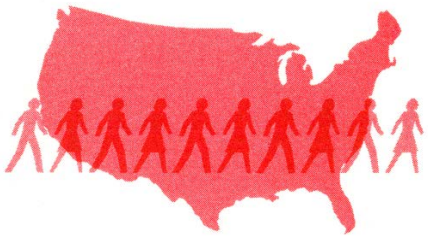

monitoring the future occasional paper series

Paper 84

THE OBJECTIVES AND THEORETICAL FOUNDATION OF THE MONITORING THE FUTURE STUDY

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2016

Monitoring the Future: A Continuing Study of the Lifestyles and Values of Youth

As its title suggests, this study is intended to assess the changing lifestyles, values, and preferences of American youth on a continuing basis. Each year since 1975, at least 13,000 seniors have participated in the annual survey, which is conducted in some 130 high schools nationwide. Since 1991, the study's annual surveys also have included surveys of similar nationally representative samples of eighth- and tenth-grade students. In addition, subsamples of high school seniors from previously participating classes receive follow-up questionnaires by mail each year.

This Occasional Paper Series is intended to disseminate a variety of products from the study, including pre-publication (and somewhat more detailed) versions of journal articles, other substantive articles, and methodological papers.

A full listing of occasional papers and other study reports is available on the study's website, www.monitoringthefuture.org. The website contains a complete listing of all publications from the study, the abstracts or full text of many of these publications, and recent press releases.

The mailing address of Monitoring the Future is Institute for Social Research, The University of Michigan, P.O.Box 1248, Ann Arbor, MI 48106.

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THE THREE BROAD AIMS OF THE STUDY

Monitoring the Future (MTF) is an ongoing program of research designed to accomplish three broad and complementary aims:

(1) To monitor drug use and potential explanatory factors among American secondary school students, college students, other young adults, and all adult high school graduates through age 55 and eventually age 60 (Objectives 1 through 3, below); and to monitor and study, among adults ages 21–40, risk and protective behaviors related to transmission of the human immunodeficiency virus (Objective 10).

(2) To distinguish which of three fundamentally different kinds of change—age, period, and cohort—are occurring for various types of drug use, including the use of various forms of tobacco and alcohol (Objective 4).

(3) To study the causes, consequences, and (where relevant) developmental patterns associated with these different types of change in drug use (Objectives 5 through 9).

The three broad aims are delineated in ten objectives while two more objectives define additional methodological, policy, and data-sharing objectives. The twelve objectives are described in the next section.

In pursuit of the three broad interrelated aims, the project employs a cohort-sequential research design consisting of (a) annual cross-sectional surveys of large, nationally representative samples of high school seniors (beginning in 1975) and 8th and 10th graders (beginning in 1991); and (b) follow-up surveys of a representative subsample of each senior class annually through age 30, and at 5-year intervals thereafter through age 60.

Currently, 42,000 to 45,000 secondary school students located in 415 public and private schools are surveyed annually: about 14,000 students each in 8th, 10th, and 12th grades. The 8th grade is surveyed in about 145 schools, and the 10th and 12th grades are surveyed in 135 different schools each. In addition, the follow-up surveys of previously graduating classes yield an annual sample of 6.000 to 8,000 respondents in the age range of 19 to 30, which includes about 1,750 young adults who are actively enrolled full-time in a two- or four-year college and comprise the college student sample.[1] Additional follow-ups are conducted at ages 35, 40, 45, 50, 55, and eventually age 60.[2] These data sets provide the information base with which the multiple objectives of the study are pursued.

The first of the broad aims—monitoring drug use and related factors in order to provide social indicators of historical change, as well as to explain those changes—clearly implies an

[1] For an in-depth description of the study's research design, see Bachman, J. G., Johnston, L. D., O'Malley, P. M., Schulenberg, J. E., & Miech, R. A. (2015). *The Monitoring the Future project after four decades: Design and procedures* (Monitoring the Future Occasional Paper No. 82). Ann Arbor, MI: Institute for Social Research, University of Michigan.

[2] Panel data also exist based on a panel survey of three of the 8th-grade cohorts who were first surveyed as 8th graders in 1991–1993.

ongoing effort. The same is true for the second aim of distinguishing the three types of change—age, period, and cohort. Although it may be less obvious, the third aim—exploring causes, consequences, and developmental patterns—is also an ongoing effort, involving analyses at both individual and aggregate levels.

At the aggregate level we continue to document the emergence of new secular and cohort changes as well as the emergence of new drugs (e.g., synthetic marijuana, synthetic stimulants or "bath salts", energy drinks) and new forms of drug use (e.g., edible marijuana, powdered alcohol, vaping, and, hookah smoking). At the individual level of analysis, the process is ongoing in part because new developmental stages are being added to the study, and in part because the underlying relational patterns are themselves subject to change (Bachman, O'Malley, & Johnston, 1986; Bachman, Johnston, & O'Malley, 1981a, 1989; Jager, Schulenberg, O'Malley, & Bachman, 2013; Johnston, O'Malley, Bachman, & Schulenberg, 2006b; McCabe, Schulenberg, O'Malley, Patrick, & Kloska, 2014; Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015; Patrick, Schulenberg, O'Malley, Johnston, & Bachman, 2011). Further, new policies and programs are constantly being introduced (e.g., medical marijuana, decriminalization and legalization of marijuana use, lowering of the legal blood alcohol level for teen drivers, changes in the minimum drinking age, and earlier the parent group movement, national advertising campaigns against drug and cigarette smoking), so having this "social observatory" in place permits a more timely and often a prospective assessment of their impacts.

We believe that the multiple objectives of the combined MTF base-year and panel studies are interconnected and mutually facilitating. Thus, a substantial efficiency results in addressing them in a single project rather than separate ones, and in some important ways, the total product is greater than would be possible under a fractionated approach whereby the parts cannot be examined in combination.

THE TWELVE OBJECTIVES OF THE STUDY

To provide an overview, the 12 objectives of the study are listed below without commentary. In the subsequent section we discuss the objectives in the context of the theoretical background and conceptual framework that gave rise to the general design and to the many variables that we have chosen to include in the study in order to address this extensive set of objectives.

Objective 1

To continue monitoring a broad range of drug-related behaviors, as well as potential explanatory factors—including attitudes, beliefs, and perceptions—across nationally representative samples of eighth-, tenth-, and twelfth-grade students. This annual monitoring began in 1975 for twelfth-grade students, and in 1991 for eighth- and tenth-grade students. The specific domains to be monitored are:

a. Self-reported use of over 50 classes and subclasses of drugs, including various kinds of illicit drugs, prescription drugs, alcoholic beverages, and tobacco products (listed in Table 1).

b. Patterns of initiation of use and noncontinuation of use of the drugs.

c. Patterns of multiple drug use, both concurrent and non-concurrent.

d. Beliefs about the harmfulness of various types of drugs at various levels of use.

e. Personal disapproval of various types of drugs at various levels of use.

f. Perceptions of disapproval by peers of the use of various drugs (i.e., perceived peer norms).

g. Beliefs (or stereotypes) regarding cigarette smokers and frequent marijuana users.

h. Extent of direct exposure to use of various drugs, and the proportions of friends reported to be using the various drugs.

i. Perceived availability of the various drugs.

j. Contexts in which drugs are used (when, where, and with whom).

k. Personal reasons for use of various drugs, for abstention, and for discontinuation.

l. Self-reported use under medical supervision of stimulant-type prescription drugs for the treatment of attention deficit disorder, hyperactivity, or both (ADHD).

m. Sources of drugs reported by users, including particularly for marijuana and prescription drugs used without medical supervision.

n. Self-attributed problems resulting from alcohol, marijuana, and other drug use.

o. Drug treatment experiences and estimates of proportions of those in need of treatment receiving it.

Objective 2

To continue to monitor and study these same drug-using behaviors and potential explanatory variables among nationally representative samples of American college students, their

noncollege age-mates, and nationally representative samples of young adult high school graduates generally (modal ages 19–30).

Objective 3

To monitor and study longer term patterns and consequences of drug use beyond young adulthood by continuing to conduct follow-up surveys at ages 35, 40, 45, 50, 55, and eventually by adding age 60.

Objective 4

To attempt to distinguish among three basic types of change in drug use and related beliefs and attitudes at the aggregate level: age (developmental), period (secular trends), and cohort.[3]

Objective 5

To attempt to explain, at the aggregate level of analysis, secular trends and lasting cohort differences in drug use and drug-related beliefs and attitudes, emphasizing changes in cultural influences, norms, attitudes and beliefs, value orientations, price, availability, and legal status as possible explanatory factors.

a. To focus on substance-use related attitudes and beliefs, including perceived risk, which has proven to be an important *leading indicator* of historical changes in use.

b. To monitor and explain changes in drug- and alcohol-impaired driving by adolescents and adults.

c. To examine the effects of policy changes, especially natural experiments occurring at the state level.

d. To examine the impact of changes in marijuana policies in particular (medicalization, decriminalization, legalization).

Objective 6

To examine at the *individual* level of analysis changes with age of substance use and abuse and related consequences from early adolescence through middle and later adulthood (ages 13-60) within and across cohorts, and to attempt to explain both age and social role effects on the initiation, maintenance, and cessation of drug use.

a. To assess, during the secondary school years, the impact on drug use and related factors of individual characteristics (e.g., values, beliefs, and lifestyles), other behaviors (e.g., delinquency, school performance, religiosity, and healthy behaviors), psychological factors (e.g., depression, anxiety, boredom, and ADHD), and social environments (e.g., part-time work, sports and other extracurricular activities, activities outside of school, household composition, peer groups), with particular emphasis on the specification of risk and protective factors.

[3]Age effects are consistent changes with age observed across different birth cohorts (or in this case, across graduating class cohorts). Period effects are consistent changes over a historical period observed across various age groups. Cohort effects are enduring differences among cohorts compared at equivalent ages.

b. To assess, during the post-high school years, the impact of individual characteristics and major social environments (e.g., college, military service, civilian employment, homemaking, unemployment) and roles (e.g., marriage, pregnancy, parenthood, divorce) on drug use and related variables

Objective 7

To assess both the short- and longer-term consequences of various types of drug use—particularly heavy use—on a number of outcomes in the domains of physical and psychological health, educational and occupational attainment, role performance, family and social relations, driving performance, deviant behavior, and ongoing use, abuse, and dependence.

Objective 8

To give special emphasis throughout to the more frequent or heavier users of the different drugs, i.e., individuals most likely to be characterized as abusers.

Objective 9

To continue to study drug use and drug-related attitudes and beliefs among a number of subgroups historically underrepresented in drug abuse research. These include women, ethnic minorities, young adults who do not attend college, as well as those in military service, civilian employment, or homemaking after high school.

Objective 10

To continue to monitor and study, at the individual level of analysis among adults ages 21–40, risk behaviors (including injection drug use, needle sharing, drug use more generally, and risk-associated sexual practices) and protective behaviors of relevance to the transmission of HIV/AIDS.

Objective 11

To continue to make methodological, substantive, and policy-relevant contributions to the larger fields of social, behavioral, educational, and medical research dealing with drugs and/or youth.

a. To refine methodologies for the analysis and interpretation of self-report measures of drug use, including documenting the reliability and validity of such measures.

b. To continue to provide measures for, and stimulate comparability of measurement in drug research at the local, state, national, and international levels and to provide United States national norms for comparison.

c. To continue to conduct research of policy and program importance, particularly the evaluation of "natural experiments" that can build upon the main study with great economies in cost and time and to facilitate the use of MTF data for policy studies by and with external collaborators, who often combine MTF data with other relevant data sets.

d. To continue to provide measures of progress toward the accomplishment of various national goals and indicators, including in the following report series:

- National health goals in *Health, United States*[4] and *Healthy People 2020*[5]
- Child welfare goals in *Child Trends*,[6] *Youth Indicators*,[7] and *America's Children*[8]
- National education goals (*National Education Goals Panel Reports*[9] are now ended but measures continue)
- Surgeon General's reports on smoking and adolescent violence: *Preventing Tobacco Use Among Youth and Young Adults*[10] and *Youth Violence*
- *Sourcebook of Criminal Justice Statistics*[11]
- National drug control goals in ONDCP's *National Drug Control Strategy*[12]

Objective 12

To increase the scientific yield of MTF by continuing to facilitate and expand the use of the MTF databases by other researchers—in a variety of substantive and disciplinary fields—while adequately protecting the confidentiality of the study's many respondents. In particular, to introduce the use of portals through which other researchers can access sensitive MTF data—especially panel data—from remote locations.

[4] Centers for Disease Control and Prevention. (2014). *Health, United States*. http://www.cdc.gov/nchs/hus.htm
[5] Office of Disease Prevention and Health Promotion. (2015). *Healthy People 2020*. http://www.healthypeople.gov/
[6] Child Trends. (2015). Various substance use reports such as "Binge Drinking," "Illicit Drug Use," and "Daily Cigarette Use." http://www.childtrends.org/?s=%22monitoring+the+future%22
[7] U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. (2011). *Youth Indicators 2011. America's youth: Transitions to adulthood*. https://nces.ed.gov/pubs2012/2012026/
[8] Federal Interagency Forum on Child and Family Statistics. (2015). *America's Children: Key National Indicators of Well-Being, 2015.* http://www.childstats.gov/americaschildren/index.asp
[9] National Education Goals Panel. *Various Reports*. http://govinfo.library.unt.edu/negp/page9-3.htm
[10] U.S. Department of Health and Human Services, Office of the Surgeon General. (2012). *Preventing Tobacco Use Among Youth and Young Adults.* http://www.surgeongeneral.gov/library/reports/preventing-youth-tobacco-use/full-report.pdf
[11] University at Albany, Hindelang Criminal Justice Research Center. *Sourcebook of Criminal Justice Statistics.* http://www.albany.edu/sourcebook/
[12] Office of National Drug Control Policy. *National Drug Control Strategy.* https://www.whitehouse.gov/ondcp

THEORETICAL FOUNDATION AND CONCEPTUAL FRAMEWORK

In 1980, Lettieri, Sayers, and Pearson edited a volume presenting 43 different theoretical perspectives on drug use, and since then there has continued to be a great deal of development of new and existing theoretical approaches (Akers & Cochran, 1985; Baumrind & Moselle, 1985; Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Brown et al., 2008; Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Catalano et al., 2005; Compton, Thomas, Conway, & Colliver, 2005; Dodge et al., 2009; Dodge et al., 2006; Donovan, Jessor, & Costa, 1991; Donovan, 1996; Elliott, Huizinga, & Ageton, 1985; Elliott, Huizinga, & Menard, 1989; Flay & Petraitis, 1994; Hawkins, Lishner, Catalano, & Howard, 1986; Herting, Eggert, & Thompson, 1996; Johnston, 1991; Kandel, 1998; Kandel, 2002; Kaplan, Martin, & Robbins, 1982; Kaplan, Johnson, & Bailey, 1987; Kaplan, Martin, Johnson, & Robbins, 1986; Kaplan, 1985; Kumpfer & Turner, 1990; Lonczak et al., 2001; Marcos, Bahr, & Johnson, 1986; Masten, Faden, Zucker, & Spear, 2008; Newcomb & Earleywine, 1996; Newcomb & Bentler, 1988; Newcomb, 1997; Oetting & Beauvais, 1987; Pandina & Johnson, 2005; Pfeifer & Allen, 2012; Rhodes & Jason, 1990; Schulenberg & Maggs, 2002; Schulenberg, Patrick, Maslowsky, & Maggs, 2014; Sloboda, Glantz, & Tarter, 2012; Steinberg et al., 2006; Szapocznik & Coatsworth, 1999; Tarter & Mezzich, 1992; Windle & Davies, 1999; Zucker, 1989; Zucker, 2006).[13] The various perspectives run a wide gamut in terms of (a) the classes of substances encompassed (e.g., heroin only, alcohol only, any illicit substance), (b) the stage of involvement being explained (e.g., initiation, continuation, transition to dependence or "abuse," cessation, relapse), (c) the classes of determinants under consideration (e.g., social, psychological, economic, physiological), (d) the more general theory of human behavior, if any, upon which the specific drug use theory is grounded (e.g., behavioral, developmental, ecological, psychoanalytic, social field, social learning), and (e) the level at which the phenomena to be explained are measured (e.g., degrees of use at the individual, institutional, or societal level).

Although there have been some efforts made toward developing fairly general theories (Fishbein & Ajzen, 1975; Jessor & Jessor, 1977; Kaplan et al., 1982; Kaplan et al., 1987; Kaplan et al., 1986), most of these theoretical perspectives are still rather limited in scope and are what Merton called "theories of the middle range, theories intermediate to the minor working hypotheses evolved in abundance during day-to-day routines of research, and the all-inclusive speculations comprising a master conceptual scheme." Such theories consist of a "general orientation toward data, suggesting types of variables which need somehow to be taken into account, rather than clear, verifiable statements of relationships between specified variables" (Merton, 1957), pp. 5, 9). Writing much later, Petraitis and colleagues (Petraitis, Flay, & Miller, 1995) commented that ". . . as social scientists we might be aware of many (if not most) of the constructs that contribute to [adolescent substance use], but we do not yet know how all these constructs . . . fit together" (p. 67).

We certainly regard the theoretical approach that has guided much of the development of our own work over the past 40 years to be middle-range; *and* it is eclectic, since we did not feel that any single extant theoretical approach was sufficiently comprehensive and specified to serve

[13]The word "theory" is used rather loosely here, as is common practice in this field; we take a broad-based view of the term and recognize that its meaning can range from conceptual frameworks to elaborated and specific systems of testable hypotheses.

as the sole basis for selecting measurement and guiding analysis in this large and ongoing study. The fact that MTF has the multiple objectives described here makes it particularly impractical to take a single theoretical stance. Our theorizing provided a general approach for generating hypotheses, conceptualizing the measures, and organizing many analyses. There are multiple hypotheses implied in our conceptual framework that are described later; but there are many more we had in mind at the outset and that we have added over the life of the study. Thus our approach to theory, like most others mentioned here, has actually been an evolving process in which further elaboration and specification have occurred and are to be expected in the future. It is an iterative process, in that the theoretical framework leads to some empirical tests, which in turn yield some revisions and/or elaborations of the framework. This process is consistent with what Cattell (Cattell, 1966) described as the "inductive-hypothetico-deductive spiral."

In the present study, a theoretical structure has been evolving to provide explanation of trends in drug use at the societal or *aggregate* level. Building upon a set of measures of perceived risk, disapproval, and peer norms, which were included in the study from the start (Johnston & Bachman, 1980), we have tested our hypothesis that these are important determinants of changes in drug use. When marijuana use began to decline after peaking around 1979, we described changes in perceived risk of harm as a likely determinant because of the correlated upturn in perceived risk (Johnston, Bachman, & O'Malley, 1981; Johnston, 1982). More evidence was presented from the reasons quitters and abstainers gave for *not* using marijuana and from the trends in the frequency with which they gave these reasons (Johnston, 1982, 1985; Terry-McElrath, O'Malley, & Johnston, 2009), and, on the other hand, the reasons that users reported *for* use (Patrick, Schulenberg, O'Malley, et al., 2011; Patrick, Schulenberg, O'Malley, et al., 2011; Patrick & Schulenberg, 2011). Early on, we also advanced the hypothesis that changes in perceived risk may be helping to drive changes in disapproval of use (and, derivatively, in peer norms). Trends in marijuana use, related attitudes, and beliefs continued to evolve in the predicted way throughout the 1980s and 1990s, providing additional evidence to support this theoretical position. Further, one major competing hypothesis—that changes in availability were driving the downturn—was not supported by our data (Johnston, O'Malley, & Bachman, 1989). Another alternative hypothesis offered by Jessor (Jessor, 1985)—that a shift in young people toward a more conservative lifestyle could have caused the downturn—was addressed and found inadequate (Bachman, Johnston, O'Malley, & Humphrey, 1988). The latter article also demonstrated that if one looked separately at trends across high school classes within each level of perceived risk, no downturn in use occurred, but rather some increased. A subsequent article dealing with the same issues with regard to the downturn in cocaine use led to much the same conclusions (Bachman, Johnston, & O'Malley, 1990). Later, as marijuana use rose again, changes in both perceived risk and disapproval proved to be leading indicators of the turnaround in use (Bachman et al., 1989; Johnston, O'Malley, Bachman, & Schulenberg, 2013; Johnston, O'Malley, Bachman, & Schulenberg, 2006a; Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015). Based on our original set of hypotheses, the confirmation of many of those hypotheses over a number of years, and other correlated evidence, we offered a first statement of a fairly comprehensive theory covering the spread, maintenance, and contraction of drug epidemics (Johnston, 1991). Subsequently, the country entered what we have characterized as a "relapse phase," for which further theoretical formulations were added. See Monitoring the Future Volume II of 2015 and earlier volumes in this series (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015) for a

discussion of the roles of "generational replacement" and "generational forgetting," as well as other factors at the societal level.

At the *individual* level of analysis and explanation, there certainly has been much progress toward cataloguing the multitude of individual and contextual influences on drug use and attempting to place them within a coherent conceptual framework (Brown et al., 2008; Catalano et al., 2005; Chassin, Fora, & King, 2004; Chassin, Hussong, & Beltran, 2009; Dodge et al., 2009; Glantz & Hartel, 1999; J. D. Hawkins et al., 1992; Pandina & Johnson, 2005, 1999; Petraitis et al., 1995; Schulenberg & Maggs, 2002; Sloboda et al., 2012; Szapocznik & Coatsworth, 1999; Windle & Davies, 1999), but there is not as yet a comprehensive theory to deal with all aspects of drug use. We are not unduly discomforted by this fact, nor are we especially uneasy about taking a somewhat eclectic (though certainly not arbitrary) approach to the development of our measurement and analysis. More than four decades ago, sociologist Otis Dudley Duncan, in discussing next steps in social reporting, wrote at some length about the "theorist" versus the "inductivist." His comments are sufficiently fundamental to theory in the drug area, and particularly to our own approach, that we quote them here:

> . . . It is a rare body of theory in the social sciences (and perhaps even in the natural sciences) that is sufficiently complete and detailed to specify exactly how to accomplish the relevant measurement. On the contrary, many quantities now considered to be well-measured became so only as a result of a long process of trial and error, leading to an evolution of the measurement technique, and ultimately a standardization of it . . .
>
> It can hardly be the case that any serious effort at measurement is undertaken on the basis of a theoretical tabula rasa . . . A fortiori, a social scientist steeped in the conceptual framework of his discipline could not, even if he wanted to, undertake a job of measurement without its being affected by some set of ideas . . . of how the quantity to be measured relates to other variables of interest . . .
>
> . . . But to the degree that one sees a body of understanding as a crescive structure with ragged edges in the neighborhood of recent increments, one should expect the . . . "theoretical" quality of a collection of measurements to emerge pari passu with the growth of the measurements themselves. (Duncan, 1969), pp. 8–9)

In our view, this describes much of what has been happening in the drug field in recent decades. There has been a good deal of measurement (some more theoretically guided, some less so) as well as a good deal of relational analysis; this activity has contributed importantly to the further development and refinement of theory. We see our own research, past and future, as providing valuable ingredients for this ongoing process as we and others continue gradually to advance theory relating to drug use (some of our recent work in terms of advancing a developmental perspective—e.g., (Patrick, Schulenberg, Maggs, & Maslowsky, 2014 online; Schulenberg & Maggs, 2002; Schulenberg, Maggs, & O'Malley, 2003; Schulenberg & Patrick, 2012). *Thus we do not think it appropriate to have premised such a large and ongoing research endeavor, with its many varied research purposes, on any single theoretical position.*

Domain of Variables and General Theoretical Grounding

Throughout the history of MTF, our approach to theory has been at the broadest level social-psychological, in that nearly all determinants under consideration are social or psychological characteristics of the person, or characteristics of his or her social environment. (Thus, we omit several domains of undoubted importance: in particular, genetic, biological, and physiological.) The general theoretical approach to human behavior that we have brought to the selection and analysis of variables has its roots in Lewinian field theory, which also underlies our previous work on the Youth in Transition study (Bachman, Kahn, Mednick, Davidson, & Johnston, 1967; Johnston, 1973), and which, incidentally, underlies the theoretical perspectives of others in the drug field, such as Jessor and Jessor (1977). The three major components of Lewinian theory are the person, the environment, and behavior; additionally, a distinction is made between the perceived environment and the actual environment (Bronfenbrenner, 2005; Deutsch, 1968).

Within Lewinian field theory, it is the subjective perceptions of the environment (e.g., perceived peer disapproval of drug use) that are considered critical in determining the motivation and intention to act. In the present study, nearly all measures of the environment are of this type (though aggregating answers of students in school does provide a more objective measure of aspects of the environment than can be commonly observed).[14] The "person" refers to the psychological characteristics of the individual (attitudes, values, beliefs, and perceptions) as well as to directly observable characteristics. Certainly the central contribution of Lewinian field theory was the emphasis it placed on the environment, and on the interdependence between characteristics of the person and characteristics of the environment in determining behavior. Bronfenbrenner's human ecology framework (e.g., Bronfenbrenner, 2005) has extended many aspects of field theory, and has helped to bring considerations of the social context to the forefront in psycho-social research in general and developmental research in particular.

The Basic Conceptual Framework

Our initial conceptual model has remained central to the design and purposes of MTF. In its most rudimentary form, our basic conceptual model contains three elements: (1) the focal behavior to be explained, (2) the characteristics of the person (including all other behavior), and (3) the characteristics of the social context. All three elements are nonstatic and are posited to

[14]While recognizing the potential for discrepancies between the "objective environment" and the "subjective environment" as perceived by the person, we have chosen not to focus on the measurement of those discrepancies (which would have required an even more elaborate research design involving data collection from direct observation, significant others, and/or archival records), nor do we here theorize about the importance of them. For many of our measures of social context, there should be relatively little discrepancy due to unconscious distortion or misperception (e.g., presence of family members in household, enrollment as a student or holding a paid job, the size of the high school or college). Some measures of perceived attitudes of significant others (e.g., status ascribed to particular behaviors by students in the school) can be checked against aggregate data from those students. An important example exists in our comparing perceived norms regarding drug use with the aggregated self-reported attitudes of peers: our conclusion that there often is a "collective ignorance" about others' attitudes is a case of looking at the discrepancy between objective and subjective environments. However, for some measures (such as friends' or parents' expectations of the respondent) we rely on the subjective reality reported by the respondent.

influence all others, and characteristics of the person and the environment are posited to have interactive effects on the focal behavior. This basic model is presented schematically in Figure l.

For the sake of brevity, we will leave the "focal behavior" broadly stated in the following discussions. It should be noted, however, that in this study we include as eligible for this status the use of (or *changes* in use of) any *one* of the substances under study (defined by period prevalence, frequency, quantity, or some combination of these); use (or changes in use) of empirically defined *constellations* of these drugs; and/or *stage transitions* in one or more of the indexes of drug involvement, discussed under Objective 1b. We find it useful for heuristic purposes, however, to segment and elaborate portions of the other two elements in the model—the person and the social context.

First, there is a class of person characteristics that cannot accurately be said to be influenced by the other elements in the model, namely, family background and ascriptive characteristics. Since nearly all of these come prior to and have important effects on a number of the other characteristics of the person, the family background and ascriptive characteristics have been placed earlier in the causal sequence. Figure 2 shows this placement, as well as some other elaborations of the model that are discussed in the next paragraphs.

Second, the social context has been segmented into two very broad domains: (1) the proximal immediate domain, including those aspects of the context with which the individual interacts directly and in person; and (2) the distal domain, including those aspects that are more distant and conveyed through the media, books, and other sociocultural influences. The current study contains a rather modest amount of measurement relative to the latter aspects of the social context. Measurement includes questions about exposure to antidrug and antismoking ads in the media, perceived drug and cigarette use and related attitudes among public role model groups, as well as state-level characteristics such as medical marijuana laws and changes in the legal age of drinking. We chose to include the distal social context here explicitly to illustrate that we view such sociocultural influences as extremely important, particularly for explaining changes in behavior at the aggregate level (see Johnston, 1991b). Like the ascriptive characteristics, this class of variables has no reciprocal causation posited to affect it. The characteristics of the larger society are presumed to influence characteristics of the person's immediate social context, as well as the person's own behavioral and personality characteristics directly. They are posited to affect a person's role status indirectly through these other elements.

Figure 1.
Basic Elements in the Theoretical Framework

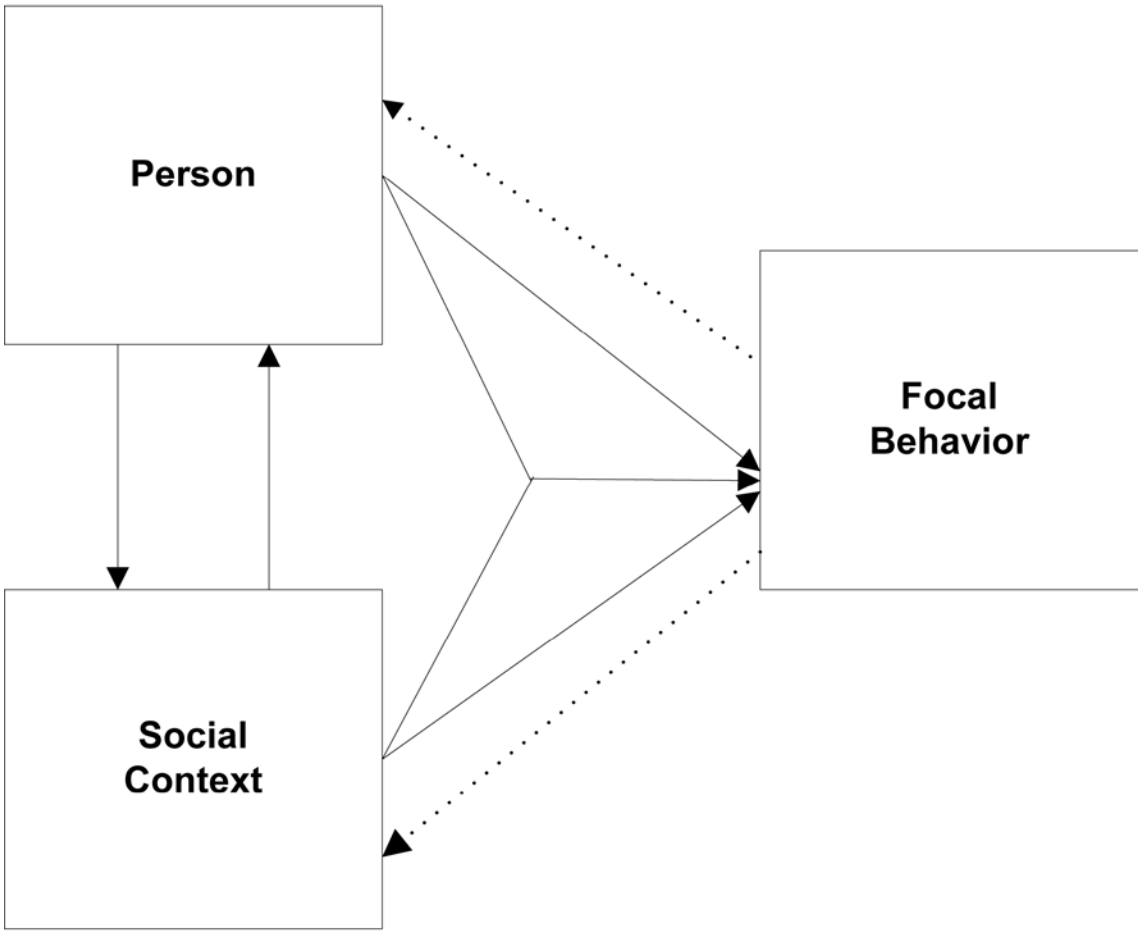
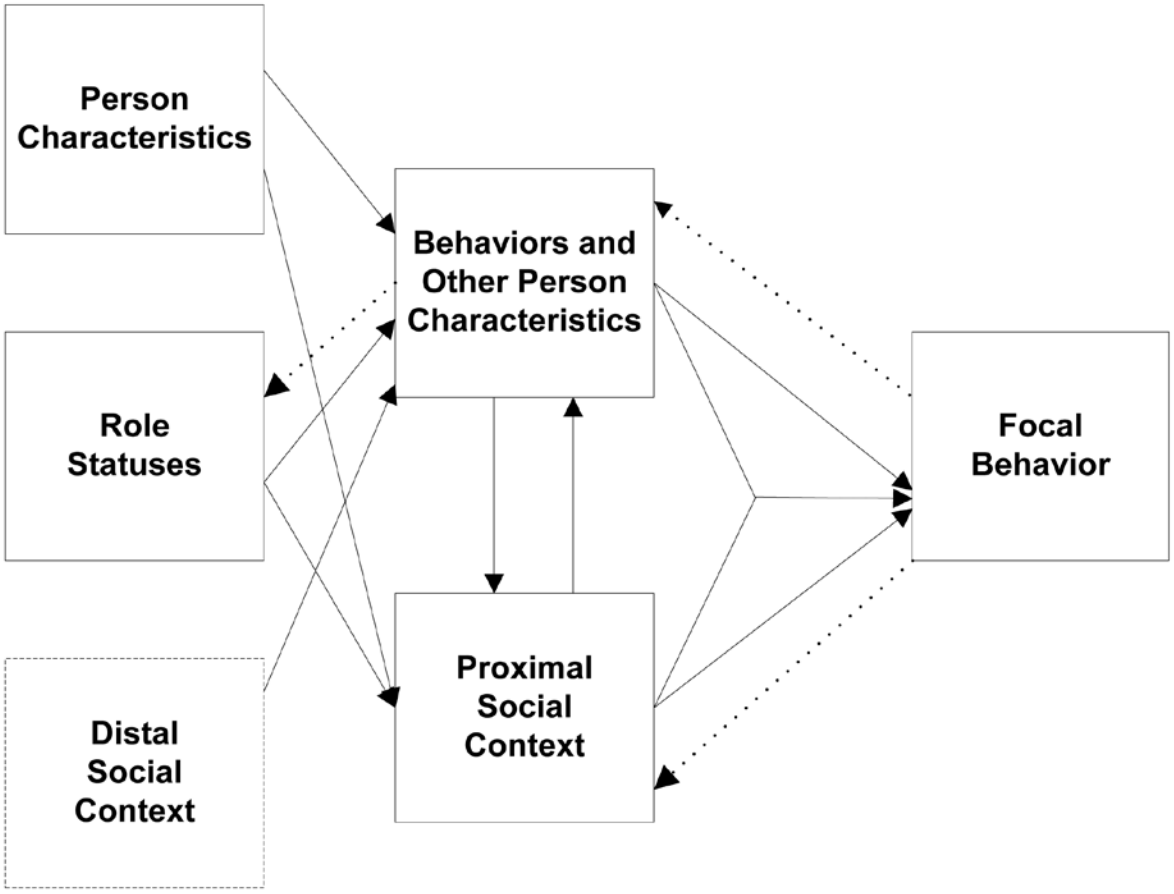


Figure 2.
Elaboration of the Elements in the Theoretical Framework

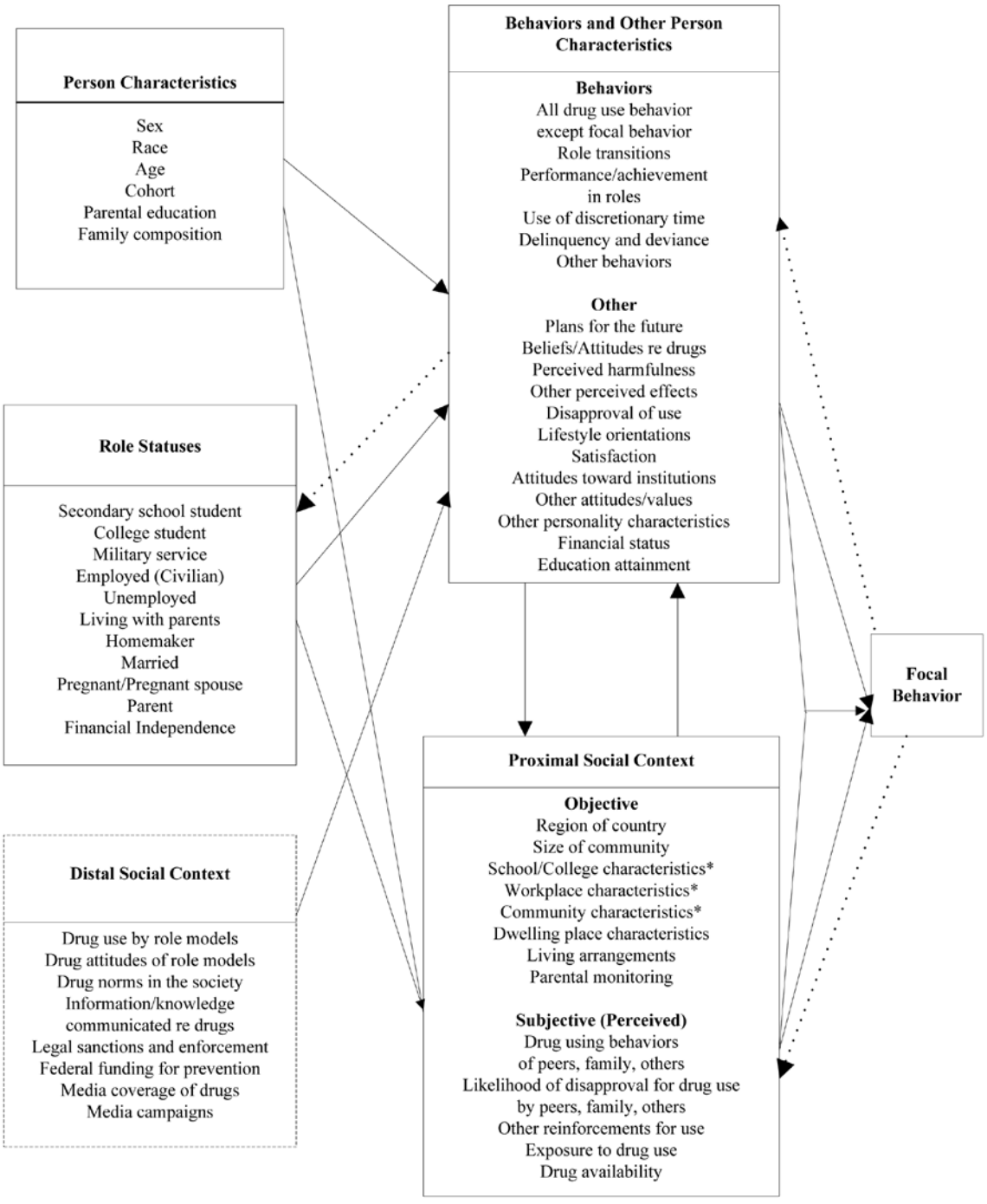


Third, a class of variables delineated separately in the framework contains elements that are characteristics of both the person and his or her social context. These are the role statuses held by the individual: his or her student status, work status, marital status, parental status, and so forth, as listed in Figure 3. Holding these statuses and, equally important, moving into and out of these statuses (Bachman et al., 2002; Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997; Schulenberg & Maggs, 2002) are posited as influencing some of the personality and behavioral characteristics of the person; the characteristics of the proximal social context(s) being experienced by that person; and through them, the focal drug-using behavior. Only one causal arrow leads to "role statuses" in the model (i.e., the arrow from behaviors and other person characteristics); this is because the *act* of entering or leaving a role (i.e., a "role transition") is classified with the other behaviors. The influences of the other major elements in the framework on role status (and they are nearly all certainly assumed to affect role status) are mediated through their effect on the role transition behavior. Many family background and ascriptive characteristics, as well as features of

the larger social context, are presumed to influence one's role status via their impact on the person's proximal social context, which in turn influences his or her role transition behaviors.[15]

[15]We should make explicit here that, in our actual analyses of data, we sometimes examine relationships where there are no arrows shown. Thus, for example, the ascriptive characteristics of parental educational level may relate to role status as a college student or as a high school student in the college preparatory curriculum. We *theorize* that such relationships occur via social contexts, role transition behaviors, etc.; nevertheless, we may not have measured such contexts and behaviors adequately, and thus are not able to represent the hypothesized intervening processes in our analyses.

Figure 3.
Further Specification of the Elements in the Theoretical Framework



*Including drug prevention programs and policies.

The Proximal Social Context

Social influence processes. While Lewinian field theory may be thought of as the source of the emphasis we give to subjectively measured characteristics of the social context, and to person–context interactions, a number of other theoretical approaches have contributed to our theoretical elaboration within this framework. The selection of particular environmental variables has been guided in substantial part by the social learning theory of Bandura (Bandura, 1977) and others, with its emphasis on modeling and imitation, and by social role theory more generally (Sarbin & Allen, 1968; Simons, Conger, & Whitbeck, 1988), with its emphasis on the communication of role expectations. Stephens (Stephens, 1985) provided an example of an earlier theoretical approach to drug addiction that is explicitly role-theoretic, and a more recent example was provided by Bogart and colleagues (Bogart, Collins, Ellickson, Martino, & Klein, 2005).

We believe that the social expectations of others in the individual's immediate context—particularly peers—and the role models they provide comprise an important set of determinants (social influences) for the various types of drug-using behavior under investigation. Thus, quite a number of measures having to do with modeling and role expectations in the proximal social context are included in this study, most of them addressed to more proximal elements—that is, to people with whom the individual interacts in person. However, we also believe that important role expectations and models are presented through the media and other more remote elements in the social environment. This emphasis on the larger social environment is consistent with the contextual approach that has been advocated by, for example, Biglan et al. (Biglan, Glasgow, & Singer, 1990) and Dent et al. (Dent, Grube, & Biglan, 2005). We have added some measurements in this domain in more recent years, and we continue to consider external measures of what we hypothesize to be important variables in the larger (distal) social context in our search for the causes of changes in aggregate levels of drug use—such variables as levels of cigarette advertising and promotional expenditures (Wakefield et al., 2006), media coverage of antidrug commercials, advertisements promoting marijuana and tobacco use (Slater, Chaloupka, Wakefield, Johnston, & O'Malley, 2007), and levels of media coverage of the tobacco and drug issues in the news (Clegg Smith et al., 2008). While finding correlated trends between these types of factors and our aggregate levels of drug use is not sufficient to prove causation, it certainly helps to narrow the list of plausible explanations because, in the absence of a correlation (with or without a time lag), many potential explanations can be eliminated. It also permits us to adjust the probabilities we can attach to various possible explanations, even if some cannot be eliminated outright.

For each of the elements in the conceptual framework, Figure 3 provides a specification of the general classes of variables that are hypothesized to predict drug use. Under the Immediate Social Context are listed three classes of variables hypothesized to have their effect on drug use through these social influence processes—namely, the drug-using behaviors of salient others, the perceived likelihood of their disapproving of the subject using drugs, and the felt pressure from them to use drugs. More specifically, these include the attitudes (or norms) regarding drugs perceived to be held by three particularly salient roles in the subject's immediate social environment: parents, close friends, and the student body in general. Also of hypothesized importance, because of their social influence via modeling and imitation, are the actual drug-using behaviors of these three groups. The proportion of students in the school using drugs can be determined from school aggregate data, while the proportion of close friends using drugs is asked directly of the subject (Kumar, O'Malley, Johnston, Schulenberg, & Bachman, 2002). (Parental

use cannot be asked of students, unfortunately, due to practical considerations including the willingness of schools to participate.) It should be noted that we see the effects of these social influence factors on drug use as working in part through their effects on the respondent's own attitudes, beliefs, and perceptions regarding those drugs. We also predict they will have effects that are not mediated by these intervening variables.

***Parental monitoring and influence*.** Another element in the proximal social context that is particularly relevant to understanding drug use among adolescents is "parental monitoring." This refers both to the amount of time spent in the parental home (presumably under parental influence) and the extent to which students perceive their parents as taking an active role in their lives (e.g., educational pursuits). There are several measures contained in the study that are of direct relevance to this factor including, for example, how many nights per week the young person goes out for fun and recreation, the extent to which parents help with homework (for 8th and 10th graders), and whether the young person is living in the parental home (for young adults). We judge this factor to be reflective of one of the more important sources of social control for drug use—parental influence or monitoring (Bachman et al., 2008; Baumrind, 1985; Brook et al., 1990; Chilcoat & Anthony, 1996; Collins & Laursen, 2004; Dever et al., 2012; Dodge et al., 2009; Dodge et al., 2006; Duncan, Duncan, Biglan, & Ary, 1998; Hawkins, Catalano, & Miller, 1992; Hops, Andrews, Duncan, Duncan, & Tildesley, 2000; Murray & Perry, 1985; Pilgrim, Schulenberg, O'Malley, Bachman, & Johnston, 2006; Steinberg, 1987; Wills, Resko, Ainette, & Mendoza, 2004).

Of course there are other positive and negative reinforcements in the proximal social context besides the disapproval or approval of parents, friends, and the larger student body. These are represented in the model in the aggregate as other reinforcements for use. (The influences of having a spouse and children are discussed below under Role Transitions.)

***Availability*.** Other important environmental determinants built into our theoretical structure are the availability of various drugs and the opportunity to use. These derive in part from the "availability proneness theory of illicit drug use" explicated by Smart (Smart, 1980). (This theory, incidentally, fails to take into account the social influence processes of the type just mentioned.) It emphasizes availability as a major determinant, and availability refers to the set of physical, social, and economic circumstances surrounding the ease or difficulty of obtaining drugs (Smart, 1980), p. 47).

Respondents in the Monitoring the Future study are asked to rate their access to various specific drugs, in terms of how difficult they believe it would be for them to get some, if they wanted them. We expect market access to vary from school to school and among the different types of environments entered after high school. The longitudinal panels provide a particularly good opportunity to assess dynamically the strength of the relationships between access and use. The effect of price can to some degree be addressed in the reasons given for abstention and quitting by nonusers. Externally gathered price information can also be used in conjunction with the study's usage data. Such analyses have been conducted by, for example, Grossman et al., Pacula et al., and Tauras et al. (Grossman, Chaloupka, & Brown, 1996, January, 1996; Pacula et al., 2001; Tauras, O'Malley, & Johnston, 2001).

Our own position is that access is a necessary, but by no means sufficient, condition to cause use. We have argued elsewhere that the other necessary conditions are (1) an awareness of

the drug and its alleged psychoactive effects, (2) reassurance about its safety, (3) a willingness to violate the law and/or predominant social norms, and (4) a motivation to use (Johnston, 1991). The motivation for use may be any of a broad variety, including curiosity, rebellion, social facilitation and/or expression, and psychological coping with negative effects (Johnston & O'Malley, 1986; Patrick, Schulenberg, O'Malley, et al., 2011; Patrick & Schulenberg, 2011; Terry-McElrath et al., 2009). The evidence presented from the study so far (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2014; Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015) supports the notion that use of a specific drug in the aggregate can decline with either little or no change in availability (as in the case with marijuana) or an actual increase in availability (as with the case of cocaine starting in the late 1980s). In at least one case, there appeared to be evidence that a reduction in availability influenced use of a specific substance. Following the closure in 2000 of a major production lab by the Drug Enforcement Administration, LSD use declined, very likely due in large part to the disruption of supply. Price was also shown to be an important driver of change in marijuana use in a particular historical period, using MTF data (Pacula et al., 2001).

Other aspects of the proximal social context. The proximal social context is also a function of the region of the country and the size of the city in which the individual resides, and the particular characteristics of his or her school, workplace, and dwelling. We therefore expect them to be predictors of the more proximal contextual factors just discussed—that is, of relevant modeling, role expectations, availability, and exposure to use. The characteristics of the school, workplace, and dwelling in turn are very much a function of the role statuses (or combination of statuses) held by the respondent. For example, we have found that involvement in sports in high school, depending on the type of sport, has concurrent and long-term associations with substance use (Veliz et al., 2015).

The Distal Social Context. There are many features of the larger social environment, including at the state and national level, which we hypothesize can influence the substance-using behaviors and related attitudes, those of adolescents and young adults in particular. Some elements in the distal social context may be drug-specific. We cite a few such social context effects that we have evaluated in the references in this section. Those at the national level, in particular, include some that we believe can have an influence, such as the perceived attitudes and behaviors of well-known musicians and sports stars who serve as public role models; anti-drug advertising campaigns (Terry-McElrath, Emery, Szczypka, & Johnston, 2011); and national laws (Johnston, 2002, June 25, 1999, October 14; O'Malley & Wagenaar, 1991) and regulations. At the state level, there may be advertising campaigns (Carpenter, Kloska, O'Malley, & Johnston, 2007; Tauras et al., 2001; Tauras et al., 2005) aimed at reducing use of tobacco, alcohol, various illicit drugs, or drug use generally. There have been important state-level changes in laws regarding tobacco control (Tauras et al., 2005; Tworek et al., 2010), alcohol use (O'Malley & Wagenaar, 1990; Wagenaar, O'Malley, & LaFond, 2001), decriminalizing marijuana use (Johnston, 1983; Johnston, O'Malley, & Bachman, 1981; Miech, Johnston, O'Malley, Bachman, Schulenberg, et al., 2015), permitting marijuana use for medical purposes (Hasin et al., 2015), and legalizing use and sale for recreational purposes.

Person Characteristics

Age and cohort. For discussion purposes, we focus here on age and cohort (which together define period), though we might just as well have chosen age and period (which together define cohort), or even cohort and period (which together define age). These are ascriptive characteristics of the person that are often forgotten or overlooked in social science but which, as we will document later, are generally very important determinants of behavior—particularly drug-using behaviors.

We hypothesize that the role expectations of others (both parents and peers) and the modeling behavior of others (in particular, peers) vary according to the age of the respondent and the cohort in which he or she grows up. Obviously illicit drug use would have been viewed by both parents and peers as a more deviant behavior for a teenager born in the 1940s or 1950s than it is for a teenager today. Similarly, marijuana use is likely to be more strongly disapproved by both parents and peers for an 8-year-old than for an 18-year-old. Others' beliefs about what is age-appropriate behavior, which of course can lead to expectations about appropriate role behavior for oneself, probably also account for the early peaking of inhalant use (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015) and for the sequential nature in which delinquency, drug use, and other problem behaviors emerge (Elliott et al., 1985; Jessor & Jessor, 1977; Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2015; Johnston, O'Malley, & Eveland, 1978; Kaplan, 1995). It may also help to account for the ages and sequences in which these behaviors tend to extinguish.

Thus, we believe role expectations and modeling effects are a function of the age and cohort of the respondent. Further, we expect cohort to be predictive of attitudes and beliefs about drugs in ways other than through the role expectations and role modeling of others in the immediate environment; more specifically, we expect them to occur because of changes taking place simultaneously in the larger culture (e.g., in the role modeling, norms, and social expectations transmitted through the media). Johnston (1991b) has argued that modeling and communication of role expectations regarding drug use by older cohorts to younger ones is one of the important mechanisms by which the forward momentum of an epidemic is maintained after some of the historical forces that initially gave rise to it (e.g., the counterculture and antiwar movements) have ceased to exist. While not explicit in our graphical presentations, we obviously expect cohort to covary with many such characteristics in the larger social context that are changing over time [for an empirical example see (Keyes et al., 2011)].

Finally, age and cohort are certainly predictive of whether an individual is likely to hold various adult role statuses; thus age and cohort are expected in part to work through whatever effects those role statuses have. To take an example, if being married tends to reduce illicit drug use (as we know it does), then the deferral of marriage, seen in more recent cohorts, may cause an increase in drug use during the early and mid-20s (Bachman et al., 2002; Bachman et al., 1997; Schulenberg & Zarrett, 2006).

***Financial status*.** Recall that in our earlier discussion of availability, the other component, besides market access, was the financial means with which to acquire drugs. We hypothesize that discretionary income, moderated by the market price of drugs, is a predictor of use. Discretionary income, in turn, is a function of total income and of adult role responsibilities, many of which carry financial burdens. We assume that many of the role responsibilities listed in Figure 3 include,

among other things, financial obligations that have a high priority lien against total income. Obviously, our purpose here is not to do a careful financial accounting, but rather to show major factors likely to predict financial status. We have already demonstrated that total income is predictive of drug use during high school (Bachman & Schulenberg, 1993; Bachman, Johnston, & O'Malley, 1981b). The role of adult responsibilities has been examined to some extent in this data set, and consistent with others' findings (Bogart et al., 2005; Flora & Chassin, 2005; Leonard & Homish, 2005), we have found that marriage and parenthood relate negatively to drug use in the years after high school (Bachman, O'Malley, & Johnston, 1984; Bachman, Johnston, O'Malley, & Schulenberg, 1996; Schulenberg, O'Malley, Bachman, & Johnston, 2005).

Discretionary time. We also expect adult role responsibilities to operate through another closely related intervening variable—the amount of discretionary or leisure time available for activities such as recreational drug use. The less time available, the less such use is predicted. In other words, like discretionary income, discretionary time may be a necessary resource for at least some forms of drug use, but it may also be more than that. For the person with few role responsibilities, uncommitted time may actually be a burden and, in addition to providing a necessary resource, may also provide an increased motivation to use substances (Johnston & O'Malley, 1986). While we do not have a direct measure of discretionary time, we do have some indirect indicators (e.g., hours worked, school enrollment), plus the ability to make some deductions from the person's role status configuration and self-reported reasons for use. In addition, we have a set of questions about activities in which the respondent engages during leisure time. We analyzed these "routine" activities (Osgood, Wilson, O'Malley, Bachman, & Johnston, 1996) within a "Routine Activities Perspective." We found consistent evidence that socializing with peers away from home and authority figures is closely related to deviant behavior, but only in the absence of a structuring agenda such as going on a date or participating in sports. These routine activities may help explain why or how transitions in social roles (work, family, living arrangements) are related to changes in drug use.

Other drug-using behavior. The use of other drugs, and in particular the previous use of the drug being predicted, are obvious and central predictors of the focal behavior. Having these variables is critical for analyses using any stage model of drug use (e.g., (Kandel, 1975; Kandel, 2002), and it is important to control for past drug experience when looking at the effect of role status or almost any other variable.

Role transitions and achievement/performance in role. Relevant to Objective 6, role transition and role performance, and developmental transitions in general, are important dimensions to search for possible effects of drug use (Bogart et al., 2005; Leonard & Homish, 2005). And they seem to be likely determinants of use for a number of reasons. For one, they are apt to influence the person's self-concept and satisfaction in some fundamental ways. Kaplan (1980) states that one aspect of self-concept, self-derogation, is an important determinant of use. Performance in some of these roles is also likely to affect the probability of choosing particular lifestyles, especially a deviant one. Poor role performance is likely to add to the stress experienced by individuals, for which some drugs may be used as palliative. Finally, most roles bring with them a role set of other people who have influence on the individual, marriage being a particularly salient example.

As we have discussed and shown in our work, performance in one role (say academic performance in high school) can influence not only the transition made out of that role (e.g., dropping out), but also the transitions made into other roles (e.g., going to college, getting a job) (Bachman et al., 2008; Bachman, Schulenberg, O'Malley, & Johnston, 1990, March; Schulenberg et al., 2005; Schulenberg & Maggs, 2002; Schulenberg, Bachman, O'Malley, & Johnston, 1994; Schulenberg, O'Malley, Bachman, & Johnston, 2000; Staff et al., 2010). Thus the impact of poor performance in one role can reverberate and lead to further impact via transitions or performance in other roles (Schulenberg & Maggs, 2001; Schulenberg, Bryant, & O'Malley, 2004). Role statuses, in turn, are important not only because of their possible psychological and economic effects on the person, but also, as is discussed above, because of their substantial impact on the type of proximal social context experienced by that person (Patrick, Schulenberg, & O'Malley, 2013).

1. Marriage, Pregnancy, and Parenthood. One set of role transitions that is common in early adulthood involves some or all of the following: engagement, marriage, pregnancy, and parenthood. Not infrequently, divorce and possibly remarriage follow some or all of these. One would expect such transitions to influence drug-using behaviors for a number of reasons. First, engagement and marriage mean that the respondents must deal with the expectations of a very significant person in their lives. Since most young adults disapprove of drug use and most do not use drugs (e.g., (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015), we expect that the majority who get married receive additional role sending (and reinforcement) from their spouse not to use. We have reported that becoming married has a deterrent effect on use (Bachman et al., 2002; Bachman et al., 1984; Bachman et al., 1997; Schulenberg et al., 2005; Schulenberg et al., 2000; Staff et al., 2010). The fact that some of this "marriage effect" actually precedes marriage, and shows up after the point of engagement, is consistent with the interpretation that role sending from the mate is an important factor. There may be other factors helping to account for a marriage effect, of course, including a change in self-concept, financial responsibilities, social activities, and friendship networks. We have done considerable work on the effects of this and other major role transitions and will be looking at additional transitions such as unemployment and retirement. We have also demonstrated a marriage effect in HIV-related risk behaviors (Johnston, O'Malley, Bachman, Schulenberg, Patrick, et al., 2015; Patrick, O'Malley, Johnston, Terry-McElrath, & Schulenberg, 2012).

For women, pregnancy carries the burden of protecting the fetus from the effects of drug use, and we have shown substantial effects from this temporary role transition (Bachman et al., 2002; Bachman et al., 1997; Bachman, Johnston, & O'Malley, 1991; Schulenberg et al., 2005; Schulenberg et al., 2000; Staff et al., 2010). Having children adds to the financial responsibilities of the parent, which may make the opportunity cost of drug expenditures higher; but perhaps more important, parents may be concerned about the underlying effects of their own behaviors on their role performance as a parent. For these reasons, we hypothesized that parenthood will have deterrent effects on drug use, particularly as the children get older and become more aware of their parents' behavior, and parents become more concerned about their own modeling effects on their children.

2. Jobs and Career Stage. We also hypothesized that as young people advance further into their careers, the potential loss of their job from drug use being discovered rises; thus, such individuals will be more likely to desist use. Also, we think that those who have a higher possibility

of discovery—in particular the almost 50% of U.S. workers subjected to drug testing in the workplace (Carpenter, 2007)—will be more likely to desist from use (Johnston & O'Malley, 1997). (Certainly the trends in drug use in the military would suggest this.) Both of those hypotheses have become testable in the evolving data set (Bachman, Freedman-Doan, O'Malley, Johnston, & Segal, 1999; Merline, O'Malley, Schulenberg, Bachman, & Johnston, 2004; Schuster, O'Malley, Bachman, Johnston, & Schulenberg, 2001).

3. Lifestyle Orientations. A great deal has been said about the presumed or hypothesized importance of lifestyle orientations, as well as other values and attitudes (Jessor, 1998; Johnston, O'Malley, & Bachman, 1987, October). We expect at least some types of drug use to relate to them in some historical periods because (1) such use can serve as a public, symbolic expression of a lifestyle orientation or, more likely, of a particular value/attitude stance; (2) it can serve as a ritual through which to express or attain group cohesion or loyalty; and (3) it is a behavior that, by its intrinsic nature, is either consistent with a certain part of the belief system (e.g., the counterculture emphasis on inner directedness and subjectivity) or inconsistent (e.g., the antichemical orientation of the "back to nature" or "healthy lifestyle" movements) (Johnston, 1973, 1991). Being part of the "rave" scene, which related to the use of "club drugs" such as ecstasy, is a more contemporary example of the connection between drug use and lifestyle. The prevalence (or even existence) of many lifestyle orientations will be heavily influenced by the age and cohort under study, of course.

Attitudes and Beliefs About Drugs

As the above discussion illustrates, many complex causal chains can be elaborated within the rather simple theoretical framework we have specified. We have tried to describe those that at present seem the most salient, given the domain of determinants within which we are working. However, as stated earlier, we view this as an evolving and iterative process in which the theory will instruct the analysis and the analysis will further instruct the theory (cf. Cattell, 1966). One of those elaborations involves a set of person characteristics in the form of beliefs about the harmfulness of drugs.

Prior to the outset of the study, we hypothesized that beliefs about the dangers of drugs and attitudes about the acceptability of their use could be important determinants of use, and of aggregate changes in use over time (Johnston, 1973). We also believed that they may vary independently for the different drugs, and for different levels of use of those drugs, and as a result made a considerable investment in measuring these attitudes and beliefs separately for the various drugs and levels of use. (In fact, we now believe that it would have been valuable to have such measures on even more drugs [such as PCP].) This investment in measurement has yielded results of considerable theoretical and practical importance. Indeed, we now conclude beliefs about the dangers of drugs are, or can become, a major deterrent to initiation of use and to continuation of use, and we have provided evidence in support of this interpretation over the past four decades (Bachman, Johnston, & O'Malley, 1998; Bachman et al., 1990; Bachman et al., 1988; Bachman et al., 1991; Johnston et al., 2014; Johnston, 1985), and many preceding volumes in the same series. While the use of some drugs appears to have fallen for reasons other than a change in perceived risk (Johnston, 1991), perceived risk appears to have played a pivotal role in the cases of marijuana and cocaine, and very likely in the cases of LSD, PCP, and crack (although we have more limited empirical data to support the argument in these cases, because perceived risk was not measured

prospectively, as it was for many of the other drugs). More recently synthetic marijuana use declined in the face of increasing perceived risk (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015). In positing some of the social dynamics in the emergence, maintenance, and decline phases of an epidemic, we suggest (Johnston, 1991b) that there must be some reassurances about the dangers of a drug *before* a significant proportion of the population will even initiate use, which probably explains the low levels attained for several of the drugs perceived to be most dangerous, such as heroin, crack cocaine, crystal methamphetamine, and "bath salts." (Certain modes of administration are undoubtedly seen as more dangerous, as well, such as intravenous injection and the inhalation of hot fumes.) We also posit that, because most drugs have adverse side effects, there tends to be a natural correction cycle wherein the consequences eventually manifest themselves, become known to the population, and motivate people to avoid or desist using. However, this cycle can range from several days to several decades, depending on how severe and obvious the acute and chronic effects are. Cigarettes have undergone one of the longest correction cycles observed so far and PCP and crack some of the shortest cycles of just a few years. We note that these cycles can be shortened by two intentional and purposeful activities—increased research on consequences and clinical monitoring for adverse effects, and more rapid dissemination of the adverse results to the population at risk. These constitute important ways in which science and education can help to reduce drug use, and have increasingly become the strategies pursued by the National Institute on Drug Abuse in recent years. (For example, NIDA pursued this strategy aggressively with the drug ecstasy.)

We also argue that through a process of vicarious learning, the public learns from the experience of "unfortunate public role models," whose own tragic consequences resulting from drug use have the effect of changing the risk others associate with the drug in question (Johnston, 1991). Examples include River Phoenix, John Belushi, Chris Farley, Len Bias, and Lyle Alzado. In fact, Alzado, who attributed his brain tumor to his longtime use of anabolic steroids, intentionally set out to present himself as a negative role model for young people. Based on this, we expected to see a change in perceived risk and perhaps in active steroid use among students, very much like the sharp drop in cocaine use (accompanied by a sharp increase in perceived risk) that occurred in the year after Len Bias' death in 1986. Our prediction was confirmed a year later. More recent examples include Tony Gwynn, who attributed his cancer and eventual death to chewing tobacco; Heath Ledger, who died of a prescription drug overdose; and Whitney Houston, who died as a result of her drug use. (Our findings on the importance of perceived risk are parallel in many ways to findings in the public health literature in other domains, and the similarities to the Health Belief Model are discussed in Johnston, 1991.)

We hypothesize that perceived risk operates on the relevant drug-using behavior directly, by increasing the expectation of negative health and other consequences, but also indirectly by influencing peer norms about the acceptability of using the drug (Bachman et al., 1990; Bachman et al., 1988; Johnston, 1985, 1991). Perhaps the clearest example of this indirect effect can be seen in the case of cigarettes, where norms about use have changed dramatically since the release of the 1984 Surgeon General's Report on the health consequences of smoking (US Public Health Service, 1964). In subsequent years, an additional factor became salient and contributed to a further change in the norms, namely an increased awareness of the effects of smoking on *others* in the smoker's environment. While most other drugs do not appear to involve a direct physiological impact from passive exposure to consumption of the drug, they have an analogous impact on people in the

user's role set who are adversely affected by the user's behaviors as a result of using the drug.[16] For example, heavy cocaine users, crack users, and crystal methamphetamine users are now understood to be dependent, and therefore desperate enough to steal from those around them in order to maintain their habit; heavy marijuana users are often seen as functioning poorly in their various social roles; and so on. Thus, we believe that disapproval of these drug-using behaviors has risen as a result of changes in the consequences perceived to be associated with their use, in particular the deleterious consequences for the users; but also the derivative consequences for others in the users' immediate environment. In any case, this expansion of our theoretical framework, with its emphasis on the direct and indirect effects of the risks perceived to be associated with various forms of drug use, has proven to be an exciting and, we believe, important one.

Self-reported reasons for use

Statistical association is not the only approach to determining why young people are using particular drugs. We have included questions asking the respondents their reasons for using each of a number of drugs, and have published several papers from those data (Johnston, 1998; Johnston & O'Malley, 1986; Patrick, Schulenberg, O'Malley, et al., 2011; Patrick & Schulenberg, 2011; Terry-McElrath et al., 2009).

Differentiating age, period, and cohort changes or "effects"

The second major aim of the MTF study is "to distinguish which of three fundamentally different kinds of change—age, period, and cohort—are occurring for various types of drug use, including the use of various forms of tobacco and alcohol." The study was specifically designed to facilitate the accomplishment of this aim by having a cohort-sequential design, meaning that multiple age cohorts (or in this case graduating class cohorts) are surveyed and then followed over time as they progress through various ages (up to age 55 so far). We have been addressing this aim for many years in our annual monographs, noting in particular the emergence of cohort effects for tobacco going back to the beginning of the study, of secular trends for most illicit drugs prior to the 1990s, and the emergence of cohort effects for most illicit drugs beginning in the 1990s (Johnston et al., 2014; Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015), and prior volumes. In addition, articles have specifically addressed the issue of separating age, period, and cohort effects and examining cohort effects in the MTF data (Keyes et al., 2012; Keyes et al., 2015; Keyes et al., 2011).

Comparison with Jessor and Jessor's Original Theoretical Approach

Those familiar with the theoretical work of the Jessors and colleagues will see a number of similarities between our own conceptual framework and that proposed by them for explaining problem behavior (Jessor & Jessor, 1977, p. 38). This is due in large part to the fact that both their work and ours (which began in the mid-1960s with Youth in Transition) grew out of the Lewinian

[16]The impact of a pregnant woman's drug use on the fetus is one important example of the direct effects of passive consumption, and it appears to operate for most drugs. Indeed, we have found evidence that concern about this type of derivative consequences has appreciably influenced the drug-using behaviors of pregnant women (Bachman, Johnston, et al., 1991).

field-theoretical approach, as well as the fact that both also draw heavily upon social learning theory. However, it may be useful to highlight some of the differences between the two theoretical frameworks. First, we do not include most of the elements listed under the general rubric of "socialization" in their conceptual framework (e.g., parental ideology, home climate, friends' interests). Secondly, our model, as illustrated in Figure 3, contains one major element not in the Jessor model—the role statuses held by the person—and , importantly, we emphasize the *cohort* of the person as a determining variable under ascriptive characteristics, permitting the examination of the relative importance of age, period, and cohort effects. Some other important differences are to be found in the variables listed under the personality and behavioral systems in the two frameworks. While we have considerably more variables dealing with role performance and role achievements, the Jessors include at least one additional "problem behavior" (i.e., sexual precocity) that we do not, primarily for practical reasons (i.e., the difficulty of including such measures in questionnaires that must be approved for in-school survey administration). The current study also lays a great deal more emphasis on a broad array of lifestyle orientations and other social values and attitudes, given the extensive measurement we devote to those areas. We also include more variables having to do with access to drugs, as well as the means for acquiring them. Under contextual determinants, we emphasize characteristics of high school and post–high school environment(s) in which the person is located. Finally, the emergent significance in our own work of the perceived risk associated with various types of drug use is another distinguishing characteristic of particular importance.

Another type of difference may be found in the fact that the Jessors and colleagues group their behaviors separately from the personality system, whereas we group all behaviors except the focal drug-using behavior with the personality system. Their approach is dictated partly by the fact that the Jessors define their dependent variable more broadly as "problem behavior," and most of their behavioral measures relate to this hypothetical construct. In Monitoring the Future we have a very wide range of behaviors, many of which we think have direct and indirect causal impacts on drug use; separating them from the focal behavior helps to make that clear. We have also concluded that a general deviance factor, such as the one posited by Jessor and Jessor (1977) under "problem behavior," accounts for only a part of the explainable variance in various forms of drug use (Osgood, Johnston, O'Malley, & Bachman, 1988). Further, our conceptual definition of "lifestyles," which comprises an important set of person characteristics to be related to drug use, can include not only attitudes and values but also behaviors. Therefore, grouping all of these person characteristics together in the framework helps to show that they will be examined together as we attempt to discover and document latent variables in the lifestyle domain.

Indexes versus Individual Variables

One noteworthy characteristic of the study has been the extent to which we treat many variables on a stand-alone basis, rather than combining them into scales or indexes—particularly the measures of drug use and drug-related attitudes and beliefs. We have done this because we have learned that each class of drugs varies differently over time (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015; Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015); and preceding volumes). Had they been treated in a combined way, much important and explainable variance would have been lost, along with key findings based on it. Likewise, attitudes and beliefs—in particular, perceived risk—tend to move quite independently over time for the different drugs, suggesting that much of what is learned about drugs is drug-specific—an important

theoretical finding in the current study. A global index of "perceived risk of drugs" would have lost much of the real action found for marijuana and cocaine, for example. In fact, we have separate measures of perceived risk associated with different patterns of use of any specific drug (for example, perceived risk of harm from experimental versus occasional versus regular use of cocaine); we have found these distinctions to be important. The most striking example came with cocaine, where usage rates did not change in the early 1980s, despite an increase in the perceived risk of regular cocaine use. Only when the risk associated with experimental or occasional use began to change—which occurred after 1986—did adolescents' use of cocaine begin to decline. In sum, these distinctions proved very important both theoretically and empirically.

We have built a number of indexes and used them extensively when that seemed appropriate, but we are also mindful that critical information can be lost in the process of combining variables. Where drug use and related attitudes are concerned, we believe that our propensities have been well rewarded over the years by the way in which reality has unfolded. If anything, our one regret is that we did not have information on additional individual drug classes, so that we could perform similar analyses to the ones we have conducted on marijuana and cocaine, on which we have full complements of measures.

Table 1. Classes of Abusable Substances Included in the Study[1]

- Any illicit drug[*]
- Any illicit drug other than marijuana[*]
- Any illicit drug, including inhalants[*]
- Cannabis[*], plus
  - Marijuana, specifically
  - Hashish, specifically
- Synthetic marijuana
- Hallucinogens[*], including
  - LSD[*], specifically
  - Hallucinogens other than LSD[*†]
  - PCP, specifically
  - MDMA[*] ("Ecstasy", "Molly")
- Sedatives[†], including
  - Barbiturates[*], specifically
  - Methaqualone, specifically
  - Rohypnol[*], specifically
- Tranquilizers[*†]
- Amphetamines[*†], plus
  - Methamphetamine[*]
  - Crystal Methamphetamine ("Ice"), specifically
  - Ritalin[*],
  - Adderall[*]
  - Stimulant-type and nonstimulant prescribed medication for ADHD[*]
  - Synthetic stimulants ("Bath salts")
  - Energy drinks
- Cocaine[*], plus
  - Crack[*], specifically
  - Powder cocaine[*], specifically
- Heroin[*]
  - Heroin with a needle[*]
  - Heroin without a needle[*]
- Narcotics other than Heroin[*†], including
  - OxyContin[*]
  - Vicodin[*]
- GHB[*]
- Ketamine[*]
- Inhalants[*]
- Alcohol[*], plus
  - Beer[*], specifically
  - Wine, specifically
  - Wine Coolers[*], specifically
  - Hard Liquor, specifically
  - Flavored Alcohol Beverages[*],
- Cigarettes[*AA]
- E-cigarettes
- Tobacco using a hookah
- Small and large cigars
- Kreteks[*a]
- Smokeless Tobacco[*], dissolvable tobacco, snus
- Anabolic Steroids[*]
- Androstenedione[*]
- Creatine[*‡]
- Over-the-Counter Psychoactive Substances, including
  - Diet Aids
  - Stay-Awake Stimulants
  - "Look-Alike" Stimulants
- Non-prescription Cough or Cold Medicines[*]
- Any drug by injection
- Salvia[*]
- Provigil

[1]All classes have been included in the 12th-grade base-year and the 12th-grade follow-up questionnaires except for a few that are not included in the follow-up questionnaires—Methaqualone, the nitrite inhalants, GHB, Ketamine, Ritalin, bidis, kreteks, androstenedione, creatine, and smokeless tobacco.

[*] Included in 8th- and 10th-grade questionnaires.

[†] A more detailed listing of specific drugs in this class is asked of 12th graders, and the results are reported annually in Appendix E of *Volume I* (Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015).

[‡] Not a psychoactive substance.

[a]These substances were dropped from the 8th- and 10th-grade questionnaires in 2006.

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