.9	49.2	54.0	57.9	59.4	64.6	64.4	65.1	69.8	71.5	74.1	73.9	74.3	+0.5
	23-26					54.3	56.4	57.1	63.1	68.1	73.2	71.8	72.5	75.3	+2.7
	27-30									67.8	69.4	71.9	73.7	76.0	+2.3
Smoking marijuana regularly	18	72.0	75.0	74.7	77.6	79.2	81.0	82.3	82.9	85.5	84.9	86.7	85.9	88.0	+2.1
	19-22	70.3	75.2	75.7	79.5	80.0	82.7	83.5	84.8	86.9	87.5	89.1	88.4	89.1	+0.8
	23-26					77.8	78.4	80.9	82.0	85.8	89.2	88.1	87.9	90.3	+2.4
	27-30									85.4	86.0	88.4	89.2	88.7	-0.4
Trying LSD once or twice	18	87.4	86.5	87.8	87.8	87.6	88.6	89.0	87.9	89.5	88.4	87.9	87.9	87.3	-0.6
	19-22	87.4	90.5	88.0	89.3	89.3	91.1	90.5	91.8	90.8	91.2	89.1	89.9	87.2	-2.7
	23-26					87.4	90.8	88.6	89.8	88.9	91.0	90.1	92.4	88.9	-3.5
	27-30									88.8	89.7	92.3	91.1	91.4	+0.3
Trying cocaine once or twice	18	NA	NA	NA	NA	NA	NA	79.6	83.9	88.1	88.9	90.5	91.8	92.2	+0.4
	19-22	NA	NA	NA	NA	NA	NA	76.4	NA	84.8	87.7	89.2	92.3	91.9	-0.4
	23-26					NA	NA	70.8	NA	81.4	84.5	84.1	86.7	87.4	+0.7
	27-30									81.8	81.1	83.7	83.5	84.4	+0.9
Taking cocaine occasionally	18	NA	NA	NA	NA	NA	NA	87.3	89.7	92.1	92.1	94.2	94.7	94.4	-0.3
	19-22	NA	NA	NA	NA	NA	NA	84.9	NA	91.0	93.8	94.2	95.6	95.9	+0.3
	23-26					NA	NA	81.7	NA	88.2	91.5	92.4	94.1	93.8	-0.2
	27-30									87.7	89.5	90.0	92.2	92.3	+0.1
Trying an amphetamine once or twice	18	78.9	74.4	75.7	76.8	77.0	77.0	79.4	80.0	82.3	84.1	84.2	85.3	85.7	+0.4
	19-22	75.8	76.7	75.3	74.3	77.0	79.7	81.5	81.3	83.0	83.5	84.5	86.5	83.8	-2.7
	23-26					78.4	79.1	76.7	81.7	83.0	85.6	84.3	85.0	83.6	-1.4
	27-30									82.7	84.1	84.9	84.6	84.7	+0.0
Taking one or two drinks nearly every day	18	70.5	69.5	71.9	71.7	73.6	75.4	75.9	71.8	74.9	76.4	79.0	76.6	77.9	+1.3
	19-22	71.9	72.1	68.6	73.5	71.6	72.2	72.7	70.2	73.9	77.1	73.3	73.7	74.0	+0.2
	23-26					63.6	66.8	67.7	68.3	69.2	70.8	72.7	72.5	72.1	-0.3
	27-30									71.0	68.0	70.4	71.9	68.8	-3.0
Taking four or five drinks nearly every day	18	87.9	86.4	86.6	86.0	86.1	88.2	87.4	85.6	87.1	87.2	88.2	86.4	87.4	+1.0
	19-22	93.7	91.7	89.9	91.9	91.7	92.5	91.5	90.8	90.4	92.5	89.9	91.7	92.6	+0.9
	23-26					90.8	90.2	92.5	92.8	93.7	92.1	92.1	92.4	91.1	-1.3
	27-30									92.8	92.0	92.9	92.7	92.7	-0.0
Having five or more drinks once or twice each weekend	18	50.6	50.3	51.2	50.6	51.3	55.9	54.9	52.4	54.0	56.4	59.0	58.1	60.8	+2.7
	19-22	53.5	51.7	51.7	53.3	50.8	53.3	47.0	49.4	50.5	56.8	53.1	51.4	53.6	+2.2
	23-26					53.8	57.3	61.0	57.2	58.8	57.5	55.1	56.8	58.4	+1.6
	27-30									61.9	65.1	66.3	68.2	66.2	-1.9
Smoking one or more packs of cigarettes per day	18	74.4	73.8	70.3	72.2	73.9	73.7	76.2	74.2	76.4	74.4	75.3	74.0	76.2	+2.2
	19-22	75.6	75.1	75.4	78.5	76.2	79.7	77.7	78.6	80.2	78.4	77.5	78.3	79.0	+0.6
	23-26					73.9	77.3	80.3	80.5	79.5	80.5	78.5	83.3	82.3	-1.0
	27-30									81.2	80.9	82.9	84.5	83.1	-1.4
Approximate Weighted N =	18	2766	3120	3024	2722	2721	2688	2639	2815	2778	2400	2184	2160	2229	
	19-22	569	597	580	577	582	556	577	595	584	555	559	537	520	
	23-26					510	548	549	540	510	513	516	516	507	
	27-30									483	518	479	480	451	

NOTES: Level of significance of difference between the two most recent years:

s = .05, ss = .01, sss = .001.

Any apparent inconsistency between the change estimate and the prevalence estimates for the two most recent years is due to rounding.

[a]Answer alternatives were: (1) Don't disapprove, (2) Disapprove, and (3) Strongly disapprove. Percentages are shown for categories (2) and (3) combined.

Table 28

Trends in Perceived Harmfulness of Drugs, By Age Group for Young Adults

Q. *How much do you think people risk harming themselves (physically or in other ways), if they ...*	Age Group	Percentage saying "great risk"[a] 1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	'91-'92 change
Try marijuana once or twice	18	10.0	13.0	11.5	12.7	14.7	14.8	15.1	18.4	19.0	23.6	23.1	27.1	24.5	-2.6
	19-22	8.3	7.8	9.7	9.7	12.8	11.2	13.0	12.9	16.8	16.9	17.8	19.1	19.7	+0.6
	23-26					9.6	10.0	12.4	14.5	16.0	14.0	17.7	14.0	15.0	+1.0
	27-30									14.6	16.0	17.0	15.7	15.1	-0.5
Smoke marijuana occasionally	18	14.7	19.1	18.3	20.6	22.6	24.5	25.0	30.4	31.7	36.5	36.9	40.6	39.6	-1.0
	19-22	13.9	14.2	16.9	16.7	21.7	20.6	22.4	23.0	28.7	29.1	30.1	30.2	29.5	-0.7
	23-26					15.8	16.3	20.9	20.8	26.8	25.3	30.4	26.2	27.4	+1.2
	27-30									24.2	25.7	28.7	27.4	27.5	+0.1
Smoke marijuana regularly	18	50.4	57.6	60.4	62.8	66.9	70.4	71.3	73.5	77.0	77.5	77.8	78.6	76.5	-2.1
	19-22	43.9	47.8	52.4	58.4	62.2	66.8	67.6	69.4	72.4	74.9	73.0	75.0	69.3	-5.6
	23-26					52.9	57.5	59.4	65.3	68.3	72.1	71.0	70.9	67.3	-3.7
	27-30									67.5	69.1	69.2	67.5	68.8	+1.3
Try LSD once or twice	18	43.9	45.5	44.9	44.7	45.4	43.5	42.0	44.9	45.7	46.0	44.7	46.6	42.3	-4.3
	19-22	44.8	44.4	45.0	44.7	46.0	44.3	47.6	49.4	49.2	49.5	49.3	48.0	45.6	-2.4
	23-26					48.3	46.9	47.9	51.5	53.7	50.7	52.0	50.1	49.7	-0.4
	27-30									53.3	55.6	54.6	52.5	53.0	+0.5
Take LSD regularly	18	83.0	83.5	83.5	83.2	83.8	82.9	82.6	83.8	84.2	84.3	84.5	84.3	81.8	-2.5
	19-22	83.4	85.3	86.2	86.0	84.5	86.4	87.1	85.6	85.4	85.5	85.8	86.6	87.0	+0.4
	23-26					89.0	86.6	88.7	90.0	89.2	89.0	88.2	89.1	87.3	-1.8
	27-30									89.1	91.2	92.0	87.1	88.5	+1.4
Try PCP once or twice	18								55.6	58.8	56.6	55.2	51.7	54.8	+3.1
	19-22								63.6	63.8	NA	NA	NA	NA	NA
	23-26								64.8	63.2	NA	NA	NA	NA	NA
	27-30									65.9	NA	NA	NA	NA	NA
Try cocaine once or twice	18	31.3	32.1	32.8	33.0	35.7	34.0	33.5	47.9	51.2	54.9	59.4	59.4	56.8	-2.6
	19-22	31.4	30.4	33.3	28.7	33.1	33.2	35.5	45.9	51.9	51.5	58.1	58.7	56.1	-2.6
	23-26					31.3	31.1	35.9	48.0	47.1	51.3	51.5	50.5	53.5	+3.0
	27-30									45.3	53.0	51.6	52.6	51.8	-0.8
Take cocaine occasionally	18							54.2	66.8	69.2	71.8	73.9	75.5	75.1	-0.4
	19-22							53.8	61.3	67.1	72.6	74.6	72.6	74.9	+2.3
	23-26							50.9	62.6	63.2	69.9	69.9	70.3	69.9	-0.4
	27-30									62.6	66.6	66.6	69.1	69.9	+0.8
Take cocaine regularly	18	69.2	71.2	73.0	74.3	78.8	79.0	82.2	88.5	89.2	90.2	91.1	90.4	90.2	-0.2
	19-22	65.2	69.3	71.5	75.2	75.1	82.9	82.0	88.0	90.3	89.1	93.9	93.5	92.9	-0.6
	23-26					75.6	76.9	83.0	88.9	90.9	91.2	91.2	92.7	89.9	-2.7
	27-30									88.9	92.0	91.4	90.9	92.0	+1.1
Try crack once or twice	18								57.0	62.1	62.9	64.3	60.6	62.4	+1.8
	19-22								59.4	67.3	68.5	69.4	66.9	65.4	-1.5
	23-26								59.1	63.5	69.8	67.3	66.9	67.1	+0.2
	27-30									66.5	64.9	68.7	66.8	64.3	-2.6
Take crack occasionally	18								70.4	73.2	75.3	80.4	76.5	76.3	-0.2
	19-22								75.0	77.3	81.8	82.3	82.7	81.9	-0.8
	23-26								70.3	74.0	79.9	81.1	83.9	84.4	+0.5
	27-30									76.4	76.7	82.6	81.8	79.1	-2.8
Take crack regularly	18								84.6	84.8	85.6	91.6	90.1	89.3	-0.8
	19-22								89.6	91.1	94.1	94.9	95.6	93.4	-2.2
	23-26								88.0	89.2	91.5	94.2	95.4	94.1	-1.4
	27-30									89.6	89.5	95.3	94.4	93.3	-1.1

(Table continued on next page)

Table 28 (continued)

Q. *How much do you think people risk harming themselves (physically or in other ways), if they ...*	Age Group	Percentage saying "great risk"[a] 1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	'91-'92 change
Try cocaine powder once or twice	18								45.3	51.7	53.8	53.9	53.6	57.1	+3.5
	19-22								44.0	48.6	51.1	54.5	52.7	56.2	+3.5
	23-26								41.0	43.6	48.4	48.9	47.4	45.9	-1.5
	27-30									42.0	45.1	46.2	43.3	42.3	-1.0
Take cocaine powder occasionally	18								56.8	61.9	65.8	71.1	69.8	70.8	+1.0
	19-22								58.0	59.0	63.2	70.0	69.9	72.6	+2.6
	23-26								50.0	53.2	62.2	63.3	67.0	65.8	-1.2
	27-30									53.6	52.7	60.9	59.2	61.2	+2.0
Take cocaine powder regularly	18								81.4	82.9	83.9	90.2	88.9	88.4	-0.5
	19-22								86.6	87.6	91.3	92.5	93.8	92.1	-1.7
	23-26								82.9	84.1	88.5	92.4	93.8	91.3	-2.5
	27-30									85.1	86.7	92.7	91.1	91.5	+0.4
Try MDMA ("ecstasy") once or twice	19-22										45.2	47.1	48.8	46.4	-2.4
	23-26										49.5	47.2	47.4	45.5	-1.8
	27-30										44.9	48.7	47.7	44.2	-3.5
Try heroin once or twice	18	52.1	52.9	51.1	50.8	49.8	47.3	45.8	53.6	54.0	53.8	55.4	55.2	50.9	-4.3s
	19-22	57.8	56.8	54.4	52.5	58.7	51.0	55.5	57.9	58.9	59.6	58.3	59.9	59.8	-0.1
	23-26					58.2	59.2	60.8	66.6	65.4	62.3	64.1	62.4	63.7	+1.3
	27-30									66.0	69.7	67.5	66.1	66.5	+0.3
Take heroin occasionally	18	70.9	72.2	69.8	71.8	70.7	69.8	68.2	74.6	73.8	75.5	76.6	74.9	74.2	-0.7
	19-22	77.5	77.8	73.6	74.5	74.9	73.6	77.2	77.6	77.5	79.8	80.8	80.2	81.6	+1.4
	23-26					81.2	80.7	78.9	84.5	82.4	80.8	83.4	84.4	81.5	-2.9
	27-30									86.0	86.8	85.3	84.3	84.9	+0.6
Take heroin regularly	18	86.2	87.5	86.0	86.1	87.2	86.0	87.1	88.7	88.8	89.5	90.2	89.6	89.2	-0.4
	19-22	87.2	89.9	87.5	88.6	86.8	90.2	90.7	90.2	89.6	90.8	91.2	91.5	92.2	+0.7
	23-26					92.0	90.1	90.6	92.8	91.5	91.3	91.0	92.6	91.3	-1.4
	27-30									92.7	93.5	93.0	90.7	91.3	+0.6
Try amphetamines once or twice	18	29.7	26.4	25.3	24.7	25.4	25.2	25.1	29.1	29.6	32.8	32.2	36.3	32.6	-3.7s
	19-22	24.6	24.6	27.8	24.8	26.9	23.9	27.1	27.4	31.7	28.9	35.6	32.8	34.5	+1.7
	23-26					29.6	29.4	29.4	34.1	33.2	32.5	35.3	31.0	32.7	+1.7
	27-30									35.2	37.5	36.9	36.5	36.2	-0.3
Take amphetamines regularly	18	69.1	66.1	64.7	64.8	67.1	67.2	67.3	69.4	69.8	71.2	71.2	74.1	72.4	-1.7
	19-22	71.9	69.9	68.3	69.9	68.4	68.5	72.3	72.0	73.9	71.3	74.0	77.1	73.5	-3.6
	23-26					75.8	77.2	75.6	78.2	77.4	76.7	77.8	79.4	76.4	-2.9
	27-30									80.6	82.9	83.3	79.4	80.3	+0.9
Try crystal meth ("ice")	18												61.6	61.9	+0.3
	19-22											57.8	58.6	57.7	-0.9
	23-26											56.5	56.0	55.6	-0.4
	27-30											59.6	57.2	52.7	-4.4
Try barbiturates once or twice	18	30.9	28.4	27.5	27.0	27.4	26.1	25.4	30.9	29.7	32.2	32.4	35.1	32.2	-2.9
	19-22	27.6	26.4	30.5	25.4	29.9	25.0	30.7	29.6	32.7	30.5	36.4	33.5	33.5	0.0
	23-26					32.2	29.9	30.2	35.5	35.8	32.9	37.9	31.8	33.5	+1.7
	27-30									37.2	38.7	39.0	37.0	38.2	+1.3
Take barbiturates regularly	18	72.2	69.9	67.6	67.7	68.5	68.3	67.2	69.4	69.6	70.5	70.2	70.5	70.2	-0.3
	19-22	74.0	73.3	72.7	71.3	71.6	71.7	74.5	73.0	74.0	71.7	75.5	75.5	73.6	-1.9
	23-26					77.4	77.0	74.9	79.9	79.8	76.6	80.5	77.7	76.3	-1.4
	27-30									81.5	83.7	84.0	79.6	78.6	-1.0
Approximate Weighted N =	18	3234	3604	3557	3305	3262	3250	3020	3315	3276	2796	2553	2549	2684	
	19-22	590	585	583	585	579	547	581	570	551	565	552	533	527	
	23-26					540	512	545	531	527	498	511	505	518	
	27-30									513	587	490	486	482	

NOTES: Level of significance of difference between the two most recent years:
s = .05, ss = .01, sss = .001.

Any apparent inconsistency between the change estimate and the prevalence estimates for the two most recent years is due to rounding.

[a]Answer alternatives were: (1) No risk, (2) Slight risk, (3) Moderate risk, (4) Great risk, and (5) Can't say, drug unfamiliar.

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THE GQT POLYGRAPH TEST: SCORING AND VALIDITY

By

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The use of polygraphic examinations for the detection of deception assumes that physiological responding will be greater when a deceptive response is made. For purposes of evaluation, the physiological reaction to an issue-related (relevant) question is often compared to that of a probable-lie (control) question, a question not directly related to the issue. One examination format which has developed in the field of polygraphy is the General Question Technique (GQT). This technique brackets and compares the relevant (crime-related) question with a modified or disguised control question concerning lying during the examination.

The interpretation of charts is the comparison of responses on the charts leading to a label of deceptive (DI), nondeceptive (NDI), or inconclusive (INCL) for the examinee. The scoring of this test procedure has been done in three different ways: 1) overall visual inspection of the charts, 2) a three-point numerical evaluation against the "strongest" control component of each chart, and 3) a three-point numerical evaluation against the "weakest" control component of each chart. Question has arisen concerning the most appropriate scoring system and the interchangeability of the systems. The purpose of this study is to investigate the postdictive validity of the GQT comparing these three evaluative systems.

The accuracy of polygraph examinations centers upon the tests' ability to correctly identify as DI those people who were involved in the offense (true positives) as well as to identify as NDI those individuals who had no involvement in the offense (true negatives). Inaccuracy or error is the labelling of innocent people as DI (false positives) or the identification of guilty individuals as NDI (false negatives). Evaluation of individual relevant questions against the control question having the greatest (strongest) physiological reactivity should give the most conservative scores with more examinees being called INCL and NDI. Overall visual evaluation of the charts compares the strongest response in each physiological component for the relevant as a group and control questions as a pair. This procedure uses the strongest control reaction and should produce scores similar to those of the previous system. Use of the lesser physiologically reactive control response against each relevant question's reaction should lead to more scores that fall into the INCL and DI ranges. Accuracy rates for the GQT using these three scoring systems were compared in this study.

Dr. Crowe is a professor of Psychology at Jacksonville State University and a trained polygraph examiner. Mr. Chimarys is an experienced federal examiner and instructor and Mr. Schwartz is an experienced examiner and Chief of Instruction at the DODPI. For reprints write to Mr. Schwartz at the DoD Polygraph Institute, 13th Street, Bldg. 3195, Fort McClellan, AL 36205-5114. [An earlier version of the GQT was a relevant-irrelevant technique, causing some confusion in terminology. Ed.]

Method

Thirty different GQT polygraph series (examinations consisting of three charts each) were evaluated by nine polygraphers. Seventeen series were of subjects who were programmed as deceptive. These people participated in mock crimes which were later the focus of their respective polygraph examinations. Thirteen series were of subjects who were programmed as nondeceptive having not participated in any crime. Three scoring systems were used for evaluation of the charts: 1) comparison of the strongest control reaction to the response for each relevant question (SC), 2) comparison of reaction to the response for each relevant question to the weakest control (WC), and 3) overall visual rating of the charts (OR).

Table 1
Accuracy of chart evaluations across the scoring systems

	Scoring System		
Programming	**SC**	**WC**	**OR**
True Positive (DI Score)	6/7 (86%)	17/17 (100%)	8/10 (80%)
True Negative (NDI Score)	7/7 (100%)	0/9 (0%)	3/5 (60%)
False Negative (NDI Score)	1/7 (14%)	0/17 (0%)	2/10 (20%)
False Positive (DI Score)	0/7 (0%)	9/9 (100%)	5/8 (62%)
Inconclusive			
DI Programmed (n = 17)	10	0	7
NDI Programmed (n = 13)	6	4	5

A two factor analysis of variance (ANOVA) with repeated measures on the second factor was used to evaluate the GQT between programming (DI/NDI) and across the three scoring systems. The accuracy of each system in terms of proportions of true positives and negatives as well as false positives and negatives was calculated. Since INCL scores reflect a need for further testing of an invalid test, they were excluded from these calculations.

Results

The ANOVA with repeated measures found the expected significant difference between NDI and DI programming, $F(1,28) = 8.29$, $p = .0076$. A significant difference was also indicated across the repeated measure, scoring system, $F(2,56) = 30.75$, $p = .0001$. Finally, the interaction between programming and scoring systems was significant, $F(2,56) = 3.87$, $p = .0266$. Table 1 depicts this interaction which is primarily due to the low scores for those NDI programmed charts graded using the WC scoring system.

Accuracy of the examinations as evaluated by the various scoring systems is presented in terms of true/false negatives and positives in Table 1. Being neither correct nor incorrect, INCL scores were excluded.

The WC system successfully identified all the deceptive charts while not correctly identifying any of the nondeceptive charts. The OR system correctly identified 80 percent of the deceptive charts and 60 percent of the nondeceptive charts. The SC scoring system was correct for 86 percent of the deceptive charts while successfully identifying all the true negatives who did not score INCL.

Discussion

These results indicate that the GQT can be a valid test for the detection of deception when the charts are numerically scored against the strongest control question. Visually scoring the overall chart was somewhat less accurate but had fewer inconclusive results. Scoring against the weaker control's reaction was not acceptable because such scoring increased the identification of deceptive individuals from their charts at the cost of eliminating any correct identification of charts from nondeceptive people.

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