

Reviewing Theories of Adolescent Substance Use: Organizing Pieces in the Puzzle

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This article reviews 14 multivariate theories of experimental substance use (e.g., alcohol and marijuana use) among adolescents, including those theories that emphasize (a) substance-specific cognition & (b) social learning processes, (c) commitment to conventional values and attachment to families, and (d) intrapersonal processes. Important similarities and differences among these theories are addressed, as are the conceptual boundaries of each theory. In an attempt to integrate existing theories, a framework is proposed that organizes their central constructs into 3 distinct types of influence (viz., social, attitudinal, and intrapersonal) and 3 distinct levels of influence (viz., proximal, distal, and ultimate). Implications for future theory development are discussed.

Before any adolescents become dependent on tobacco, alcohol, or an illicit substance (e.g., marijuana), they pass through a stage of experimental substance use (ESU) during which they are not committed to continued use and during which a substance has not yet become a regular part of their lives (Clayton, 1992; Ray, d'Avernas, Best, Kersell, & Ryan, 1983). However, not all adolescents even enter this early stage of substance use. In fact, Johnston, O'Malley, and Bachman (1999) estimated that 77% of high school seniors in 1991 had not used marijuana in the preceding year, and 64% had never experimented with marijuana at any time in their lives. Of course, this still implies that a sizable portion of adolescents experiment with substance use.

Over the decades, social scientists have tried to understand why some adolescents do and others do not experiment with substances. However, understanding the causes of ESU has presented a challenging puzzle for social scientists. Moreover, as the number of constructs that apparently contribute to ESU has grown, so has the number of pieces in that increasingly complex puzzle. In a thorough review of research, Hawkins, Catalano, and Miller (1992) concluded that the pieces in the puzzle include

laws and norms favorable toward drug use; availability of drugs; extreme economic deprivation; neighborhood disorganization; certain psychological characteristics; early and persistent behavior problems including aggressive behavior in males; other conduct problems, and hyperactivity in childhood and adolescence; a family history of alcoholism and parental use of illegal drugs; poor family management practices; family conflict; low bonding to family; academic failure; lack of commitment to school; early peer rejection; social influences to use drug; alienation and rebelliousness; attitudes favorable to drug use; and early initiation of drug use. (p. 96)

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With so many potential causes, it is difficult to form a clear picture of ESU. However, by describing both how and why different constructs are related to ESU, numerous theories attempt to assemble various pieces from this puzzle into more coherent pictures of ESU. For instance, Elliott's social control theory (Elliott, Huizinga, & Ageton, 1985; Elliott, Huizinga, & Menard, 1989) describes the mechanisms by which neighborhood disorganization, attachment to families, and social values contribute directly to involvement with deviant peers and indirectly to involvement with ESU. By contrast, Brook, Brook, Gordon, Whiteman, and Cohen's (1990) family-interaction theory emphasizes how ESU is affected by parental support for, affection for, and control of a child.

In theory, it is argued, there is nothing so practical as a good theory. Good theories of ESU can organize that which appears disorganized, make sense out of seemingly unrelated phenomena, lend to the prediction of future events, guide the analysis of etiological data, and form the foundation of prevention programs (see Flay & Petraitis, 1991). In practice, however, existing theories of ESU have not been entirely practical. Careful reviews of the literature (e.g., Moncher, Holden, & Schinke, 1991) suggest that the puzzle of ESU is far from complete, and probably few social scientists would argue that existing theories successfully integrate current knowledge about the causes of ESU, make sense out of seemingly unrelated research findings, lead to accurate predictions regarding ESU, and form the foundation of effective prevention programs. In fact, Simons, Conger, and Whitbeck (1988) lamented that "while research has established a number of correlates of drug use, no theoretical model has been developed which specifies the causal ordering of these associations and explicates their relationship to each other" (p. 306). Stated another way, as social scientists we might be aware of many (if not most) of the constructs that contribute to ESU, but we do not yet know how all of these constructs (or pieces in the puzzle) fit together. As a result, we are currently without a clear, comprehensive, and coherent picture of what causes ESU and how to prevent it.

The current impracticality of etiological theories is not due to a lack of ideas. In fact, Lettieri, Sayers, and Pearson (1980)

reviewed 43 different theories of ESU which, taken together, address a broad range of constructs. However, the lack of practicality might be due to a lack of organization, comparison, and integration of existing theories (Flay et al., 1983; Sher, 1991). In the past, theories of ESU generally stood in isolation from one another and were rarely taken together. The theories posed by sociologists (e.g., Elliott et al., 1985), for instance, have emphasized different pieces from the puzzle, offered different strategies for assembling those pieces, and presented different pictures of ESU than the theories posed by social psychologists (e.g., Ajzen & Fishbein, 1980). Social psychologists, in turn, have offered theories that have emphasized different factors and presented different pictures of ESU than those emphasized by theorists oriented toward personality (Wills & Shiffman, 1985), development (Hawkins & Weis, 1985), or biology (Tarter & Blackson, 1991).

We believe that a clear picture of ESU cannot emerge until existing theories are first compared, organized, and, where possible, integrated. If theories of ESU are to be practical, we need to understand in what ways they are similar, in what ways they are different, in what ways they overlap, and where there are gaps among them. Consequently, we describe in this article the theoretical assertions, practical applications, methodological considerations, and conceptual boundaries of 14 of the most prominent theories of ESU. Then, in an attempt to clarify the field, we offer a framework for organizing the constructs from existing theories of ESU.

Although our primary focus is on describing the assertions, applications, and boundaries of existing theories, we do review some of the empirical support for these theories. Our review, however, is not a comprehensive summary of all support for or against each theory. Such a review would be beyond the scope of any one article. Rather, our empirical review merely highlights some cross-sectional and longitudinal studies that address critical issues for each theory. We also describe some methodological concerns with the way different theories have been tested in the past.

When reviewing existing theories of ESU, we have excluded those theories that focus on only one or two constructs, opting to review only the more comprehensive, **multivariate** theories. In particular, we review (a) two theories that focus primarily on cognitive causes of ESU, (b) two theories that focus on social learning processes, (c) two theories that describe how weakened commitment to conventional values and weakened attachment to families affect ESU, (d) four theories that detail how intra-personal characteristics and personality traits of adolescents contribute to ESU, and (e) four integrative theories that incorporate cognitive, learning, commitment/attachment, and intra-personal influences.

Our review emphasizes the degree to which these theories focus on relatively proximal causes of ESU (e.g., intentions to use substances) or relatively far-removed and indirect causes of ESU (e.g., childrearing practices). This review also distinguishes between constructs that these theories do and do not address. However, this attention should in no way imply that theories are misleading or invalid unless they address all potential causes of ESU. In fact the theories we review were selected because they all have empirical support and they all help clarify part of the puzzle of ESU. This attention is merely intended to help artic-

ulate the foci and conceptual boundaries of existing theories. The reader of this article should keep in mind, of course, that our review provides only one **summarial** description of each theory. Therefore, readers are strongly encouraged to study the original theoretical publications for complete, firsthand descriptions of each theory. The reader should also keep in mind that our review only focuses on 14 theories. We do believe, however, that it captures the dominant theories in the field. Moreover, the theories we have selected (a) individually have replicated empirical support from longitudinal studies of ESU, and (b) collectively appear to capture the bulk of known predictors of ESU.

Multivariate Theories of Experimental Substance Use

Cognitive-Affective Theories of Experimental Substance Use

Numerous theories focus on how beliefs about the consequences of ESU contribute to adolescents' ESU. More specifically, numerous theories focus on how perceptions about the costs and benefits of ESU contribute to adolescents' decisions to experiment with various substances. These models share the assumptions that (a) the primary causes of decisions to use substances lie in the substance-specific expectations and perceptions held by adolescents and (b) the effects of all other variables—including, for example, adolescents' personality traits or involvement with peers who use substances—are mediated through their effects on substance-specific **cognitions**, evaluations, and decisions. Among the most encompassing of these cost-benefit/decision-making models are the theory of reasoned action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and the theory of planned behavior (TPB; Ajzen, 1985, 1988).¹ Although these two theories were developed as models of behavior in general and not as models of ESU in particular, they have been applied successfully to understanding the causes of ESU.

Theory of reasoned action. According to Ajzen and Fishbein's (1980) TRA, ESU is determined exclusively by an ado-

¹ The health beliefs model (HBM; Becker 1974; Janz & Becker, 1984) and Rogers' (1983; Maddux & Rogers, 1983) protection motivation theory (PMT) are additional cognitive theories that could be applied to adolescent ESU. When applied to ESU, the HBM focuses on perceptions of the risks, costs, and benefits of ESU. By contrast, PMT focuses on three beliefs about abstaining from ESU and three beliefs about using substances. According to Rogers, adolescents will be at risk for ESU if they (a) think that abstaining from ESU can produce unwanted consequences, such as peer rejection, (b) feel personally susceptible to the unwanted consequences of abstinence, (c) think the unwanted consequences of abstinence outweigh the dangers of ESU, (d) believe that ESU will produce certain benefits, such as feeling euphoric, (e) believe that the benefits of ESU outweigh the costs of ESU, and (f) feel personally capable of using substances. However, all of the substance-specific beliefs that make up the HBM and PMT theories can be subsumed under Ajzen's (1985, 1988) TPB. For instance, Ajzen's model would integrate the HBM's perceptions of risks, costs, and benefits into a single construct, called *attitudes toward the behavior*. Similarly, Ajzen's model would integrate the first five beliefs from PMT into *attitudes* and integrate the sixth belief into *self-efficacy*. Consequently, Ajzen's theory can supplant both the HBM and PMT.

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lescent's decisions or reasoned intentions to engage in substance-specific behaviors. In turn, these decisions are determined exclusively by two cognitive determinants. First, TRA claims that intentions are **affected** by adolescents' attitudes regarding their own ESU. Adopting a value-expectancy approach to attitudes (Edwards, 1954; Feather, 1982), Ajzen and Fishbein posited that substance-specific attitudes are a mathematical function of both the personal consequences (i.e., costs and benefits) that adolescents expect from ESU and the affective **value** they place on those consequences. Presumably, youths should hold positive attitudes toward ESU if the **expected benefits of substances** are valued more than the expected costs. Second, TRA claims that decisions are affected by an adolescent's beliefs regarding the social norms surrounding ESU. According to TRA, social normative beliefs are based on an adolescent's perception that others want him or her to use substances and on the adolescent's **affective** motivation to comply with (or desire to please) the substance-specific wishes of those people. Presumably, youths will feel strong pressure to use substances if they believe, rightly or wrongly, that important friends and family members endorse ESU. They might **also** feel strong pressure to use substances if they overestimate the prevalence of ESU use among peers and adults in general (Chassin, Presson, Sherman, Corty, & Olshavsky, 1984).

Demonstrating the predictive power of TRA, Ajzen, Timko, and White (1982) found that over a 3-week period 64% of the variance among college students' decisions to use marijuana could be predicted from only two variables: attitudes toward and social normative beliefs regarding marijuana use. Furthermore, studies have shown that nationwide **use of a specific substance** (e.g., crack) among high school students usually declines following increases in the perceived **risk and social disapproval** associated with that substance (Bachman, Johnston, & O'Malley, 1990; Bachman, Johnston, O'Malley, & Humphrey, 1988).

Despite its empirical power, a central assertion of TRA can be challenged. TRA insists that ESU can be explained completely by substance-specific decisions, attitudes, and normative beliefs. Challenging this assertion, at least three studies have found that other variables, such as prior experiences with ESU, have direct influences on substance-specific behaviors (Bentler & Speckart, 1979; Chassin et al., 1984; Schlegel, d'Avernas, Zanna, DiTecco, & Manske, 1987). Even Ajzen (1985, 1988) subsequently acknowledged that intentions are affected by more than just attitudes and normative beliefs regarding a particular behavior.

Theory of planned behavior: In an important modification of TRA, Ajzen (1985, 1988) claimed that three, not two, constructs affect behavioral intentions. In addition to attitudes and normative beliefs, Ajzen's TPB posits that self-efficacy (i.e., perceptions of control over the successful completion of a particular behavior) will directly affect intentions and behaviors.² Self-efficacy specifically represents the 'perceived ease or difficulty of performing the behavior' (Schifter & Ajzen, 1985, p. 844). According to TPB, self-efficacy plays a crucial and independent role in shaping behavioral intentions such that people will have little intention to perform a behavior that they feel is beyond their ability or control, even if they hold positive attitudes toward that behavior and expect approval from others.

When applied to ESU, two forms of self-efficacy are impor-

tant. One form, which we call *use self-efficacy*, represents adolescents' beliefs in their abilities to obtain **and successfully use** substances. According to TPB, some adolescents start using alcohol and illicit substances in part because they know where to obtain them **and how to use them**. For instance, not knowing how to mix alcoholic drinks to mask any unpleasant tastes or not knowing how to roll **and inhale** marijuana cigarettes might deter alcohol and marijuana use. The second form, which we call *refusal self-efficacy*, represents adolescents' beliefs in their abilities to resist social pressure to begin using substances. Accordingly, adolescents might have no long-term plans to begin using substances **but** still not have the skills that are necessary to refuse when faced with **peer** pressure to engage in substance use. In these examples, adolescents' abilities to control their behaviors independently contribute to their ESU.

Recently, studies have found support for the independent role of refusal self-efficacy. In particular, DeVries and colleagues (DeVries, Dijkstra, & Kuhlman, 1988; DeVries, Kok, & Dijkstra, 1990; Kok, DeVries, Muddle, & Strecher, 1991)³ have reported that adolescents' beliefs in their abilities to resist pressures to smoke added significantly to the prediction of cigarette use. Moreover, marijuana use appears related to an adolescent's inability to resist social pressures to drink alcohol, smoke cigarettes, and use other drugs (Wills, Baker, & Botvin, 1989). Similarly, other studies (e.g., Basen-Engquist & Parcel, 1992; Jemmott, Jemmott, & Hacker, 1992; Schifter & Ajzen, 1985; Tedesco, Keiffer, & Fleck-Kandath, 1991) have shown that perceived self-efficacy can account for significant portions of variance in myriad health-related behaviors. Thus, when compared with TRA, the inclusion of self-efficacy has made TPB a more encompassing theory of ESU.

Applications of the cognitive-affective theories. Although TRA and TPB help predict ESU, they also allude to some ways of preventing it. According to these theories, the roots of ESU are found in adolescents' beliefs about substances. Consequently, the key to preventing ESU is through persuasive messages that directly target substance-specific beliefs. Four beliefs are particularly important. First, persuasive messages should

² Although Ajzen's (1985, 1988) model does not acknowledge the similarities, its emphasis on individual differences in perceived behavioral control seems equivalent to Bandura's (1982) emphasis on differences in self-efficacy. It is our opinion that these two terms can be used interchangeably, and we use the more common term, *self-efficacy*, throughout this article.

³ DeVries and colleagues (DeVries, Dijkstra, & Kuhlman, 1988; DeVries, Kok, & Dijkstra, 1990) have proposed a theory that uses the same constructs used by Ajzen (1985, 1988) in the TPB (viz., attitudes, subject norms, and efficacy expectations). Like Ajzen, DeVries and colleagues contended that adolescents will be at risk for ESU if they (a) expect that a substance will produce more positive than negative consequences, (b) think that other people want them to use a substance, and (c) feel capable of performing substance-specific behavior. Supporting the model, DeVries et al. (1990) found that the prediction of cigarette smoking was significantly enhanced by including adolescents' beliefs in their ability to remain nonsmokers. Adolescents in DeVries et al.'s (1990) study were more likely to remain nonsmokers if they held negative attitudes toward smoking, perceived social pressure to avoid smoking, and believed that they were personally capable of remaining nonsmokers.

increase adolescents' expectations regarding the adverse consequences of ESU (e.g., health dangers) and decrease their expectations regarding the potential benefits of ESU (e.g., social approval or coping with stress). Second, messages should alter adolescents' evaluations of the apparent costs and benefits of ESU, somehow giving more potent evaluations of the costs and less potent evaluations of the benefits. For instance, messages could present the health risks of ESU as "more costly" and evaluate them more strongly by graphically depicting substance-specific risks. Third, messages should challenge adolescents' perceptions concerning the normative nature of ESU, perhaps challenging any inflated estimates of the prevalence of ESU among peers. Finally, messages should provide adolescents with information and skills that directly promote feelings of refusal self-efficacy and, as a result, indirectly prevent ESU.

Boundaries of cognitive-affective theories. By focusing on substance-specific beliefs, TRA and TPB are based on some of the strongest predictors of ESU. In particular, the studies cited in the previous paragraphs suggest that adolescents begin ESU after (a) forming impressions about the costs and benefits of ESU, (b) developing positive attitudes toward ESU, (c) coming to believe that other people endorse ESU, (d) doubting their ability to refuse pressures to use substances, and (e) forming some intentions to use substances in the future.

However, the focus on substance-specific beliefs raises two concerns. The first is a methodological concern. In particular, it is unclear whether substance-specific beliefs are primarily a cause or primarily a consequence of ESU. Although cognitive-affective theories argue that substance-specific beliefs are primarily a cause of ESU, these beliefs are also a likely consequence in that adolescents who experiment with a substance might subsequently change their beliefs and intentions regarding future ESU, forcing their beliefs and intentions to conform with their past behaviors (see Stacy, Bentler, & Flay, 1994). This might even be true in longitudinal studies that (a) have short intervals between the measurement of substance-specific beliefs at Time 1 and the measurement of ESU at Time 2 and (b) do not control for ESU at or prior to Time 1.

The second concern is more theoretical. By focusing only on adolescents' substance-specific beliefs, both TRA and TPB do little to explain the long-term roots of ESU. For instance, although TPB clearly describes how ESU can be predicted from attitudes, norms, and self-efficacy, it cannot explain why some adolescents hold positive attitudes toward ESU, expect other people to approve of ESU, desire to please other people who endorse ESU, or believe they are capable of using substances. Stated another way, TRA and TPB focus on the effects of substance-specific cognitions but not on their causes.

This criticism of TRA and TPB, however, must be tempered by recognition that neither was specifically developed as a comprehensive model of ESU. Rather, these theories were developed as models of behavior in general and as models that emphasize the most immediate and most proximal causes of behavior. As such, scholars should not expect these theories to identify all of the factors (especially any distal factors) that affect ESU in particular. Moreover, the value of these theories might come from their ability to integrate other theories that focus on ESU specifically and that emphasize less immediate and more distal causes of ESU. Quite possibly, the core constructs of these theories

(e.g., substance-specific decisions, attitudes, normative beliefs, and self-efficacy) are not only among the most consistent predictors of ESU but are also the constructs through which more distal factors exert their influence over ESU. Consequently, despite their very proximal focus, TRA and TPB are important models of ESU that clearly describe some of the pieces in the puzzle and leave other pieces to be described by other theories.

Social Learning Theories of Experimental Substance Use

Other theorists have shifted attention away from the substance-specific beliefs of adolescents and toward the possible causes of those beliefs. As early as 1939, sociologist Edward Sutherland's differential association theory identified one of those causes by suggesting that delinquent behaviors (such as ESU and crime) are socially learned in small, informal groups. Subsequent sociologists (e.g., Akers, 1977) and cognitively oriented psychologists (e.g., Bandura, 1977, 1986) have built upon Sutherland's (1939) assertion that adolescents acquire their beliefs about delinquent behaviors from their role models, especially close friends and parents. Thus, when compared with cognitive-affective theories, the following social learning theories of ESU focus on interpersonal or social influences as much as cognitive-affective influences.

Social learning theory As with the cognitive-affective theories, Akers' (Akers, 1977; Akers & Cochran, 1985; Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979; Krohn, Akers, Radosevich, & Lanza-Kaduce, 1982) social learning theory (SLT) assumes that substance-specific cognitions (called *definitions* in the language of SLT) are the strongest predictors of adolescent ESU. However, SLT does not assume that the roots of ESU originate in an adolescent's own substance-specific cognitions. Rather, SLT begins at a more distal point and assumes that ESU originates in the substance-specific attitudes and behaviors of people who serve as an adolescent's role models.

Specifically, SLT asserts that an adolescent's involvement with substance-using role models is likely to have three sequential effects, beginning with the observation and imitation of substance-specific behaviors, continuing with social reinforcement (i.e., encouragement and support) for ESU, and culminating in an adolescent's expectation of positive social and physiological consequences from future ESU. The anticipated consequences of ESU might be largely social in nature during experimental use (taking the form of acceptance or rejection by peers) and might become largely physiological in nature during subsequent stages (taking the form of positive or negative physiological reactions to the substances themselves). Much like the cognitive-affective theories, SLT concludes by asserting that an adolescent who expects substances to produce more personal benefits than costs will be at risk for ESU.

Social cognitive/learning theory Bandura's (1986) social cognitive/learning theory (SC/LT), when applied to ESU, also argues that adolescents acquire their beliefs about ESU from their role models, especially close friends and parents who use substances. Specifically, SC/LT asserts that exposure to friends and parents who use substances will shape ESU by shaping two substance-specific beliefs. First, observing role models who ex-

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periment with substances will directly shape adolescents' outcome expectations, which are their beliefs about the most immediate and most likely social, personal, and physiological consequences of ESU (cf. the expectancy component of attitudes in TPB). Thus, observing parents use alcohol to relax or observing peers smoke marijuana to smooth social interactions will shape adolescents' beliefs about the consequences of, and their attitudes toward, their own ESU.

SC/LT goes beyond SLT by including the concept of self-efficacy. Bandura (1977, 1982) has posited that role models can shape both use self-efficacy and refusal self-efficacy. For instance, observing peers buy and inhale marijuana cigarettes can provide adolescents with the necessary knowledge and skills to obtain and use marijuana. Conversely, observing a close friend resist the pressures to use alcohol can boost an adolescent's refusal skills and self-efficacy by displaying the necessary skills to avoid using alcohol.

Moreover, adolescents probably do not have to observe ESU among influential role models for ESU to be socially modeled and reinforced. In fact, simply hearing influential role models speak favorably about ESU and people who use substances might promote the onset of ESU. Therefore, the causes of ESU might be found among (a) ESU by parents, close friends, and other role models and (b) favorable statements or attitudes toward ESU by such role models, especially close friends and admired peers who endorse ESU.

Empirical evidence supporting both SLT and SC/LT suggests that role models might contribute strongly to adolescents' use of alcohol and illicit drugs. For example, marijuana use is more common among adolescents who have talked to friends about using illicit drugs (Kandel, Kessler, & Margulies, 1978), have friends who hold positive attitudes toward marijuana use (Bailey & Hubbard, 1990; Kandel et al., 1978), have friends who use cigarettes, alcohol, marijuana, and narcotics (see Huba, Wingard, & Bentler, 1980b; Kandel et al., 1978), and have been offered cigarettes, marijuana, alcohol, and pills by their friends (Huba et al., 1980b; Kandel et al., 1978). Moreover, Akers et al. (1979) found that nearly half of the variance in alcohol use and nearly two thirds of the variance in marijuana use could be predicted from adolescents' perceptions that significant adults, peers, and close friends approve of alcohol and marijuana use.

However, this empirical support must be viewed as somewhat tentative because of the possibility that peer ESU might be a consequence of an adolescent's own ESU rather than a cause. Along this line, Fisher and Bauman (1988) argued that the strong relationship between peer ESU and an adolescent's own ESU stems less from peer influences (as described by social learning theories) than from the process of friendship selection, whereby adolescents who experiment with substances seek out and befriend other peers who also experiment (see also Flay et al., 1983). This tendency for birds of a feather to flock together can even explain findings from longitudinal studies if ESU at Time 1 is not controlled when assessing the relationship between peer ESU at Time 1 and an adolescent's own ESU at Time 2.

Application of social learning theories. There are important similarities between the cognitive-affective theories (reviewed above) and the social learning theories. The cognitive-affective theories and social learning theories all assume that substance-

specific beliefs are the most immediate and direct cause of ESU, and all of these theories assume that expectations about the personal consequences of ESU are critical beliefs. However, unlike the cognitive-affective theories, which suggest that a key to ESU prevention is to alter adolescents' substance-specific beliefs, the social learning theories suggest that a key to prevention lies in making substance-using role models less salient and substance-abstaining role models more salient. Bandura's SC/LT suggests that an additional key to prevention lies in teaching refusal skills and enhancing refusal self-efficacy.

Boundaries of social learning theories. When compared with the cognitive-affective models of Ajzen and Fishbein (1980) and Ajzen (1985, 1988), which emphasize the effects of substance-specific beliefs, the social learning theories adopt a slightly more distal focus by describing one key cause of substance-specific beliefs: the substance-specific attitudes and behaviors of influential role models. Despite this more distal focus, however, the social learning theories leave an important issue unresolved: Why do some adolescents become involved with role models who use or approve of ESU while other adolescents avoid such involvement? Although the social learning theories carefully describe what happens after adolescents become involved with substance-using peers, they do not explain why some adolescents associate with substance-using peers in the first place. For theorists who focus on adolescents' commitment to conventional values and emotional attachments with family and peers (described next), the focus of social learning theories, although important, does not address the long-term causes and more distal pieces in the puzzle of ESU. Furthermore, for theorists who emphasize personality traits and intra-personal characteristics (described later) as causes of ESU, social learning theories do not address other critical pieces in that puzzle.

Conventional Commitment and Social Attachment Theories of Experimental Substance Use

Like social learning theories (described above), Elliott's (Elliott et al., 1985, 1989) social control theory (SCT) and Hawkins and Weis's (1985) social development model (SDM) assume that emotional attachments to peers who use substances is a primary cause of ESU. However, unlike social learning theories, these two theories focus on the causes of those attachments, specifically targeting weak conventional bonds to society and institutions and individuals who discourage deviant behaviors, including ESU.

These theories are based, in large part, on classic sociologic theories of control (see Hirschi, 1969; Reckless, 1961; Shoenmaker, 1990), which argue that the deviant impulses that all people presumably share are often held in check or controlled by strong bonds to conventional society, families, schools, and religions. However, for some adolescents, such controlling influences are missing. Consequently, adolescents who have weak conventional bonds will not feel controlled by or compelled to adhere to conventional standards of behavior.

In these theories, the phrase *weak conventional bonds* is used to mean two things. First, it means a lack of commitment to conventional society, its values, and its institutions and socializing forces, especially schools and religions. Assuming that con-

ventional society, school personnel, and religions oppose ESU (and any other deviant behavior), these theories contend that adolescents who feel uninvolved with, uncommitted to, or alienated from conventional society, school, and religion will not internalize conventional values or standards for conventional behavior. Consequently, adolescents who are uncommitted to conventional society and do not endorse its values are more likely to become attached to substance-using peers and, consequently, more likely to experiment with ESU than adolescents whose commitment to conventional society and internalized standards for conventional behavior serve to control their behaviors. Second, *weak conventional bonds* also means weak attachment to conventional role models, including teachers, family members, and especially parents. Assuming that conventional role models (especially parents) encourage conventional behaviors and oppose deviant behaviors (such as ESU), these theories also contend that adolescents who feel detached or estranged from their conventional influences are likely to form attachments with peers who use substances and encourage ESU among others.⁴

Common support for these theories comes from studies that show that ESU is more common among adolescents who are socially nonconforming, independent, critical, alienated, or rebellious (see Baumrind, 1985; Block, Block, & Keyes, 1988; Jessor, Donovan, & Costa, 1991; Jessor & Jessor, 1977; Kandel et al., 1978; Kaplan, Martin, Johnson, & Robbins, 1986; Kaplan, Martin, & Robbins, 1984; Pedersen, 1991; Shedler & Block, 1990; Simcha-Fagan, Gersten, & Langer, 1986; Smith & Fogg, 1979; Stein, Newcomb, & Bentler, 1986, 1987a, 1987b; White, Pandina, & LaGrange, 1987); who feel detached from their families, their school, and religions (see Bailey & Hubbard, 1990; Brook et al., 1990; Elliott et al., 1985; Jessor et al., 1991; Jessor & Jessor, 1977; Kandel et al., 1978; Kandel, Simcha-Fagan, & Davies, 1986; McBride, Joe, & Simpson, 1991; Stein et al., 1987a, 1987b); and who are involved with deviant peers (Elliott et al., 1985; Jessor et al., 1991; Jessor & Jessor, 1977; McBride et al., 1991; White et al., 1987).

Finally, these theories share a common assumption that weak conventional commitment and weak attachment to teachers, families, and parents initiates a move toward ESU that is continued by social learning. Together, commitment and attachment theories assert that when adolescents hold weak bonds to conventional society, they will feel they have little to lose through attachment to deviant peers. These theories then argue that adolescents, once attached to deviant peers, are likely to observe, imitate, and be socially rewarded for a variety of deviant behaviors, including ESU. Thus, weak conventional commitment and weak attachments to conventional role models begin the movement toward ESU that is continued by modeling, social pressures, and social learning. These theories differ, however, in the factors that are thought to weaken commitment to conventional society and attachment to conventional role models.

Social control theory Elliott's (Elliott et al., 1985, 1989) SCT focuses on three possible causes of weak commitment to conventional society and weak attachment to conventional role models. One of those causes is *strain*, which is defined as the discrepancy between adolescents' aspirations (e.g., academic or occupational goals) and their perceptions of the opportunities

to achieve those aspirations. SCT asserts that adolescents who feel that their academic or career aspirations are being frustrated by their educational and occupational options will feel uncommitted to conventional society and, consequently, will become more attached to deviant peers who use substances and encourage ESU. Furthermore, some adolescents might feel strain at home because they want but are not receiving closer relationships with their parents. According to SCT, strain at home will (a) weaken attachments with parents who generally oppose ESU, and (b) encourage attachments with peers who more frequently encourage ESU. Thus, SCT includes school strain, occupational strain, and home strain among the first causes of weak commitment to conventional society.

A second cause is social disorganization, which represents "the weakness or breakdown of established institutions" (Kornhauser, 1978, p. 52) or the inability of "local institutions to control the behavior of the residents" (Farrington et al., 1990, p. 310). As such, SCT implies that adolescents feel uncommitted to conventional society if they come from disorganized neighborhoods where crime and unemployment are common, where schools are ineffective, and where failed social institutions offer adolescents little hope for the future. They might also feel less attachment to parents if they come from disorganized families where, for instance, only one parent is present or the parents have divorced.

Finally! SCT asserts that conventional commitments and attachments to conventional role models are the result of effective socialization into conventional society. Even if adolescents (a) do not feel strain because of frustrated interpersonal, educational, and occupation opportunities and (b) do not come from disorganized neighborhoods and families, they might still become attached to substance-using peers if they have not been socialized (presumably by parents) to adopt conventional standards.

There is empirical support for this focus on strain and social disorganization. Supporting the contributions of school strain, several longitudinal studies have shown that ESU is more common among adolescents who have poor academic grades or were ill-prepared for school (Bailey & Hubbard, 1990; Elliott et al., 1985; Jessor et al., 1991; Kandel et al., 1978; Kaplan et al., 1984; Smith & Fogg, 1979; White et al., 1987). Similarly, other findings suggest that home strain contributes to ESU, showing that ESU is more common among adolescents and young adults who at earlier points reported frequently arguing with their parents, feeling rejected by their parents, or wanting closer relationships with their families (Elliott et al., 1985; Kaplan et al., 1986). Finally, some studies demonstrate the contributions of social disorganization, showing that ESU is more common among adolescents from disrupted homes where parents have separated or divorced or

⁴ In addition to weak commitment to conventional society and weak attachment to conventional role models, Hirschi (1969) would argue that *weak conventional bonds* also means (a) participating in conventional activities, such as participating in organized sports, and (b) believing that substantial amounts of personal time, money, and effort are invested in conventional behaviors.

where there is only one parent (Baumrind, 1985; Kandel et al., 1978; Stein et al., 1987a).⁵

The social development model. Much like Elliott's SCT, the SDM (Hawkins & Weis, 1985) suggests that adolescents become attached to substance-using peers if they feel uncommitted to conventional society or unattached to their parents and other conventional role models. However, the causes of conventional commitment and attachment differ in these two models. SCT focuses largely (but not exclusively) on social systems by targeting academic and occupational strain, disorganization among social institutions (e.g., local economies, schools, and families), and inadequate socialization. In contrast, the SDM focuses more on individuals, their social development, and their immediate social interactions.

This focus is achieved by assuming that the relative influence that families, schools, and peers wield over an adolescent's behavior shifts developmentally, with parents dominating preschool years, teachers dominating preadolescent years, and peers dominating behaviors during adolescence. The SDM also targets adolescents' skills, opportunities, and reinforcement for involvement with parents and schools, both of which presumably discourage ESU. In particular, the SDM posits that adolescents are especially likely to become involved with substance-using peers if, during earlier developmental stages, they had (a) infrequent opportunities for rewarding interaction at home and school, (b) few of the necessary interpersonal and academic skills for successful and rewarding interactions at home and school, and (c) received little reinforcement during their interactions with parents and teachers.

The role of positively reinforced interactions, interpersonal skills, and academic skills is supported by several studies. In particular, ESU is more common among adolescents and young adults who report feeling rejected by their parents (Kaplan et al., 1984, 1986) and wanting closer relationships with their families (Elliott et al., 1985). ESU is also more common among youths who are interpersonally aggressive (Block et al., 1988; Johnston, O'Malley, & Eveland, 1978; Kellam, Brown, & Remington, 1982), hostile (White et al., 1987), have difficulty getting along with others (Block et al., 1988), and who have weak academic skills (Bailey & Hubbard, 1990; Kandel et al., 1978, 1986; Shedler & Block, 1990).

This focus on adolescents' interpersonal and academic skills is particularly noteworthy for three reasons. First, unlike the previous theories, the SDM implies that the prevention of ESU requires the nurturing of interpersonal and academic skills among children, long before they form substance-specific beliefs as adolescents and become involved with substance-using peers. Second, this focus suggests that some origins of ESU are found in individual differences among adolescents themselves and are not found solely in differences among their social institutions, economic conditions, schools, and neighborhoods (cf. SCT). Consequently, the SDM presents a dynamic model of ESU in which the individual characteristics of adolescents simultaneously influence and are influenced by interactions with conventional and deviant role models. When they lack interpersonal and academic skills, or when these skills are not rewarded by parents and teachers, adolescents might feel they have little to lose by becoming involved with deviant peers who encourage ESU. Third, this focus on interpersonal and academic skills is

also noteworthy because it sets the stage for the next set of theories, which are based on the intrapersonal characteristics and individual differences among adolescents.

Applications of commitment and attachment theories. Taken together SCT and the SDM suggest that attachment to substance-using peers (and, by implication, ESU) is caused by (a) frustrated academic and occupational expectations, (b) inadequate social and academic skills, (c) weak attachment to and inadequate reinforcement from parents and other conventional role models, (d) disorganized neighborhoods and families, and (e) improper socialization. Therefore, all of these factors are potential pieces of ESU prevention programs. For instance, programs might deter some ESU by boosting adolescents' academic and career skills or by providing adolescents with realistic appraisals of academic and career opportunities. Programs might also deter ESU by teaching parents how to reinforce and socialize their children. Furthermore, social or economic programs that promote the growth and stability of neighborhoods might have a side effect of decreasing ESU. It is worth noting that none of these methods of ESU prevention directly target adolescents' substance-specific beliefs or exposure to substance-using role models. Rather, they focus on more long-term and less direct causes of ESU.

Boundaries of commitment and attachment theories. SCT and the SDM share common predictions, asserting that adolescents are at risk for ESU if they feel alienated from conventional values, uncommitted to school, and detached from their families, parents, and conventional role models. In contrast to their heavy emphasis on conventional commitment and social attachment, however, these theories place less emphasis on two other influences. First, they deemphasize the role of substance-specific cognitions by arguing that attachment to substance-using peers affects ESU directly. By comparison, research by Goidman, Brown, Christiansen, and Smith (1991) suggests that involvement with substance-using role models might only affect ESU indirectly through its effects on substance-specific beliefs, expectations, and memories. Moreover, cognitive-affective theories of ESU (e.g., Ajzen, 1985, 1988) suggest that before adolescents use substances, they will envision and weigh the potential consequences of ESU, evaluate the costs and benefits of ESU, gauge their capabilities to use or refuse substances, and, on the basis of an evaluative weighing of these cognitive factors, make a decision about ESU. Although weak conventional commitment, weak attachment to parents, and deep involvement with substance-using peers might profoundly influence decisions about ESU, cognitive-affective models suggest they are

⁵ Interestingly, some evidence indirectly contradicts SCT. A central assumption of SCT is that adolescents who feel they have little to lose through socially deviant behaviors will be at risk for ESU. If it can be assumed that adolescents from families in low socioeconomic strata have less to lose through deviance than adolescents with higher socioeconomic status (SES), then according to SCT, ESU ought to be more common among the former than the latter. However, some studies have actually found the opposite, showing that ESU is positively related to the SES of adolescents' families (Baumrind, 1985; Kandel et al., 1978; Kaplan et al., 1986; Simcha-Fagan et al., 1986). As one reviewer of this article pointed out, these findings suggest a curvilinear relationship between SES and ESU. If so, some gains in commitment to conventional values among upper-SES adolescents are offset by their financial ability to obtain illicit substances.

only some of the many factors that contribute to substance-specific beliefs.

Second, commitment and attachment theories focus comparatively little attention on individual differences among adolescents. This is particularly true of Elliott's SCT, which emphasizes the role of social institutions, schools, local economic conditions, and neighborhoods. Although commitment and attachment theories point toward three individual-difference factors as potential origins of ESU (viz., strain, interpersonal skills, and academic skills), they do not address many of the intrapersonal characteristics, personality traits, and affective states that fill more prominent roles in the next set of theories. Therefore, just as with the cognitive-affective theories and social learning theories, scholars should remain aware of the boundaries around commitment and attachment theories and the pieces in the ESU puzzle that they do and do not address.

Theories in Which Intrapersonal Characteristics Play Key Roles

The previous theories focused attention on adolescents' social settings, suggesting that adolescents will be at risk for ESU if (a) they are surrounded by **peers** or adults who use substances and encourage ESU and (b) their communities and families leave them little reason to commit to conventional values or bond to parents. By contrast, the next four theories build upon previous theories by focusing more equal attention on both the characteristics of adolescents' social settings (e.g., **peers**, communities, and families) and the characteristics of adolescents themselves (e.g., their self-esteem and coping skills).

In particular, the next four theories all assume that within a given social setting, adolescents will differ from each other in their attachment to substance-using peers and their motivation to use substances. They also assume that these individual differences have some (although certainly not all) of their most important roots in adolescents' relatively permanent personality traits, more transient affective states, and behavioral skills. As such, they are similar to recent theories by sociologists, who have argued that adolescents are at risk for criminal behavior if they are "impulsive, insensitive, physical (as opposed to mental), risk-taking, short-sighted, and nonverbal" (Gottfredson & Hirschi, 1990, pp. 90-91). The next four theories of ESU differ from each other, however, on which intrapersonal characteristics (i.e., traits, states, and skills) are thought to cause ESU.

The social ecology model. In both SCT (Elliott et al., 1985) and the SDM (Hawkins & Weis, 1985), the underlying causes of ESU are lack of attachment to families and lack of commitment to conventional values. Presumably, adolescents who are not attached to their families and not committed to school have little to lose by associating with deviant **peers** or by using substances. However, Kumpfer and Turner (1990-1991) offered a different view of ESU. According to their social ecology model (SEM), the underlying cause of ESU is stress in general and **school-related** stress in particular. Presumably, adolescents who find school to be stressful or unpleasant are likely to withdraw from school-related activities, seek out deviant peers as ways of escaping stress, and, consequently, be rewarded for ESU. Moreover, the SEM suggests that low academic self-efficacy is a primary cause of school-related stress. As a result, the SEM asserts

that adolescents are at risk for involvement with deviant peers and ESU if they have doubts about their own academic skills or feel that their schools are stressful, unrewarding environments.

In a cross-sectional test of this model, Kumpfer and Turner (1990-1991) reported that youths who held negative perceptions of and felt detached from schools were more likely to associate with deviant peers and more likely to use substances. There are discrepancies, however, between the nature of the constructs in the SEM and the nature of variables in Kumpfer and Turner's study. Specifically, the SEM is based, in part, on academic self-efficacy but it has only been tested using measures of self-esteem. Consequently, support for this theory is somewhat circuitous and limited to one cross-sectional study. Nonetheless, the merit of the SEM is that (a) it amplifies the roles of the school environment and adolescents' perceptions of their own academic abilities and (b) it implies that ESU can be prevented through programs that promote academic skills and students' sense of academic mastery and through programs that make schools more rewarding environments.

Self-derogation theory. Rather than focusing specifically on academic stress and academic self-efficacy, Kaplan (1975) and colleagues (Kaplan, Martin, & Robbins, 1982, 1984) have described a theory in which generalized self-esteem is the key piece in the puzzle of ESU and the key to ESU prevention. Self-derogation theory (SDT) argues that adolescents experience low self-esteem and frequent self-derogation if they repeatedly receive negative evaluations from conventional others or they feel deficient in any socially desirable attributes, including but not limited to academic performance. In defense of their egos, self-derogating adolescents who feel unwanted, rejected, or deficient in conventionally valued ways might (a) become alienated from conventional role models, (b) feel motivated to rebel symbolically against conventional standards, (c) believe that their self-worth can be enhanced by engaging in alternatives to conventional behaviors, and (d) become involved with deviant peers who boost their sense of self-worth. The motivation to rebel against conventional standards will then take the form of ESU when substances are easily accessible, used by others, not inconsistent with personally valued social roles (e.g., being an athlete), and perceived as a symbolic rejection of a conventional society that promoted an adolescent's self-derogation in the first place.

By incorporating the notions of self-esteem, detachment from conventional society, and involvement with deviant peers, SDT relies on intrapersonal characteristics, notions from commitment and attachment theories, and social learning to explain ESU. Moreover, self-esteem, which lies at the core of SDT, appears to affect ESU indirectly. In particular, a 2-year longitudinal study of young adolescents led Kaplan et al. (1982) to conclude that weak self-esteem directly affects involvement with substance-using peers and indirectly affects early ESU. However, self-esteem does not appear to affect ESU directly. In fact, 10 of 10 longitudinal studies of adolescents (Baumrind, 1985; Block et al., 1988; Jessor et al., 1991; Jessor & Jessor, 1977; Kandel et al., 1978; Kaplan et al., 1982; McBride et al., 1991; Shedler & Block, 1990; Stein et al., 1987b; White et al., 1987) failed to find a significant bivariate relationship between low self-esteem and ESU.

Multistage social learning model. Simons et al. (1988) es-

panded Akers' (1977) SLT and attempted to "explain why adolescents join substance-using peer groups" (Simons et al., 1988, p. 294). Simons et al. did this through their multistage social learning model (MSLM), which integrates social learning processes and several intrapersonal characteristics, including low self-esteem, emotional distress (e.g., tension, anxiety, and depressed affect), inadequate coping skills (e.g., using denial, avoidance, or distraction), deficient social interaction skills (e.g., being overly assertive, shy, impolite, uncompromising, and unempathic), and a personal value system that emphasizes present-oriented goals over long-term and conventional goals concerning families, education, and religion.

Simons et al. (1988) pieced these intrapersonal characteristics into a three-stage model of ESU. The first stage concerns the causes of adolescents' initial involvement with substances, an involvement that most often begins with alcohol. According to the MSLM, adolescents are initially pushed toward ESU by (a) personal value systems that emphasize present-oriented goals over long-term and conventional goals concerning families, education, and religion, (b) parents who fail to provide them with warmth, support, supervision, and discipline, and (c) a pattern of ESU displayed by parents. The second stage delineates the causes of involvement with deviant, substance-using peers, highlighting initial ESU and deficiencies in social skills. In particular, the model predicts that adolescents will gravitate toward deviant peers if they have used substances in the past or they are assertive, shy, impolite, uncompromising, or unempathic. Finally, the third stage focuses on the causes of adolescents' escalation beyond initial or experimental ESU to more regular use, and abuse. The MSLM contends that ESU will escalate when adolescents (a) observe ESU among their parents, (b) have peers who encourage ESU, (c) are emotionally distressed, and (d) have inadequate coping skills. Simons et al. reasoned that adolescents who are emotionally distressed (e.g., tense, anxious, or depressed) might escalate their ESU because they expect momentary relief in the physiological effects of ESU. Similarly, Simons et al. reasoned that adolescents who have poor coping skills might turn to ESU as a way of dealing with life's problems.

The MSLM is an ambitious effort to integrate many of the distal pieces in the etiological puzzle of ESU. Moreover, unlike any other theory, the MSLM claims that inadequate coping skills might contribute to ESU and implies that ESU can be prevented in part by helping adolescents adjust to their personal problems. Nonetheless, support for some key predictions of MSLM is lacking among longitudinal studies of ESU. In particular, there is virtually no support for its predictions that low self-esteem and high emotional distress (e.g., tension, anxiety, and depressed affect) affect ESU. As noted previously, no longitudinal study has found a significant bivariate relationship between self-esteem and ESU. Moreover, with very few exceptions (Dembo et al., 1990; Kandel et al., 1978), longitudinal studies have found only nonsignificant bivariate relationships between ESU and either anxiety or depressed affect (Block et al., 1988; Brook et al., 1990; Kaplan et al., 1986; Kellam et al., 1982; Lemer & Vicary, 1984; Pedersen, 1991; Shedler & Block, 1990; Simcha-Fagan et al., 1986; Teichman, Bamea, & Ravav, 1989; White et al., 1987), both of which can be considered signs of emotional distress. Although these findings do not automati-

cally mean that ESU is not influenced by self-esteem and emotional distress, they are not consistent with the MSLM and suggest that ESU is not directly affected by these intrapersonal characteristics.

These empirical concerns aside, the MSLM has four very strong features. First, the MSLM calls attention to several intrapersonal characteristics that might affect ESU indirectly and, therefore, might be the targets of ESU prevention programs. In particular, it suggests that adolescents might be drawn toward ESU if they have low self-esteem, excessive emotional distress, inadequate coping skills, or deficient social interaction skills. Second, it acknowledges that the causes of ESU (viz., parenting techniques, parental ESU, and an adolescent's unconventional values) might be different than the causes of habitual substance use (viz., poor coping skills, emotional distress, peer ESU, and parental ESU). No other theory offers such detailed insight into possible differences between experimental and nonexperimental substance use. Third, the MSLM identifies some potential consequences of habitual substance use, including problems with coping, social skills, school performance, delinquency, and deeper involvement with deviant peers (see Brook, Gordon, Brook, & Brook, 1989). All of these consequences are expected to lead to further involvement with substance use. Finally, it is impressive in its comprehensiveness and its attempt to integrate characteristics of adolescents, their parents, and their peers into a single model of substance use. In addition, the MSLM offers a broad focus, including relatively distal or background variables that are not direct or immediate causes of substance use.

Family interaction theory. Brook et al. (1990) also describe a complex theory in which emotional attachment to parents, social learning, and intrapersonal characteristics of adolescents directly affect ESU. The cornerstone of Family interaction theory (FIT) "is the attachment relationship or affectional bond that exists between parents and child" (Brook et al., 1990, p. 162), especially between mother and child. According to FIT, attachment between parents and children has four causes and three consequences. The causes are (a) conventional values among parents, (b) affectionate or supportive parenting styles, (c) maternal psychological adjustment, and (d) maternal control over a child. The consequences of strong parent-child bonds are (e) the development of conventional and well-adjusted adolescent personalities, (f) infrequent involvement with substance-using peers and, ultimately, (g) infrequent ESU among adolescents. According to FIT, children whose parents lack conventional values or provide little affection and whose mothers are maladjusted or exert little control are at risk for a variety of problems during their adolescence, including poor relationships with their parents, unconventional and maladjusted personalities, involvement with substance-using peers, and ESU.

More than any other theory, FIT describes how parent-child dynamics during pre- and early-teen years might contribute to ESU during later adolescence. In particular, FIT emphasizes how lack of parental supervision and support contributes to weak family attachments, adolescent personality, involvement with substance-using peers, and ESU. Consequently, it implies that some ESU can be prevented in the long run by teaching parents how to supervise and support their children. In line with this, several studies have shown that adolescents who, as children, received higher levels of support and encouragement

from their parents became less involved in ESU than adolescents who received less parental support and encouragement (Baumrind, 1985; Brook et al., 1990; Dembo et al., 1990; Jessor & Jessor, 1977; Johnson & Pandina, 1991; Shedler & Block, 1990; Vicary & Lerner, 1986).

Also, more than most theories, FIT describes how childhood and adolescent characteristics affect later ESU. Some of these intrapersonal characteristics are low achievement orientation or will to achieve, poor ego integration or superego strength, depression or low self-esteem, aggressiveness, rebelliousness, sensation seeking, and poor impulse control. Moreover, evidence suggests that both parent-child dynamics and adolescent personality traits make significant and independent contributions to ESU (Brook, Whiteman, & Gordon, 1983, 1983).

Summary of theories in which intrapersonal characteristics play a key role. The SEM, SDT, MSLM, and FIT all share an important assumption. They all assume that within a given social setting adolescents will differ in their involvement with substance-using peers and their motivation for ESU. They also assume that these differences might have some of their long-term roots in adolescents' personality traits, affective states, and behavioral skills. The SEM focuses on school-related stress and self-efficacy; SDT focuses on general self-esteem; the MSLM focuses on self-esteem, social interaction skills, coping skills, and emotional distress; and FIT interaction theory includes a wide range of intrapersonal variables. Consequently, these theories assume that ESU can be prevented in part by targeting several characteristics of children rather than the substance-specific beliefs of adolescents or the substance-specific behaviors of their peers.

However, there are two important (and probably related) restrictions to these theories. First, they generally assume that personality traits and affective states affect ESU directly. However, longitudinal studies of ESU suggest that intrapersonal characteristics are generally poor predictors of ESU. Perhaps the clearest examples come from 10 longitudinal studies on self-esteem and ESU (Baumrind, 1985; Block et al., 1988; Jessor et al., 1991; Jessor & Jessor, 1977; Kandel et al., 1978; Kaplan et al., 1982; McBride et al., 1991; Shedler & Block, 1990; Stein et al., 1987b; White et al., 1987), none of which found significant bivariate relationships between self-esteem and ESU. Although such characteristics might (and probably do) contribute to ESU, the research support is lacking, possibly because longitudinal tests of these theories are faced with special methodological difficulties concerning the appropriate time lags and sufficient data collection points. If the time span between the measurement of an affective state (such as self-esteem) and the measurement of ESU is inappropriately long, the effects of a relatively transient affective state will not be detected. Furthermore, tests of affective states might yield more positive findings if more waves of data are collected, thereby allowing researchers to see if changing levels of an affective state (e.g., decreasing self-esteem) are better predictors of ESU than are static, one-time levels of that state.

Second, these theories generally downplay the role of cognitive processes in ESU. This is, in our opinion, noteworthy because structural equation models suggest that intrapersonal characteristics (e.g., hostility and depression) do not affect ESU directly but instead appear to affect beliefs about ESU that, in

turn, affect the use of substances (Stacy, Newcomb, & Bentler, 1991). Moreover, cognitive-affective theorists (e.g., Ajzen, 1985, 1988) would argue that only substance-specific beliefs affect ESU directly and that personality traits and affective states can only act indirectly, through such beliefs. With these two concerns in mind, we believe that the processes by which intrapersonal characteristics influence ESU indirectly must be articulated more clearly and linked more closely to cognitive processes.

Theories That Integrate Cognitive-Affective, Learning, Commitment and Attachment, and Intrapersonal Constructs

The theories reviewed so far have focused on (a) substance-specific cognitions and evaluations, (b) the modeling of substance-specific behaviors by peer and parent role models, (c) factors that lead to weak commitment to conventional values and weak attachment to families, and (d) intrapersonal characteristics of adolescents. None of these theories, however, has focused on all of these areas simultaneously. By contrast, the following three theories have attempted to integrate cognitive-affective, learning, commitment and attachment, and intrapersonal pieces in the puzzle of ESU.

Problem-behavior theory Jessor's (Jessor et al., 1991; Jessor, Graves, Hanson, & Jessor, 1968; Jessor & Jessor, 1977) problem-behavior theory (PBT) not only addresses the causes of ESU but also addresses the causes of myriad behaviors that are considered especially problematic for adolescents, including sexual activity, political protest, alcohol use, illicit drug use, and criminal behaviors. Because many of these behaviors are accepted among adults but forbidden among adolescents, they might "appeal to many adolescents as a rite of passage that constitutes a symbolic assertion of maturity" (McGuire, 1991, p. 181) and a symbolic transition into adulthood. PBT asserts that adolescents who are prone to one problem behavior (e.g., delinquency) are also prone to other problem behaviors (e.g., marijuana use). In line with this, cross-sectional data suggest that adolescents who use marijuana are more likely to use alcohol, be sexually active, and engage in petty crimes, truancy, fighting, and parental defiance (Donovan & Jessor, 1985) and are less likely to engage in health-promoting behaviors (Donovan, Jessor, & Costa, 1991). Similarly, marijuana use among young adults correlates positively with drunkenness, deviance, and use of other illicit substances (Jessor et al., 1991).

PBT starts with the assumption that susceptibility to problem behaviors results from the interaction of the person and the environment. The environment is divided into proximal and distal structures. At the core of the distal structure lies attachments to family and peers. PBT contends that adolescents are at risk for ESU if they are unattached to their parents, are close to their peers, and are more influenced by their peers than their parents. At the core of the proximal structure lies social modeling and the substance-specific behaviors of friends and family members. Like all of the theories reviewed above, PBT asserts that adolescents are at risk for ESU if they have friends who use substances or they believe their friends and parents approve of ESU.

PBT then divides characteristics of the person into distal, in-

intermediate, and proximal categories, and aspects of these structures are echoed in more recent theories. The most distal characteristics are grouped in the *personal belief structure*, a structure that contends that adolescents will be at risk for ESU if they (a) are socially critical and culturally alienated (cf. commitment to conventional values), (b) have low self-esteem and feel they have little to risk through deviant behaviors (cf. self-derogation), and (c) they have an external locus of control, believing that their conventional behaviors are not socially rewarded and their deviant behaviors are not socially punished. More intermediate causes of ESU are **grouped** in the *motivational instigation structure* and concern the direction of adolescents' dominant goals, expectations, and personal values. Through this structure, PBT contends that adolescents will be at risk for ESU if they (d) highly value their involvement with peers, seek independence from parents, and devalue academic achievement, or (e) have low expectations for academic achievement (cf. conventional commitment and strain). Finally, the most proximal of the intrapersonal causes of ESU falls into the *personal control structure*. This structure focuses on attitudes toward deviant behaviors and proposes that adolescents will be at risk for ESU if they are generally tolerant of any deviant behaviors or believe that the benefits of ESU outweigh the costs (cf. substance-specific attitudes of cognitive-affective theories).

By including a wide variety of constructs, support for PBT comes from a variety of areas, many of which we have already discussed. In particular, PBT's two environmental structures and three intrapersonal structures are supported by studies (discussed above) that show that ESU is more common among adolescents who (a) feel detached from their parents, close to their peers, and more influenced by their peers than their parents (cf. evidence for commitment and attachment theories); (b) have friends who use substances and endorse ESU (cf. evidence for social learning models); (c) have attitudes that tolerate ESU (cf. evidence for cognitive-affective theories); (d) place low value on academic achievement (cf. evidence for commitment and attachment theories); and (e) are socially critical, alienated, rebellious, and seek independence from conventional society (cf. evidence for commitment and attachment theories). However, PBT's contention regarding self-esteem has been disconfirmed (cf. evidence against SDT), and its contentions regarding locus of control have only been tested in one longitudinal study (Jessor et al., 1991).

By including a wide variety of constructs, PBT also helps organize many pieces in the puzzle of ESU. Nevertheless, there are two reasons to believe that it does not organize all of the pieces. First, like the theories based on commitment and attachment (e.g., SCT) and intrapersonal characteristics (e.g., FIT), PBT deemphasizes cognitive-affective influences on ESU by explicitly stating that friends' use of substances and approval of ESU "should be the two [variables] most strongly associated with [ESU] of any of the variables" (Jessor et al., 1991, p. 30) in the model. By contrast, cognitive-affective theorists (e.g., Ajzen, 1985) would argue that PBT is deemphasizing important pieces because it downplays the mediating and pivotal effects of substance-specific beliefs.

Second, the nature of indirect effects in PBT is not clearly described at this time. PBT focuses sharply on how environmental and intrapersonal variables affect ESU directly and, to

a lesser extent, on how other variables affect ESU indirectly. Nonetheless, the latest form of PBT **does** not describe the mechanisms by which indirect effects operate. For instance, Jessor et al. (1991) suggested that low self-esteem promotes ESU indirectly, but they did not specify the mechanism through which self-esteem operates. That is, PBT does not specify whether self-esteem affects ESU indirectly by affecting commitment to conventional values, expectations regarding achievement, attachments with parents, or any other intrapersonal and environmental variables. This is unfortunate because empirical evidence suggests that many variables from PBT, although important, are less important than variables from the cognitive-affective and social learning theories in predicting cigarette smoking (Chassin et al., 1984). Moreover, regression analyses designed to test the theory (see Donovan & Jessor, 1985; Donovan, Jessor, & Jessor, 1983; Jessor et al., 1991; Jessor & Jessor, 1977; Schlegel et al., 1987) have generally found that only small amounts of unique variance in ESU can be predicted from PBT's more distal variables, such as (a) personal values and expectations concerning conventional goals, (b) social alienation or lack of commitment to conventional values, and (c) the relative importance of friends over parents. However, substantial amounts of unique variance can be predicted from the model's more proximal variables, such as general attitudes toward deviance, attitudes toward ESU, and perceptions of social norms regarding ESU. It is possible that PBT's more distal variables affect ESU only indirectly and that highly advanced statistical techniques (e.g., structural equation models) are necessary to test theories that include both distal and proximal factors.

This critique is not meant to diminish the contributions of PBT. To the contrary, we recognize that PBT is not only among the earliest multivariate theories of ESU but also remains among the most ambitious and influential theories. Jessor et al. (1968) were among the first to recognize that ESU might be just one symptom of an adolescent's more general tendency toward conduct problems and engagement in numerous problem behaviors. Consequently, PBT reminds us that understanding the causes of ESU requires that we first understand the causes of problem behaviors and conduct problems in general. Jessor et al. (1968) were also among the first to argue that an adolescent's risk for ESU is shaped by the relative balance of environmental and intrapersonal factors that promote and inhibit ESU. Furthermore, specific features of PBT's environmental and intrapersonal structures have been incorporated into other theories of ESU reviewed in this article. This critique, however, **does** suggest that the theoretical advances forged by PBT can be extended by additional mapping of both direct and indirect effects on ESU. It also suggests that the amount of variance in ESU accounted for by PBT (which Jessor et al., 1991, put at 40–60%) might be substantially augmented by including more cognitive-affective measures, such as attitudes toward ESU.

Peer cluster theory. Recently, Oening and Beauvais (1986a, 1986b, 1987) proposed a theory of ESU that addresses some of the concerns regarding Jessor et al.'s (1991) PBT. Unlike PBT, which does not fully articulate how variables affect ESU indirectly, peer cluster theory (PCT) specifies indirect effects for some distal variables and direct effects for more proximal variables. In particular, PCT proposes that "the single dominant variable in adolescent drug use is the influence provided by

peers with whom an adolescent chooses to associate [and] that drug use is nearly always *directly linked* [italics added] to peer relations" (Oetting & Beauvais, 1987, p. 206). All other pieces in the puzzle are thought to affect ESU only indirectly through their contributions to an adolescent's association with substance-using peers.

PCT posits that four broad sets of variables affect involvement with substance-using peers. *Social structure variables*, such as family divorce and socioeconomic status, are distal variables that presumably create conditions that indirectly promote ESU. *Psychological characteristics* are personality traits and affective states of adolescents that are thought to promote attachment to deviant peers, including low self-confidence, and high anxiety. *Attitudes and beliefs* represent adolescents' beliefs about deviant behaviors in general and ESU in particular. Finally, *socialization links* represent adolescents' connections with other people who might inhibit or promote ESU. For instance, PCT suggests that adolescents who feel unattached to their family, lack religious convictions, or *dislike* school (cf. low commitment to conventional values) are directly at risk for involvement with substance-using peers and indirectly at risk for ESU.

The principal merits of PCT lie in its comprehensiveness and specificity. It includes potential causes of ESU that range from very distal factors (e.g., family divorce and adolescent personality traits) to highly proximal factors (e.g., attitudes toward ESU and involvement with substance-using peers). It also specifies that ESU by peer role models is the primary cause of an adolescent's own ESU and that all other factors affect ESU only indirectly. The principal constraint of PCT is its assertion that involvement with substance-using peers is the *only* direct cause of ESU. In fact, PCT suggests that an adolescent's substance-specific attitudes do not cause ESU but instead cause an adolescent to become involved with substance-using peers. Social learning theorists (e.g., Akers, 1977; Bandura, 1986), by contrast, would argue for the opposite effect—that involvement with substance-using peers affects an adolescent's substance-specific attitudes.

Sher's model of vulnerability In an attempt to explain why children of alcoholics are vulnerable to alcohol abuse themselves, Sher (1991) recently integrated the ideas of several theorists who have emphasized the genetic roots of alcoholism (e.g., Cloninger, 1987; Phil, Peterson, & Finn, 1990; Tarter, Alterman, & Edwards, 1985). When Sher's model is extended from the etiology of alcohol abuse to the etiology of ESU, several of his predictions are consistent with the models we have reviewed so far.⁶ In fact, Sher's model includes many of the same mediating factors as other models. For instance, Sher would argue that ESU has strong ties in substance-specific expectations (cf. cognitive-affective theories), parental substance use (cf. social learning theories), school failure (cf. the SEM), emotional distress, and inadequate coping skills (cf. the MSLM.)

It is, however, the origin of these mediating (and other) factors that makes Sher's (1991) model so important and so different from previous theories. According to Sher, substance-specific expectations, parental substance use, school failure, emotional distress, and inadequate coping skills all have biological origins—origins that also contribute to a positive family history of substance abuse. Sher argued convincingly that children of

alcoholics inherit somewhat "difficult" and temperamental personalities, mildly impaired cognitive functions (particularly in terms of planning and attention deficits), increased pharmacological sensitivity to the reinforcing value of alcohol (e.g., stress reduction), increased tolerance of alcohol, and decreased sensitivity to the intoxicating effects of alcohol. When generalized beyond alcohol abuse, Sher's model suggests that some of the origins of ESU might be found among the biological foundations of personality, cognitive functioning, and individual differences in pharmacological sensitivity to substances.

Not only does Sher's (1991) model incorporate biological and pharmacological influences with other types of influence (viz., cognitive-affective, learning, commitment and attachment, and intrapersonal), it also offers relatively specific and testable predictions. In fact, the model consists of 44 different testable pathways that describe how several variables interrelate and interact to affect ESU. Moreover, many of those pathways describe how one variable moderates the influence of another. For instance, Sher's model suggests that the effect of emotional distress will depend on coping skills, such that emotional distress will contribute to ESU only among adolescents who do not have the coping skills to deal with distress. Although the ability to test all 44 pathways is probably beyond the ability of current data sets, Sher's model should be considered in future studies of ESU.

Domain model. Huba and Bentler's (1982; Huba, Wingard, & Bentler, 1980a) domain model is our final model. It is fitting that this be our final model because it catalogues many (if not most) of the causes of ESU. In all, Huba and Bentler's model includes over 50 potential causes, which are catalogued into 13 clusters of varying proximity to ESU. These 13 clusters are then grouped into four general domains. The first domain represents *biological influences* and includes genetic influences in susceptibility to the addictive effects of substances, an adolescent's physiological reactions to substances, and an adolescent's general health. The second domain represents *intrapersonal influences* and includes adolescents' beliefs about ESU (e.g., subjective beliefs about the adverse consequences of ESU), a variety of personal values (e.g., desires for success, *achievement*, and independence), and *several* personality characteristics and affective states. Included among the personality traits and affective states are sensation seeking, impulsiveness, sociability, extraversion, neuroticism, depression, anxiety, and low self-esteem. The third domain represents *interpersonal influences* and includes the characteristics of those people who provide social support for adolescents and with whom adolescents are emotionally attached. Finally, the fourth domain represents broad *sociocultural influence* on ESU, including media depictions of ESU and substance users, the market availability of substances, and social sanctions against ESU, such as criminal penalties.

One noteworthy feature of the domain model is its emphasis on an adolescent's rebelliousness and sensation seeking, which several longitudinal studies have linked to ESU (Jessor et al., 1991; Jessor & Jessor, 1977; Kandel et al., 1978; Kaplan et al., 1986; Pedersen, 1991; Smith & Fogg, 1979; Teichman et al., 1989). Another noteworthy feature is the recognition that ESU

⁶ We thank two reviewers for suggesting that Sher's (1991) model of alcohol abuse might complement models of experimental substance use.

is related to easy access to substances (Kandel et al., 1978; Teichman et al., 1989). According to the model, when the supply of a substance is low or its cost is prohibitive, very few adolescents will be able to use it, but when the supply is abundant and the cost is low, many more adolescents might be exposed to and tempted to try it.

Despite these noteworthy features and the model's comprehensive coverage of potential causes of ESU, it falls short of being a testable theory because it offers only general themes in place of specific and testable hypotheses. For instance, Huba and Bender (1982) suggested that the different domains might interact without specifying exactly which domains or how they might interact. Moreover, Huba and Bender suggested that relationships among variables might change as an adolescent matures or becomes more involved with one or more substances, but they did not specify which, how, or why relationships might change. Nonetheless, the domain model provides a useful framework for looking at the causes of ESU by reminding researchers that understanding the causes of ESU is a complex puzzle with a wide assortment of pieces.

Summary of Multivariate Theories

The preceding review discussed five classes of theories about the causes of ESU. These were (a) cognitive-affective theories, which describe how decision-making processes contribute to ESU; (b) social learning theories, which emphasize the effects of substance-using role models; (c) conventional commitment and social attachment theories, which detail how various factors promote withdrawal from conventional society, detachment from parents, and attachment to substance-using peers; (d) theories that search for the roots of ESU in the personality traits and affective states of adolescents; and (e) theories that attempt to integrate cognitive-affective, social learning, commitment and attachment, and intrapersonal constructs.

The theories we have reviewed differ in two important ways. First, there are considerable differences in the specificity of each theory. In general, Ajzen's (1985) TPB presents the most detailed descriptions of constructs, offers the clearest predictions about relations among constructs, and even dictates how to measure and compute variables. Specifically, Ajzen (a) insisted that attitudes result from the combination of expectations and evaluations, (b) dictated operationally how to define expectations and evaluations, (c) presented formulas for deriving attitudes, and (d) offered predictions about all of the possible relationships between attitudes, perceived norms, self-efficacy, decisions, and behaviors. Similarly, Sher's (1991) model of vulnerability offers relatively detailed predictions about how variables mediate and moderate the various influences on ESU. By comparison, other theorists have offered less distinct predictions, less detailed descriptions of key constructs, and less direct tests of the theory. For instance, Kumpfer and Turner's (1990-1991) theory is based on academic self-efficacy but has been tested with measures of self-esteem. Furthermore, theories based on intrapersonal characteristics of adolescents (e.g., Brook et al., 1990) argue that several characteristics affect ESU, but they do not fully articulate the mechanisms by which these effects occur.

Second, there is considerable difference in the focus of each

theory. As our introduction stated, most of these 14 theories were never intended to be comprehensive models accounting for all of the constructs that affect ESU. Rather, most emphasize a select set of constructs and attempt to explain how and why these constructs contribute to ESU. Consequently, each of these theories helps clarify part of the etiological puzzle of ESU. However, by focusing on very different pieces in the puzzle, these theories assemble very different pictures. Some, for example, clarify how each adolescent's unique substance-specific beliefs or pharmacological sensitivity to substances lead to ESU, whereas others clarify how very broad social systems or personality characteristics contribute to ESU. Moreover, theorists have, as a rule, done little to join together their models. As a result of the different foci and relative isolation of existing theories, ESU remains a puzzle for social scientists—a puzzle in which social scientists have many (if not most) of the pieces but do not know how they all fit together. We believe that the puzzle cannot be completed until existing theories are first compared (as we attempted here), then organized (as we attempt below), and eventually integrated. Consequently, we now turn our attention to organizing the theoretical causes of ESU into a single framework.

A Framework for Organizing the Theoretical Causes of Substance Use

The theories we reviewed in the previous section point toward a long and diverse list of factors that theoretically contribute to ESU, ranging from factors that are intrinsically tied to ESU (e.g., beliefs about the consequences of ESU) to factors that on the surface have little to do with ESU (e.g., parenting styles and school characteristics). The diversity of theories and causes is not surprising given that ESU, like almost any behavior, has a complex etiology. In fact, numerous scholars (e.g., Bandura, 1986; DeKay & Buss, 1992; Frankenhaeuser, 1991; Jessor et al., 1991; Magnusson, 1981; Sadava, 1987) have argued persuasively that a thorough understanding of any behavior must be based on a comprehensive and integrative analysis of (a) the broad social environment or cultural milieu surrounding the behavior, (b) the more immediate social situation or context in which the behavior occurs, (c) the characteristics or dispositions of the person performing the behavior, (d) the behavior itself and closely related behaviors, and (e) the interaction among all of these. In partial alignment with this argument, we believe that the causes of ESU can be meaningfully classified along two dimensions.

Types of Influence

The first classification is by the type of influence. We believe that three distinct types of influence underlie existing theories of ESU. These are social or normative influences, cultural or attitudinal influences, and intrapersonal influences.

Social and interpersonal influences on ESU. By focusing on characteristics and behaviors of the people who make up adolescents' most intimate support system, several theories focused on the social or interpersonal pieces of the puzzle. Among these influences were inadequate parental warmth, supervision, control, and reinforcement; negative evaluations from parents;

home strain; and parental divorce or separation. Many of these characteristics probably influence adolescents' attachment to different role models and their motivation to comply with the substance-specific wishes of various role models. Moreover, other proposed social and interpersonal influences focus on (a) adolescents' beliefs about the **normativeness** of ESU and (b) the substance-specific attitudes and behaviors of those people to whom adolescents are most closely attached. In fact, all of the theories we reviewed assert that the causes of ESU lie, to some degree, in the substance-specific attitudes and behaviors of adolescents' role models.

Cultural and attitudinal influences on ESU. Far less common, but no less important, are theories that emphasize adolescents' own substance-specific attitudes and factors that affect those attitudes. Several theories point (albeit only implicitly) toward personal values as critical in the formation of positive attitudes toward ESU. For instance, the theories we reviewed, when taken together, suggest that adolescents might endorse ESU if they (a) are not committed to conventional society, religion, school, or people who hold negative views of ESU, (b) see ESU as a symbolic rejection of conventional standards, (c) feel socially alienated, (d) are oriented toward short-term goals and hedonic gratification, (e) are rebellious, (f) have little interest in success or achievement, (g) desire independence from parents, and (h) hold tolerant or positive attitudes toward other deviant behaviors. Moreover, the theories suggest that the foundation of these personal values might be rooted in adolescents' cultural environments, especially if those environments include high crime rates, high unemployment rates, and inadequate schools.

Intrapersonal influences on ESU. The last type of influence concerns neither the characteristics of nor attachments to other people (which are the core of social and interpersonal influences), nor adolescents' orientations toward their own ESU (which are central to attitudinal influences). Rather, intrapersonal influences concern adolescents' (a) fundamental and relatively stable personality traits, (b) somewhat more transient intrapersonal dispositions and affective states, (c) general behavioral skills, and (d) beliefs about their substance-specific behavioral skills. Among the theories we reviewed, such intrapersonal influences include impaired cognitive functions, pharmacological sensitivity to the use of substances, temperamental personalities, impulsiveness, aggressiveness, emotional distress (e.g., neuroticism, anxiety, or depression), extraversion and sociability, tendencies toward risk taking and thrill seeking, external locus of control, low self-esteem, poor coping skills, deficient social interaction skills (e.g., being shy, impolite, or uncompromising), inadequate academic skills, and substance-specific self-efficacy (e.g., refusal skills, refusal self-efficacy, and use self-efficacy).

Levels of Influence

The second classification of constructs concerns the levels of influence addressed by each theory. In evolutionary biology (Alcock, 1989), the cognitive sciences (Massaro, 1991), and personality theory (Marshall, 1991), a useful distinction has been made among proximal, distal, and ultimate levels of influence. We believe this distinction helps organize the theoretical causes of ESU.

Proximal influences on ESU. According to this distinction, proximal variables are highly predictive of a given behavior but focus only on the most immediate precursors of that behavior. As such, proximal variables do little to explain the long-term roots of behavior. The cognitive-affective factors that make up Ajzen's (1985) TPB are the purest examples of proximal influences. In line with Ajzen's work, we believe there are two divisions of proximal influences. The first division includes future intentions and current decisions regarding the use of a particular substance (e.g., marijuana), along with past experiences with or feedback one has received from using that substance. It also includes experiences with other substances (e.g., hashish). In the case of marijuana use, for instance, experimenting with marijuana might lead to repeated marijuana use and subsequent experimentation with other illicit substances. Consequently, we consider intentions, decisions, trial behavior, and related behaviors as the most proximal or immediate predictors of behavior.

The second division of proximal influences includes substance-specific normative perceptions, attitudes, and self-efficacy. Researchers have, with impressive accuracy, predicted ESU by knowing whether adolescents (a) perceive that important others encourage ESU, (b) hold positive attitudes toward substance use, or (c) feel capable of using a substance. However, knowing these things does little to explain why some adolescents hold such beliefs. Nonetheless, substance-specific normative perceptions, attitudes, and self-efficacy are important to include in theories of ESU because constructs from all other levels of influence probably exert little effect on ESU unless they first affect these highly proximal substance-specific cognitions.

Distal influences on ESU. Distal influences, however, are no less important. Distal influences are relatively indirect causes of a given behavior, and their effects are likely to work through or be mediated by more proximal, cognitive-affective influences. Consequently, distal influences might be less predictive of a behavior than proximal influences but at the same time might help us understand the intermediate causes of ESU.

Several theories of ESU incorporate distal influences. The social learning theories, for instance, argue that involvement with role models who encourage ESU will directly affect an adolescent's substance-specific cognitions and indirectly affect that adolescent's ESU. For commitment and attachment theories, the origins of ESU are even more distal and can be found among factors that lead adolescents to loosen their commitment to conventional society, weaken their attachment to their families, and form strong bonds with substance-using peers.

Ultimate influences on ESU. Finally, ultimate influences are broad and exogenous factors that gradually direct individuals toward a behavior. When applied to ESU, ultimate influences are beyond the personal control of adolescents but, nonetheless, put them at long-term risk for ESU. By emphasizing academic and occupational opportunities, qualities of schools, neighborhood crime problems, parental divorce, opportunities for reinforcement from parents and schools, and parenting styles (e.g., warmth, support, and supervision), the commitment and attachment theories address some of the ultimate roots of ESU. Similarly, other theories focus on basic personality traits that adolescents cannot easily change but that might direct them toward ESU. Among such traits are aggressiveness, impulse control, temperament, neuroticism, and sociability. Fi-

nally, Sher's (1991) model of vulnerability and the domain model (Huba & Bentler, 1982) both focus on perhaps the purest examples of ultimate influences by calling attention to the inherited sensitivity to the pharmacological effects of substances, the availability or accessibility of substances, media influences, and community-wide sanctions for ESU.

When compared with proximal or distal influences, ultimate influences are broader in scope, not as narrowly defined, and more deeply rooted in an adolescent's environment, personality, or biological make-up. Consequently, ultimate influences might contribute to ESU in a variety of ways. For instance, easily available and inexpensive marijuana might influence adolescents' marijuana-related self-efficacy by promoting their ability to obtain and use it and might contribute to perceptions that marijuana use is normative as more and more peers have easy access to marijuana.

A Matrix of Constructs

We have argued that the pieces in the etiological puzzle of ESU can be classified according to three types and three levels of influence. Taken alone, however, none of these classifications adequately represents the constructs from existing theories. Rather, they present a more complete picture of ESU only if combined into a 3 X 3 matrix. This matrix is depicted in Table 1, which gives a short description of the nine cells and some examples of the constructs from existing theories that fit in each cell. In addition, we note that substance-specific decisions, intentions, and related behaviors are the most immediate precursors of ESU.

Three levels of social influences. Although each of the cells in Table 1 has captured some attention from theorists, theoretical attention has not been evenly distributed. In particular, social (or interpersonal) influences are the mainstay of existing theories. Moreover, social influences are represented on all three levels of Table 1. On the proximal level, they include normative beliefs concerning ESU, prevalence estimates, and beliefs that other people encourage ESU. On the distal level, they include adolescents' attachments to various role models (i.e., weak attachment to family members, strong attachment to peers, and strong desires to please peers). The distal level also includes the substance-specific attitudes and behaviors of those role models. On the ultimate level, by contrast, social influences include general characteristics of adolescents' parents, family members, and other role models. According to theories of ESU, such characteristics include parenting styles, negative evaluations from parents, home strain, and other characteristics.

Three levels of attitudinal influences. When compared with social (or interpersonal) influences, attitudinal influences have attracted less theoretical attention. Moreover, this attention has been focused largely on the most proximal level by targeting adolescents' attitudes, expectations, and evaluations about ESU per se. In existing theories, less attention is given to distal and ultimate influences that contribute to those proximal cognitions.

Nonetheless, some theories do focus on distal or intermediate influences by targeting general values (i.e., values not specific to ESU) among adolescents. Among such distal influences are a general tolerance for deviance, the desire to be independent

from parents, and weak commitment to conventional values, school, and religion. Furthermore, other theorists have focused on ultimate factors in adolescents' surroundings, neighborhoods, social institutions, and culture that, although beyond their personal control, put adolescents at long-term risk for developing positive attitudes toward ESU. These ultimate influences include, in part, poor employment prospects, inadequate schools, media depictions of ESU, the availability of substances, and public policies regarding ESU.

Three levels of intrapersonal influences. Although intrapersonal influences have attracted some theoretical attention, theoretical accounts often describe such influences only in vague terms and frequently lack important details about the mechanisms by which intrapersonal constructs are thought to affect ESU. Consequently, it is difficult to arrange intrapersonal constructs along different levels of influence until theories about intrapersonal influences become more specific. Moreover, it makes the division of intrapersonal influences into ultimate, distal, and proximal levels somewhat arbitrary. Nonetheless, we have attempted to divide intrapersonal influences into three levels (levels that, admittedly, have fuzzy boundaries at this time). That division is based on the degree to which an intrapersonal construct is modifiable either by an adolescent or by people in an adolescent's environment.

The ultimate level consists of personality traits (as opposed to states or skills) and inherited dispositions that are difficult to modify. Many of the intrapersonal constructs from existing theories appear to fall on the ultimate level because they fall beyond the easy control of adolescents. Such constructs include genetic susceptibility to ESU, lack of impulse control, external locus of control, aggressiveness, extraversion, risk taking, sensation seeking, sociability, and chronic emotionality or neuroticism. By contrast, other intrapersonal features appear as distal (i.e., intermediate) causes of ESU because they appear somewhat more controllable by adolescents. These include more alterable affective states (e.g., low self-esteem, anxiety, and depressed affect) and general behavioral skills (e.g., inadequate social skill and weak academic skills) that might contribute to ESU. The only proximal intrapersonal influence, and one that is more modifiable than personality traits and affective states, appears to be substance-specific self-efficacy. According to Ajzen's (1985, 1988) TPB and Bandura's (1982, 1986) SC/LT, adolescents who feel personally incapable of refusing pressure to use substances and who feel personally capable of obtaining and using substances will be at risk for ESU.

The paradigm for the past 20 years. We believe that Table 1 accurately represents the paradigm that underlies the last two decades of ESU theory. We are not suggesting, however, that the paradigm itself is necessarily complete. In fact, we have several concerns with it. First, although Table 1 suggests that there are many pieces in the puzzle of ESU, many of the existing theories have been somewhat vague when describing the mediational processes by which different constructs (or pieces) contribute to ESU. For instance, the domain model (Huba & Bentler, 1982) asserts that adolescents' access to substances will contribute to their ESU; however, the model does not say why or how access will contribute to use. Similarly, many of the models that emphasize intrapersonal characteristics of adolescents generally

Table 1
A Matrix of Types and Levels of Influence on Experimental Substance Use (ESU)

Level of influence	Types of influence		
	Social/interpersonal	Cultural/attitudinal	Intrapersonal
Ultimate	<p><i>Definition:</i> Characteristics of the people who make up adolescents' most intimate social support system. These characteristics are not specific to ESU and are beyond the personal control of adolescents but nonetheless put adolescents at risk for succumbing to social pressure to use substances.</p> <p><i>Constructs:</i> infrequent opportunities for rewards from family members; lack of parental warmth, support, or supervision; negative evaluations from parents; home strain; parental divorce or separation; unconventional values of parents; unconventional values among peers.</p>	<p><i>Definition:</i> Aspects of adolescents' immediate surroundings, neighborhoods, social institutions, and culture that, although beyond the personal control of adolescents, put them at risk for developing positive attitudes toward ESU.</p> <p><i>Constructs:</i> local crime and employment rates; inadequate schools; poor career and academic options; infrequent opportunities for rewards at school; negative evaluations from teachers; media depictions of ESU; availability of substances; weak public policies on ESU.</p>	<p><i>Definition:</i> Personality traits, intrapersonal characteristics, and biological dispositions that, although beyond the easy control of adolescents, might promote some internal motivation to use substances or make them susceptible to the physiological effects of ESU.</p> <p><i>Constructs:</i> impaired cognitive functions; genetic susceptibility to addiction; temperamental personalities; impulsivity; aggressiveness; emotional instability; extraversion; sociability; risk-taking; thrill-seeking; external locus of control.</p>
Distal	<p><i>Definition:</i> Emotional attachments of adolescents and the substance-specific attitudes and behaviors of influential role models who encourage ESU.</p> <p><i>Constructs:</i> weak attachment to and weak desire to please family members; strong attachment to and strong desires to please peers; greater influence by peers than parents; substance-specific attitudes and behaviors of role models.</p>	<p><i>Definition:</i> General values and behaviors of adolescents that contribute to their attitudes towards ESU.</p> <p><i>Constructs:</i> weak commitment to conventional values, school, and religion; social alienation and criticism; weak desire for success and achievement; hedonic values and short-term gratification; rebelliousness, desire for independence from parents; tolerance of deviance.</p>	<p><i>Definition:</i> Affective states and general behavioral skills of adolescents that promote some internal motivation for ESU and that undermine their refusal skills.</p> <p><i>Constructs:</i> low self-esteem; temporary anxiety, stress, or depressed mood; poor coping skills; inadequate social skills; weak academic skills.</p>
Proximal	<p><i>Definition:</i> Beliefs about the normative nature of ESU and pressures to use substances.</p> <p><i>Constructs:</i> prevalence estimates; motivation to comply with other users; beliefs that important others (i.e., friends, parents, and other role models) encourage ESU.</p>	<p><i>Definition:</i> Beliefs and evaluations about the costs and benefits of ESU.</p> <p><i>Constructs:</i> expected costs and benefits of ESU; evaluation of costs and benefits of ESU; attitudes toward ESU by others; attitudes toward ESU by self.</p>	<p><i>Definition:</i> Beliefs about one's ability to use or avoid substances.</p> <p><i>Constructs:</i> refusal skills; determination to use substances; use self-efficacy; refusal self-efficacy.</p>

Note. Decisions and intentions, trial behavior, and related behaviors are the most immediate predictors of ESU.

have said very little about the mechanisms by which such characteristics contribute to ESU.

Second, with the exception of Sher's (1991) model, most of the existing theories say little about protective factors and how various constructs will interact with or moderate each other. For example? some theories argue that attachment to substance-using peers promotes ESU whereas other theories argue that low self-esteem promotes ESU, but no theory discusses how or whether low self-esteem moderates or exaggerates the effects of attachment to substance-using peers. Other examples abound, and the role of moderator variables has received very little attention. We agree with Sher and believe that protective factors, interactions, and moderator effects need more systematic attention from theorists.

Third, the models we reviewed have said relatively little about the contributions of gender or ethnicity in ESU. In fact, none of the theories we reviewed specifically included gender or ethnicity as risk factors, even though adolescent boys (particularly White males) are at greater risk for daily marijuana and alcohol use than adolescent girls (Johnston et al., 1992). This omission might be justified if gender and ethnic differences in ESU arise simply because boys and Whites have higher levels on mediating variables (such as risk taking) than girls or non-Whites. However, it is not justified if gender or ethnicity moderate or interact with other causes of ESU. In such a case, gender and ethnicity would be protective factors and would require different models of ESU for boys, girls, Whites and non-Whites. We believe that the contributions of gender and ethnicity deserve more theoretical attention.

Finally, the models we reviewed have said relatively little about whether different substances have similar etiologies or whether two substances might have diverse causes, distinctive patterns of mediation, and unique patterns of moderation. In fact, these theories generally imply a common model for different substances. Although different substances probably share common etiologies, they might not, and there might be subtle or crucial differences. We believe differences and similarities in etiologies need more theoretical attention in the future.

Conclusion

In the realm of adolescent ESU, there is no shortage of theories. However, existing theories have largely stood alone, and little effort has been made to fit them together. Consequently, the cause of ESU remains a puzzle with numerous pieces (i.e., constructs), several strategies (i.e., theories) for assembling the pieces, and a variety of gaps. If understanding of ESU is to advance, the gaps among these theories need to be filled, each of the constructs needs to be defined exactly, and each of the predictions need to be clearly articulated. We believe that theories of ESU, although helpful, are incomplete unless they address social and interpersonal, cultural and attitudinal, and intrapersonal influences. Moreover, understanding of ESU is incomplete unless theories also address proximal, distal, and ultimate influences.

Fortunately, a rapprochement among existing theories appears possible because they are largely complementary and the pieces assembled by one theory often fit with different pieces assembled by other theories. For instance, commitment and at-

tachment theories and intrapersonal theories show how adolescents become involved with deviant peers: social learning theories show how involvement with deviant peers affects an adolescent's beliefs about ESU; and the cognitive-affective theories show how substance-specific beliefs affect ESU. Recognizing this, Flay and Petraitis (1994) developed an integrative theory of ESU that, like Table I, is based on multiple types and multiple levels of influence. The challenge remains, however, for all scholars of ESU to work together in completing the puzzle that earlier theories have started to assemble.

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P&C Board Appoints Editor for New Journal: *Psychological Methods*

The Publications and Communications Board of the American Psychological Association has appointed an editor for a new journal. In 1996, APA will begin publishing *Psychological Methods*. Mark I. Appelbaum, PhD, has been appointed as editor. Starting January 1, 1995, manuscripts should be directed to

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Psychological Methods will be devoted to the development and dissemination of methods for collecting, understanding, and interpreting psychological data. Its purpose is the dissemination of innovations in research design, measurement, methodology, and statistical analysis to the psychological community; its further purpose is to promote effective communication about related substantive and methodological issues. The audience is diverse and includes those who develop new procedures, those who are responsible for undergraduate and graduate training in design, measurement, and statistics, as well as those who employ those procedures in research. The journal solicits original theoretical, quantitative empirical, and methodological articles; reviews of important methodological issues; tutorials; articles illustrating innovative applications of new procedures to psychological problems; articles on the teaching of quantitative methods; and reviews of statistical software. Submissions should illustrate through concrete example how the procedures described or developed can enhance the quality of psychological research. The journal welcomes submissions that show the relevance to psychology of procedures developed in other fields. Empirical and theoretical articles on specific tests or test construction should have a broad thrust; otherwise, they may be more appropriate for *Psychological Assessment*.