

Chapter 1 : Childhood and Adolescent Predictors of Alcohol Abuse and Dependence in Young Adulthood

Association with drug-abusing peers is often the most immediate risk for exposing adolescents to drug abuse and delinquent behavior. Other factors—such as drug availability, trafficking patterns, and beliefs that drug abuse is generally tolerated—are risks that can influence young people to start abusing drugs.

February 01, Neil Swan By the first grade, or earlier, children show temperament and behavior traits that are powerful indicators of their inclination to use and abuse drugs in their teenage and adult years. Researchers have identified not only common childhood risk factors and behaviors that predict drug abuse potential but also protective factors that shield some children from influences to use drugs. A number of long-range NIDA-funded studies have traced at-risk children into adulthood and parenthood, trying to determine why some children are able to resist persistent influences to use substances of abuse. External risk factors include substance use among peers, drug use by parents, and troubles with the police. Protective factors include achievement in school or after-school activities and close family ties. The researchers are now designing drug abuse prevention and intervention strategies based on these findings made over 20 or more years. Some of the earliest studies, by Dr. Kellam and colleagues of Johns Hopkins University, started in the s with first-graders and their families in Woodlawn, a poor, urban African-American community on the South Side of Chicago. Today the researchers are following about 1, of the 1, original first-graders to continue to identify and monitor early childhood factors affecting later drug use and symptoms of psychiatric problems. These first-graders are now 32 or 33 years old. For both sexes, higher scores on first-grade IQ and readiness-for-school tests were associated with higher levels of beer or wine, hard liquor, and marijuana use 10 years later. During their studies, Dr. Psychological health was determined by a number of criteria, including psychological symptoms, abnormal behavior, and level of self-esteem. Two important risk factors identified as predictors of later drug use are shy behavior--described by the teachers as sitting alone, having few friends, and not speaking up in class--and aggression--described as fighting with others or breaking rules. Shyness and aggression are types of poor social adaptation distinct from symptoms of anxiety or depression, which are internal feelings, noted the researchers. While shyness and aggressiveness are key predictors of drug use, a complex relationship exists between the two factors. Among boys, aggressive behavior in the first grade leads to increased teenage substance abuse, while first-grade shyness alone without aggressiveness leads to lower levels of substance abuse as teenagers. However, the combination of shyness and aggressiveness leads to even higher levels of adolescent substance use among boys than aggressiveness without shyness does, the studies found. Boys whose teachers said they had problems concentrating in class had higher levels of later substance abuse because concentration problems appear to be closely related to aggressiveness, the studies reported. By contrast, neither aggressiveness, nor shyness, nor concentration problems in the first grade were associated with later substance use among girls. These gender-based considerations are now being studied in drug abuse prevention programs, says Dr. When the first-graders reached age 16 or 17, girls used smaller amounts of beer, wine, liquor, and marijuana and other illicit drugs but not cigarettes than boys did. For both sexes, higher scores on first-grade IQ and readiness-for-school tests were associated with higher levels of beer or wine, hard liquor, and marijuana use 10 years later, the researchers found. Psychological well-being and family relationships in the first grade seemed more important to girls than to boys in terms of influencing psychiatric symptoms 10 years later. Mothers had an important effect on the psychological status of their daughters but not of their sons. Girls with strong family bonds tend to use drugs less than other girls do, but the same family influence is not so apparent with boys, said Dr. Results from the Woodlawn study served as the basis for prevention programs started in Baltimore in the s by Dr. That prevention effort focused on aggressive behavior because of its relationship to later drug use and on underachievement because of its relationship to depressed feelings. Those data are now being prepared for publication. Examining Protective Factors Another long-term study of drug-use predictors focuses on children in Northeastern States. For 20 years, Dr. Sinai School of Medicine has studied risk factors identified in early childhood and in adolescence that are related to drug use during adolescence. She is conducting a study of 1, children and their mothers that began in in two

communities representative of the population of the Northeastern United States. In the continuing research, Dr. Brook is examining not only risk factors but also protective factors that help shield children and adolescents from these risk factors. Brook and her colleagues have identified a number of risk factors for subsequent drug use such as childhood aggression, which includes anger, aggression toward siblings, noncompliance, temper, and nonconforming behavior. They found that childhood aggression and parental sociopathy predicted increased levels of drug use in late adolescence. They also determined that unconventionality during the early years of adolescence had an "important and pervasive impact on all aspects of middle and late adolescent functioning," including increased drug use. The researchers also have studied interactions among risk factors and their implications for subsequent drug use as the children grow older. In addition to childhood aggression, they found three additional factors that influence late-adolescent drug use--unconventionality and drug use in middle adolescence and parental sociopathy during childhood. They found that little or no drug use in middle adolescence when combined with conventionality during the same age span resulted in the least amount of subsequent drug use. As expected, parental sociopathy is related to late-teen drug use. Parents who drink or use drugs or both may be the most strict with their children, telling them, "Do as I say, not as I do," according to Dr. Brook agrees with other researchers that there are childhood protective factors that can be very powerful shields to safeguard children and adolescents from the recognized risk factors. These protective factors include achievement, religious commitment, strong family bonds, and a solid attachment to and emulation of a wholesome role model, she says. Among those who become successful, she found evidence of protective factors such as church attendance, childhood achievement in school or in extracurricular activities, or close ties to brothers and sisters. The study by Dr. Hyman Hops and colleagues of the Oregon Research Institute examines family and peer-group influences on adolescent substance use and is now in its 10th year. About subjects were ages 11 through 15 at their first assessment in and will be 21 through 25 at their last assessment this year. Among those studied, 90 percent of subjects who progressed from one substance of abuse to another did so in the following sequence--abstinence, alcohol, cigarettes, marijuana, and hard drugs. The most dramatic increase in drug use occurred between the ages of 13 and 14, when adolescents are going from middle to high school. Within two-parent families, Dr. Their findings suggest that families with substance-abusing children typically are unable to easily resolve problems and that the resulting confrontations negatively affect drug use. The scientists reported that the amount of both family cohesion and peer encouragement to use drugs was predictive of initial levels of substance abuse. A good family relationship may play a powerful role as a protective factor in middle and late adolescence, they say. On the other hand, peer encouragement to use substances plays a stronger role across the age range and also suggests that early peer influences may encourage higher levels of drug use at later ages. Parental influence on early adolescent substance use: Specific and nonspecific effects. *Journal of Early Adolescence* Childhood precursors of adolescent drug use: Genetic, Social, and General Psychology Monographs 2: The psychosocial etiology of adolescent drug use: A family interactional approach. African-American and Puerto Rican drug use: Personality, familial, and other environmental risk factors. Genetic, Social, and General Psychology Monographs 4: Sexual activity and problem behaviors among black, urban adolescents. Sex differences in antecedents of substance use among adolescents. *Journal of Social Issues* 38 2: Parent-adolescent problem-solving interactions and drug use. *American Journal of Drug and Alcohol Abuse* Paths leading to teenage psychiatric symptoms and substance use: Developmental epidemiological studies in Woodlawn. *Childhood Psychopathology and Development*.

Chapter 2 : EMCDDA | CMRS Scales for Substance Abuse Treatment

The purposes of this study were to examine the clinical utility of the Personal Experience Inventory (PEI) Psychosocial scales to predict adolescent drug abuse treatment outcome.

Further, the contributing effects of peer influences are likely to be different at different stages of development Glantz and Pickens, Sociocultural or Environmental Factors The sociocultural factors that have an impact on drug use or abuse include community drug use patterns Robins, and neighborhood disorganization Sampson, Growing up and living in a community with high rates of crime, ready availability of drugs, association with delinquent peers, and acceptance of drug use and abuse are all associated with drug abuse Clayton and Voss, ; Elliott et al. The larger sociocultural environment also has important effects on drug use. The frequency and nature of representation of alcohol, tobacco, and illicit drugs in the media including advertising and modeling by those in the sports and entertainment industries may have important effects on the normative climate. In addition, social and legal policies taxes, restrictions on conditions of purchase and use, legal status, enforcement may have important effects on use and abuse. Ethnographic studies have explored various risk factors for drug use and abuse, as well as the impact of drug abuse on the community. The degree of acculturation and assimilation of individuals and their families into the community has been found to be of some importance as a contextual factor. Among Mexican Americans, it has been noted that several risk factors such as low socioeconomic status, higher school dropout rates, and residing in barrios in large cities exacerbate drug use Padilla et al. In many African American communities, individuals may occupy marginal social positions that prevent access to broader opportunities. This could result in failure to be responsive to dominant social norms. Detachment from conventional norms is expressed in unconventional lifestage roles Brunswick et al. In samples of whites, there is typically a termination of drug use in the midtwenties age range, when adult roles of marriage and employment are adopted Miller et al. It is not surprising that in some African American populations, drug abuse continues into adulthood since conventional adult roles are not assumed Brunswick et al. Yamaguchi and Kandel found that the African American women in their New York State sample were more likely than white women to continue marijuana use. It has been confirmed Bennett et al. Opportunities in Drug Abuse Research. The National Academies Press. Similarly, young African American men have nearly double the unemployment rate of white men U. Bureau of the Census, Native American youth interact on reservations, which are physically isolated from other communities. In these communities, unemployment rates are high and result in conditions in which drug use can flourish Oetting et al. Furthermore, among Native American adolescents, school adjustment is a serious problem and dropout rates are high Chavers, Additionally, delinquency and crime are strongly linked to drug use, and there is increasing involvement of reservation youth in gangs. Alternatively, the environment can reinforce a protective sense of self-worth, identity, safety, and environmental mastery. Neighborhood and community factors may also serve to protect individuals from drug use and abuse. For example, restrictions on tobacco use in public places are statements of the preferences of the larger community. Such restrictions also reduce the number of opportunities to use tobacco. Restrictions on smoking in public places reinforce the norm that tobacco use is not acceptable IOM, a. Although, there has been substantial progress in identifying the many correlates of drug use, there is a dearth of research on the correlates of abuse and dependence and on the protective factors that are associated with decreased likelihood of abuse and dependence. Additionally, much of the research in the etiology of drug abuse has been conducted within specific disciplines, with little integration across multiple fields. For example, studies of social factors linked to drug abuse often fail to include key biological factors, and studies of the genetics of drug abuse rarely include assessments of the social context in which drug abuse occurs. Therefore, to advance progress in this area of research there is a need for multidisciplinary studies on the variables associated with the development of drug abuse. Protective Factors Although risk reduction is the goal of many prevention programs, another approach is to enhance protective factors. At the present time, however, there has been little longitudinal research on protective factors Page Share Cite Suggested Citation: Several investigators have noted that protective factors can moderate the effects of risk

conditions, thereby reducing vulnerability and enhancing resiliency Garmezy, ; Werner, ; Brook et al. Protective factors that have been suggested based on analyses of cross-sectional data include a positive mutual attachment between parent and child Brook et al. Additional protective factors that have been identified in young adulthood include employment, marriage, and childrearing responsibilities. It has been noted that several protective factors can ameliorate the negative effects of exposure to extreme stress Garmezy, Further research is needed, however, to determine which protective factors are relevant at different developmental stages, and more attention also needs to be given to mechanisms by which protective factors influence the onset and progression of drug abuse. Additionally, research on drug use has documented substantial racial and ethnic differences in drug use among adolescents, such as lower use of tobacco products among African American adolescents than white adolescents IOM, a; Johnston et al. The reason for this particular difference is unclear; influences may include the church, cultural consensus against youth tobacco use, or lack of attention from advertisers IOM, a. Research should be conducted to enhance understanding of racial and ethnic differences in the acceptability of tobacco use and how these differences may be used in the design of prevention interventions related to other drugs of abuse. Risk Factors Numerous longitudinal studies have identified the childhood antecedents of adolescent drug use e. However, far less research has been done on identifying childhood risk factors associated with drug abuse and dependence that are not associated with behavior problems but with individual vulnerability factors such as genetic predisposition and emotional disorders. Furthermore, there has been little hypothesis-based research to distinguish between causal factors and vulnerability factors for the development of drug abuse and dependence. Prospective longitudinal studies, especially of samples at high risk for drug abuse, would be useful in identifying risk factors and in discriminating between risk factors specifically associated with drug abuse and those that emanate from the broader context of deviant behavior. Additional work is also needed on the role of risk factors and protective factors at discrete developmental stages, particularly the transition from adolescence to adulthood, which has received scant attention. It is important to obtain a deeper understanding of the complex ways in which family factors affect adolescent drug use, including the role both of parents and of siblings. There is a striking lack of controlled family studies designed to address the role of familial factors that are critical for identifying patterns of expression of drug abuse and co-occurring psychiatric disorders; for testing the classic modes of genetic transmission of drug abuse; for determining the role of sex-specific patterns of transmission of drug abuse; and for elucidating the role of genetic and environmental factors and their interaction. The interaction of individual and familial risk factors in producing vulnerability to drug abuse also requires further study. For example, recent evidence suggests that parent and child psychopathology may occur in a mutually interactive fashion, with maternal depression elicited by offspring with behavior problems Blanz et al. Unique environmental factors may also play significant roles in determining which children within a family are at risk. In other words, one cannot assume that all children within a single family will experience the same environment, including their interactions with significant others. Both transmitted and nontransmitted family factors, as well as unique environmental factors, have been shown to have a major impact on the development of drug abuse Pickens et al. Environmental risk factors tend to operate most strongly in children with genetic vulnerability Rutter et al. It is therefore critical to identify the joint role of environmental and genetic factors in the etiology of drug abuse. The genetic epidemiological approach, which focuses on the joint effects of the contributions of host, agent, and environment, provides a powerful paradigm by which to gain an understanding of the interaction of variables for drug abuse. Several cohorts of subjects should be studied, including half-siblings, which would permit identification of nongenetic familial factors that may potentiate underlying vulnerability; fraternal twins, which would provide clues to the environmental risk and protec-

Page Share Cite Suggested Citation: Finally, the continued investigation of cohorts of twins and adoptees, particularly in studies that are designed specifically to reveal the mechanisms through which genes exert their influence on drug abuse vulnerability, are also likely to be fruitful. A family history of drug abuse is one of the most important risk factors for the development of drug abuse. However, the extent to which the increased risk is attributable to genetic factors involved in the metabolic, physiological, or subjective effects of drugs or to shared environmental factors such as impaired family relationships, negative role modeling, or, indirectly,

transmission of psychopathology, should be examined. There is a need for more studies that can discriminate the roles of genetics and social environment, and their interaction in the development of drug abuse. Genetic epidemiological paradigms such as adoption studies, twin studies, migrant studies, multigenerational family studies, and high-risk studies are particularly important methods for identifying the specific sources of familial influences on drug abuse. Research and treatment programs for drug abuse and psychiatric disorders have generally proceeded independently, with little emphasis on the large overlap between them. Indeed, treatment programs for drug abuse often require cessation of psychotropic medication as an admission requirement. Evidence from retrospective studies of drug abusers, and from a growing number of prospective studies, reveals a link between signs of emotional and behavioral problems beginning in early childhood and the subsequent development of drug abuse. Studies are needed to elucidate the specific mechanisms for the development of drug abuse secondary to psychiatric disorders such as bipolar illness, depression, anxiety disorders, and learning disabilities. The committee recommends multidisciplinary research to investigate the combined effects of biological, psychosocial, and contextual factors as they relate to the development of drug use, abuse, and dependence. The committee further recommends that studies be of long enough duration to enable follow-up of participants in determining the role of risk and protective factors related to the transition from use to abuse and dependence. Research areas should include the role of the following:

Page Share Cite Suggested Citation: Information resulting from such studies would be useful to the design of prevention and treatment programs. Efforts should be made to incorporate biological measurements in epidemiological studies of drug use, abuse, and dependence in representative population samples, both to establish the validity of the drug use reports and to identify biological risk markers for dependence. Differentiation of alcoholics high and low in childhood hyperactivity. *Drug and Alcohol Dependence* A four year follow-up of hyperactive boys with and without conduct disorder. *British Journal of Psychiatry* Drug use among young adults: The impacts of role status and social environment. *Journal of Personality and Social Psychology* Developmental variation in the context of marijuana initiation among adolescents. *Journal of Health and Social Behavior* Patterns and predictors of alcohol use among th grade students in New York State. *Journal of Studies on Alcohol* Baumrind D, Moselle KA. A developmental perspective on adolescent drug abuse. *Advances in Alcohol and Substance Abuse* 4: The divergence of black and white marriage patterns. *American Journal of Sociology* Familial adversities and child psychiatric disorders. *Journal of Child Psychology and Psychiatry* 32 6: A Prospective Longitudinal Study. Longitudinally foretelling drug usage in adolescence: Early childhood personality and environmental precursors. Maternal inheritance of alcohol abuse: Crossfostering analysis of adopted women. *Archives of General Psychiatry* Genetic polymorphism of human liver alcohol and aldehyde dehydrogenases and their relationship to alcohol metabolism and alcoholism.

Chapter 3 : The Future of Teen Drug Use? - by David W. Murray

Presented are 18 papers on predicting adolescent drug abuse. The papers have the following titles: "Current Issues in the Epidemiology of Drug Abuse as Related to Psychosocial Studies of Adolescent Drug Use"; "The Quest for Interpersonal Predictors of Marijuana Abuse in Adolescents"; "Assessing the.

This sequence of disorders may reflect developmentally specific forms of deficits in the ability to control behavior. Therefore, childhood antisocial behaviors and adolescent AUDs may share common genetic and environmental influences. A comprehensive conceptual model may clarify the relationship between childhood antisocial behaviors and adolescent AUDs. A better understanding of this relationship is essential for advancing research into the causes of both behaviors and for developing prevention programs and treatment for adolescents with these problems. Prevention programs targeting childhood antisocial behaviors have met with some success. Clinical interventions for adolescents with AUDs may be improved by focusing evaluation and treatment planning on antisocial behavior. Theories and empirical observations indicate that childhood antisocial behaviors increase the risk for alcohol use disorders AUDs. In its most severe forms, childhood antisocial behavior can lead to diagnoses of conduct disorder CD or oppositional defiant disorder ODD. Throughout this review, the term "childhood" will refer to age 12 and younger, and "adolescence" will refer to ages 13 through 19. Understanding the nature of the relationship between antisocial behaviors and AUDs is essential in planning interventions designed to prevent or ameliorate both types of behaviors or disorders. This article reviews antisocial behaviors and related mental disorders commonly found in children and adolescents and describes the relationship between antisocial behaviors and alcohol problems. The article then presents a conceptual model for explaining this relationship, including genetic and environmental factors that may play a role in the process. Finally, the article summarizes the implications of the relationship between antisocial behaviors and AUDs for understanding the etiology of AUDs, for developing effective methods to prevent alcohol problems, and for evaluating and treating adolescents with AUDs. They include conduct intended to injure people or damage property, illegal behavior, and defiance of generally accepted rules and authority, such as truancy from school. These antisocial behaviors exist along a severity continuum. Dimensions of Antisocial Behavior Diagnoses summarize a constellation of characteristics as the presence or absence of a disorder. Although diagnostic classifications of such antisocial behaviors as CD and ODD have both practical and scientific utility, one can also conceptualize these behaviors as occurring along multiple dimensions. Relevant dimensions include the categories of behaviors required for a diagnosis of CD, such as aggression and deceitfulness. One can also distinguish between overt antisocial behaviors, such as fighting, and covert antisocial behaviors, such as theft without confronting the victim Loeber et al. On the other hand, these syndromes are multidimensional, and some features overlap between CD and ODD i. For CD, overt antisocial behaviors may be meaningfully distinguished from covert antisocial behaviors Loeber et al. Developmental considerations are also important for understanding the implications of particular antisocial behaviors for predicting outcomes. For example, the early emergence of aggressive behaviors tends to be accompanied by ODD Loeber et al. Mild or moderate forms of the disorders, however, are considerably less stable Loeber et al. Antisocial behaviors also tend to be consistent across social settings, such as school and home Dishion et al. Although the propensity for serious antisocial behaviors is quite stable across the lifespan, the manifestations of this propensity vary according to developmental stages. This concept has been termed "heterotypic continuity" Moffitt For example, antisocial behavior that manifests as irritability and impulsivity in young children may manifest as criminal behavior once these children reach adulthood. The significance of specific childhood antisocial behaviors also depends, in part, on the timing of their appearance. An earlier age of onset of CD has been hypothesized to indicate more severe antisocial characteristics, although to date empirical support for this hypothesis exists only for boys Loeber et al. The extent to which antisocial behaviors persist across multiple developmental periods also may be an important distinguishing feature Moffitt For example, in some people such behaviors occur during childhood, adolescence, and adulthood i. This developmental distinction may be useful in understanding the relationship between antisocial behavior and AUDs.

Correlations among various antisocial behaviors over time have led to the theory that a general tendency toward psychological dysregulation may underlie many forms of childhood and adolescent psychopathology, including alcohol and other drug use disorders Tarter et al. Thus, childhood manifestations of deficits in the ability to control behavior i. Finally, children of parents with alcohol and other drug use disorders i. Childhood antisocial behavior, such as noncompliance with parental directives in the toddler years Eiden et al. Based on these observations, it is clear that childhood antisocial behavior precedes and predicts adolescent AUDs. Consequently, a conceptual model is needed to guide further investigation into the causal relationships between both types of behaviors. Such a model is presented in the following section. A Conceptual Model

Conceptual approaches from several traditions have proven useful for developing theories about the relationship between childhood antisocial behaviors and adolescent AUDs. The model presented here, and described in more detail in Clark and Winters in press , represents an integrated conceptual model and measurement approach that allows researchers to consider the multiple causes and effects shaping this relationship. This model is informed by prior theories Zucker et al. The model combines two approaches: The multifactorial model of complex traits. The theoretical framework of developmental psychopathology. This framework emphasizes specific methodological approaches and conceptual issues by contrasting normal and atypical development. It also takes into consideration that the effects of risk factors may vary across developmental stages Cicchetti and Cohen This model, as well as conceptualizations from several other traditions, hypothesizes that childhood antisocial behaviors and adolescent AUD have common causes. Several mechanisms may underlie these common causes. These mechanisms, which are not mutually exclusive and can both be included within the proposed comprehensive model, are discussed in more detail in the following sections. Behavioral undercontrol also has been hypothesized to underlie the observed associations among childhood CD, alcohol and other drug use disorders, and adult antisocial personality disorders. Accordingly, researchers have hypothesized that the neurobiological functions that modulate thoughts i. Consistent with this hypothesis, neuroimaging findings indicate that abnormalities in the structure of the prefrontal cortex are associated with severe antisocial behavior Raine et al. The rate with which certain brain circuits involving the prefrontal cortex mature may be an important mechanism through which genetic factors influence psychopathological manifestations Todd et al. Genetic Influences Behavior Genetics. Researchers have begun to investigate the extent to which similarities in antisocial behavior and AUDs among relatives result from genetic inheritance i. Studies in this area have provided convincing evidence that genetic factors contribute substantially to individual variations in both antisocial behavior and AUDs Tarter et al. Some studies have also suggested that the high correlations between ODD and CD symptoms can be attributed to genetic similarity Eaves et al. The characteristic features of behavioral undercontrol are highly susceptible to genetic influence, and common genetic factors may account for the associations between antisocial behaviors and drug use Young et al. To explore the role of genetic factors in the intergenerational transmission of antisocial behavior, Cadoret and colleagues studied adopted children and their biological and adoptive parents. They found evidence for a genetically transmitted pathway leading from antisocial personality disorder and drug use disorders in the biological parent to CD in the offspring and, subsequently, drug use disorders and antisocial personality disorder in the offspring. Other studies found that the correlation between childhood antisocial behavior and adult drug use disorders is more strongly influenced by genetic factors than is the correlation between adult antisocial behaviors and drug use disorders Grove et al. This observation reinforces the notion that childhood characteristics are of fundamental importance for the development of adult behaviors. The relationship between childhood antisocial behavior and the later development of AUDs may be the result of common genetic influences Waldman and Slutske In general, variations in the structure of certain genes i. Although extensive evidence has established that heritable factors are a major influence in the development of AUDs, researchers have not yet been able to identify the mechanisms leading to the development of AUDs and the specific genes involved. One candidate that has been implicated in AUDs is a brain signaling system called the dopamine neurotransmitter system. Accordingly, researchers have begun to study associations between genetic polymorphisms influencing dopamine and other brain signaling systems on the one hand, and the risk for AUDs on the other hand Vanyukov and Tarter These associations may provide

insights into the genetic, biochemical, and neurobiological mechanisms underlying AUDs and may also reveal the nature of the relationship between AUDs and antisocial behaviors Vanyukov et al. Environmental Influences Several environmental factors have been found to increase the risk for antisocial behavior as well as AUDs in adolescents. These influences include problematic family functioning, such as low levels of parental monitoring and inconsistent disciplinary practices Clark et al. The developmental psychopathology framework described earlier suggests that specific environmental factors may be particularly influential during critical developmental periods. Conversely, boys whose fathers had continuing drug use disorders exhibited significant psychopathology. For example, parental drug use and other pathology may directly influence parenting behaviors. In addition, the effects of parental pathology may be indirect. The dynamic interaction of genetic and environmental influences with certain behaviors over the course of development is particularly complex and therefore difficult to analyze Tarter et al. For example, for AUDs to develop, alcohol availability in the environment e. An adolescent who chooses peers who use alcohol and other drugs may be more frequently exposed to alcohol than is an adolescent with a different peer group. Such interactions are ideally taken into consideration when studying the relationship between childhood antisocial behaviors and AUDs. For example, early intervention for antisocial behaviors might reduce the risk of developing an AUD, and treatment for AUDs might be more effective if it also addressed behavioral undercontrol. These possible implications are reviewed in the following sections. Prevention A potentially effective strategy to prevent the development of AUDs involves using interventions designed to reduce childhood characteristics that predict adolescent AUDs, such as childhood antisocial behavior. Several research programs have been investigating this approach, and early reports have shown promising results. When the children receiving the LIFT intervention and a group of control children were reevaluated 3 years after the intervention, the LIFT program was found to delay the time to first regular alcohol use, first marijuana use, and first police arrest. Other similar projects are in progress e. Researchers also have identified effective interventions for childhood CD Sheldrick et al. Too often, clinical assessments lack this foundation. For example, clinical assessment strategies are typically unstructured and may lead to inaccurate diagnoses Clark et al. Systematic diagnostic interviews provide for a more thorough assessment with greater reliability and validity and have been advocated for both clinical evaluations and research Clark et al. Clark and Winters in press have proposed assessment strategies that are designed to provide the comprehensive and developmentally appropriate information that is necessary for clinical interventions, prevention, and related research. It is also important to recognize that AUDs have risk factors and consequences that manifest differently at various developmental stages. Assessment of relationships among various behaviors over time requires specialized measurement approaches called "diachronic assessment" strategies Clark et al. Recently developed statistical techniques that can provide more realistic summaries of growth and development e. The use of diachronic assessment strategies in combination with such innovative statistical modeling techniques can allow insights into the relationships among problem behaviors such as antisocial behavior and AUDs. Treatment Although achieving abstinence from alcohol is the optimal treatment goal for patients with AUDs, adolescents participating in conventional alcoholism treatments have high relapse rates Cornelius et al. Accordingly, programs for adolescents with AUDs may need to include interventions designed to reduce antisocial behaviors. Several treatment approaches specifically target CD. Psychosocial interventions with standardized methods and documented effectiveness include training parents in child management techniques and teaching children prosocial responses to interpersonal conflicts Sheldrick et al.

Chapter 4 : Childhood Antisocial Behavior and Adolescent Alcohol Use Disorders

The role of psychosocial risk factors in predicting treatment outcome also has theoretical interest given that such factors have been associated with the development of drug abuse. The sample consisted of male and female adolescents who were recruited at a hospital-based adolescent drug abuse treatment program.

Open in a separate window aNotes: All items are from the youth surveys unless noted in parentheses. In the analyses for all following predictors, both were included in the models as control variables. Bonferroni adjustment with family confidence coefficient 0. Table 1 first presents the odds ratios associated with the controlled variables, sociodemographic background variables and SDM predictors measured at age 10. Both internalizing and externalizing behaviors at age 10 were significantly associated with alcohol abuse and dependence at age 21. The effects of these two variables were controlled in all subsequent analyses. For males, the odds of alcohol abuse and dependence at age 21 was 2. Compared with European Americans, African Americans, Asian Americans and other ethnic groups had lower probabilities of alcohol abuse and dependence and Native Americans had higher probabilities of alcohol abuse and dependence at age 21. However, the differences were not statistically significant. Poverty, measured by whether the student was eligible or not for free lunch during the fifth, sixth or seventh grades, was not significantly associated with risk for alcohol abuse and dependence at age 21. The sociodemographic variables were not included in analyses of predictors at later years. Table 1 shows that 10 of the 34 SDM constructs measured at age 10 significantly predicted alcohol abuse and dependence at age 21. At age 10, delinquency predicted a higher probability of alcohol abuse and dependence at age 21. However, neither use of alcohol nor the use of other drugs in the previous month was significantly associated with a higher risk for alcohol abuse and dependence at age 21. At age 10, on the prosocial path of the social development model, a higher level of bonding to school significantly predicted lower risk for alcohol abuse and dependence at age 21. When considering the antisocial path, living in a neighborhood with more trouble-making youths predicted higher probabilities of alcohol abuse and dependence at age 21. In addition, having antisocial friends, frequent alcohol use among best friends, frequent contact with antisocial friends and a high level of bonding to the antisocial friends at age 10 predicted higher probabilities of alcohol abuse and dependence at age 21. Last, as early as age 10, intentions to use alcohol and favorable attitudes toward alcohol use predicted alcohol abuse and dependence at age 21. Middle school predictors of alcohol abuse and dependence Eight of the 44 SDM constructs measured at age 14 predicted alcohol abuse and dependence at age 21. Involvement in several problem behaviors predicted a higher risk of alcohol abuse and dependence at age 21, including having misbehaved at school, used alcohol in the last month and been sexually active. None of the predictors in the domain of external constraints at age 14 had a significant effect on alcohol abuse and dependence at age 21. At age 14, a number of factors on the prosocial path predicted significantly less risk of alcohol abuse and dependence at age 21. They are high levels of refusal skills, strong bonding to school and belief in the moral order. Two SDM constructs on the antisocial path at age 14 predicted higher probabilities of alcohol abuse and dependence at age 21. High school predictors of alcohol abuse and dependence Of the 41 SDM constructs measured at age 16, 24 predicted alcohol abuse and dependence at age 21. A number of problem behaviors predicted higher risk of alcohol abuse and dependence at age 21. These are having misbehaved at school, committed delinquency, used alcohol in the last month, been sexually active and been charged with offenses in juvenile court. Youths who reported good parental monitoring and clear family rules during the high school period had a significantly lower probability of alcohol abuse and dependence at age 21. A number of predictors on the prosocial path at age 16 predicted significantly lower risk of alcohol abuse and dependence in young adulthood. These are high levels of refusal skills, strong bonding to school, a high level of educational expectations and strong belief in the moral order. A variety of factors on the antisocial path at age 16 were predictive of increased risk of alcohol abuse and dependence at age 21. For example, more opportunities for antisocial activities e. Having more involvement with antisocial friends also predicted a higher probability of alcohol abuse and dependence at age 21. If a youth perceived fewer negative consequences low cost for antisocial involvement e. In addition, stronger bonding to antisocial community or antisocial friends at age 16

predicted a higher risk of alcohol abuse and dependence at age 10. Last, intention to use alcohol and favorable attitude toward alcohol significantly predicted higher probabilities of alcohol abuse and dependence at age 10. Gender differences in the effects of elementary, middle and high school SDM constructs. Very few significant gender by predictor interactions were found in this study. Of these 10 significant gender differences, three showed more predictive power for females than for males in the expected direction: family opportunities at age 10, average number of offenses at age 14 and alcohol use among siblings at age 16; the rest showed more predictive power for males than for females in the expected directions. In sum, six SDM prosocial constructs predicted a lower risk for alcohol abuse and dependence at age 10. The significant protective factors were strong bonding to school, high educational expectations, close parental monitoring of children and clearly defined family rules for behavior, appropriate parental rewards for good behaviors, high level of refusal skills and strong beliefs in the moral order only. Of these, only school bonding consistently predicted less risk for alcohol abuse and dependence from all three developmental periods. On the antisocial path, youths who had a higher risk of alcohol abuse and dependence at age 21 were those who engaged in more problem behaviors, had more opportunities for involvement with antisocial others, spent more time with and were more bonded to those individuals, viewed fewer negative consequences from antisocial behaviors and held more favorable views on alcohol use. Of those, prior problem behaviors, antisocial opportunities and involvement consistently predicted alcohol abuse and dependence from all three ages: Overall, with development from age 10 to age 16, more constructs of the SDM were significantly related to later alcohol abuse or dependence, as expected. Predictors of alcohol dependence The effects of SDM predictors at ages 10, 14 and 16 on alcohol dependence are also presented in Table 1. In general, SDM predictors that showed significant effects on the combined measure of alcohol abuse and dependence also showed significant effects on alcohol dependence across all three ages. It is interesting to note that, as shown by the size of the corresponding odds ratios, these significant predictors generally had greater effects on predicting alcohol dependence, in spite of the smaller number of youths in the study who met criteria for this more serious disorder. Crum and colleagues found childhood and adolescent academic performance important predictors of alcohol abuse and dependence in adulthood. This study found that childhood and adolescent bonding commitment and attachment to school also consistently protects against later alcohol abuse and dependence. The consistency in prediction from prior problem behaviors, antisocial opportunities and antisocial involvement across ages 10, 14 and 16, indicates the importance of continued prevention efforts throughout childhood and adolescence. These findings are consistent with prior reports of the importance of childhood and adolescent problem behaviors. e. Limitations of the study should be noted. First, it examined each SDM predictor independently from the others; thus, the present study provides a foundation for theory-guided multivariate analyses of alcohol abuse and dependence. In addition, although differences in the strength of predictors at different developmental periods were observed, the present methods do not allow assessment of whether these differences are statistically significant, nor do they allow the examination of whether the changes in these predictors over time had significant effects on the risk of alcohol abuse and dependence. Further studies focusing on these issues will yield more developmental insight into the etiology of alcohol abuse and dependence. It is noteworthy that on the prosocial path of the SDM, neither opportunities for prosocial involvement nor prosocial involvement were, by themselves, protective against later alcohol abuse and dependence. Another study using SSDP data showed that the prosocial socialization process of opportunities, involvement and rewards significantly predicted less alcohol misuse at age 18 through prosocial bonding and belief Lonczak et al. Prosocial opportunities and involvement may be only indirectly linked to later alcohol abuse and dependence. Many predictors of alcohol abuse and dependence found in this study have predicted such other problem behaviors among youths as early high school dropout Battin-Pearson et al. Preventive efforts targeting these predictors may not only yield beneficial results in the prevention and reduction of adolescent delinquency, violence or crime, but may also help to prevent and reduce alcohol abuse and dependence in young adulthood. This study found individual, family, peer, school and community factors, at ages 10, 14 and 16, that predicted alcohol abuse and dependence in early adulthood. These data suggest that preventing alcohol abuse and dependence in young adulthood is a long-term undertaking. It should begin early and should involve a broad spectrum of

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Chapter 5 : Early Childhood Behavior and Temperament Predict Later Substance Use | NIDA Archives

The purposes of this study were to examine the clinical utility of the Personal Experience Inventory (PEI) Psychosocial scales to predict adolescent drug abuse treatment outcome. The role of psychosocial risk factors in predicting treatment outcome also has theoretical interest given that such.

Vivek Murthy will he confront what is becoming the largest immediate health risk to American youth: Murthy acquired some political notoriety by casting guns as a public health issue, but when it comes to marijuana, he has been, at best, reticent. But all available evidence points in one, disturbing direction: And the link between legalization and increased use is becoming clearer by the day. The survey is school-based, reporting on the drug use of 8th, 10th, and 12th graders by type of drug used and by the frequency of use lifetime, past year, and past month, as well as daily cigarette and marijuana use. Researchers know that youth marijuana use is strongly related to perceptions of risk and norms of social disapproval. When marijuana use is perceived as a high risk and socially disapproved, marijuana use is low. When perceived risk or social disapproval decline, increased marijuana use will likely follow. One can tell people that rattlesnakes make good pets. The decline in perceptions of risk may be accelerating. As norms of disapproval and perceptions of risk for tobacco use are thankfully rising, tobacco use has declined. Perversely, the societal message concerning marijuana is leading us in exactly the wrong direction, and more youth now use marijuana than tobacco. Since , lifetime, past year, past month, and daily use of marijuana among 8th, 10th, and 12th graders combined have all increased by 13 , 9 , 16 , and 22 percent in the respective categories. About 26 percent of 12th graders who reported using marijuana in the past year have consumed edibles laced with the marijuana intoxicant, THC. But in states with medical marijuana laws, the rate is 40 percent of 12th graders, a statistically significant difference. In states that do not allow medical marijuana, Though the results of Monitoring the Future are based on self-reports and hence subject to some misreporting, the study samples used are fairly robust, with more than 40, students participating representing the approximately 18 million public and private high school students in the country. First, adolescent drug use presages subsequent drug use all throughout life, as drug use is largely an adolescent-onset behavioral disorder. Therefore, when youth use rates rise, we can expect the impact of that use to cascade through subsequent years. Conversely, the protective effect of shielding children from experimenting with drugs during adolescent years can literally last a lifetime. Second, as we have seen, steep declines in norms and attitudes among youth regarding marijuana use and its dangers portend greater use in the future. This relationship of attitudes and values to subsequent drug use has been well documented in the Netherlands, a country notorious for its liberalized drug use policies though policies that have been recently retrenched. When cannabis coffee shops opened in Amsterdam, researchers did not find the expected surge in Dutch youth marijuana use—lifetime use among Dutch to year-olds was 15 percent in But as a new generation of Dutch youth came of age under the liberalized regime with commercialized cannabis and shifting social norms, marijuana use rose dramatically , with 44 percent of to year-olds reporting lifetime use in —a threefold increase in just over a decade. We can similarly expect a looming social disaster if we do not take action to reverse course in our own country. Monitoring the Future showed us yesterday that the minds and well-being of all children and young adults remain at risk. How long must we wait before the Surgeon General casts politics aside and does his duty to the nation? How long before the Obama Administration confronts and rejects the travesty of legal, recreational marijuana?

Buy Predicting Adolescent Drug Abuse: A Review of Issues, Methods and Correlates (Research Issues Series - US Department of Health and Human Services.

Selected indexing terms included substance abuse prevention, risk factors, and protective factors. Research monographs from the National Institute on Drug Abuse and the Center for Substance Abuse Prevention were used, along with information from authors of prevention curricula. Studies of adult patients that investigated predisposing risk factors for substance abuse eg, genetic implications were also used. Care was taken to ensure studies included children from diverse racial and social backgrounds. Controlled random-designed studies were used to determine prevention program efficacy. Behavioral, emotional, and environmental factors that place children at risk for the development of substance abuse may be remediated through prevention and intervention programs that use research-based, comprehensive, culturally relevant, social resistance skills training and normative education in an active school-based learning format. THE DIRECT and indirect effects of alcohol and other drugs on children lead to many adverse health and safety risks for the child, family, and community. Understanding risk and protective factors that may affect the development of substance abuse is a first step in ameliorating the problem of drug use in the pediatric population. This article reviews the literature on the prediction, protection, and prevention of substance abuse in the pediatric population, including a list of available prevention programs for children across the age continuum. The younger a child initiates alcohol and other drug use, the higher the risk for serious health consequences and adult substance abuse. The sharp rise in pediatric HIV infection from to paralleled the occurrence of the crack cocaine epidemic. In this capacity, knowledge about available drug and alcohol prevention curricula and their researched effectiveness is of utmost importance. Some of the more widely available curricula have had modest to no significant improvements in drug use patterns yet, through sophisticated marketing, have been implemented in many school districts. Proactive approaches by pediatric health care providers to recommend the use of effective validated universal, selective, and indicated prevention curricula will assist community, public health, and school officials in their decisions to select and implement prevention programs. This study reported that, for the first time in 6 years, marijuana and other illicit drug use was unchanged among eighth-graders; in addition, there was a concurrent increase in disapproval of marijuana use among these students. Johnston, PhD, principal investigator for the Monitoring the Future Study, learn[ed] from the relapse in the drug epidemic in the s that drug use among kids is a persistent and recurring problemâ€”one which needs consistent and unremitting attention. It is a long-term problem, which means that we must institutionalize prevention efforts. If a child smoked tobacco or drank alcohol, they were 65 times more likely to use marijuana than a child who never smoked or drank. Children who used marijuana were times as likely to use cocaine compared with their peers who never used marijuana. The initiation of first drug use is determined by interactions between social, cognitive, cultural, attitudinal, personality, and developmental factors. The earliest influences to smoke, drink alcohol, or use drugs may come from the family. Factors that are related to drug use during adolescence include poor self-image, low religiosity, poor school performance, parental rejection, family dysfunction, abuse, under- or over-controlling by parents, and divorce. These disorders may initially present with relatively mild behavior problems and progress to severe symptoms such as stealing, aggression, and substance abuse. Difficult temperament, characterized by moodiness, negativity, poor compliance, and provocativeness, may lead to the child being criticized and ostracized by parents. The resultant parent-child interactions may lead to the coercive model of parenting that is often present in families who have children with substance abuse and delinquency. Childhood aggression has been reported to place a child at risk for adolescent substance abuse. Peer cross-pressure, 48 that is, the opposing influences on individuals exerted by the choices they make or by their socioeconomic standing or social group membership, may play a role in initiation of drug use. With the exception of alcohol, there was a direct relationship between peer cross-pressure and subsequent drug use; the lower the acceptance of drug use, the less frequent the drug use. The higher the perceived risk, the lower the drug use. Adolescents whose drug use is influenced by peer pressure, in the absence of psychological

dysfunction, are more likely to stop using drugs. The transmission of type II alcoholism, from father to son, demonstrated a high heritability despite environmental factors. It was hypothesized that this receptor gene, located on the qq23 region of chromosome 11, may confer increased probability for the development of alcoholism. Other studies suggest that the dopamine D2 receptor locus may serve as a gene that modifies expression of severe psychiatric disorders, rather than being a marker for alcoholism. The trajectory for these patterns of drug use may be found in childhood, where drug use is generally higher in boys than in girls. Notably, risk factors differed by sex. In short, for girls, the absence of resiliency ie, skills that allow a person to cope with adverse situations and the lack of self-control during early childhood predict both marijuana and hard drug use in adolescence. In boys, lack of self-control is strikingly important. Involvement with harder drugs seemed to represent an extension of the behavioral characteristics that predisposed to marijuana use in boys, while in girls additional psychopathological characteristics were usually present when harder drug use was evidenced. In another study, Luthar et al 66 reported that women who abused drugs had a higher incidence of internalizing problems, eg, depression, anxiety, and withdrawn behaviors, during childhood and had more severe psychiatric symptoms as adults. Conduct disorders were found more frequently in men who were in treatment for drug abuse. Family Ecology Childhood abuse has been implicated as a significant risk factor for later substance abuse. Unkempt, crowded, noisy, disorderly conditions where there is little emphasis on conventions and religion are very potent predictors of later drug use in girls. These findings were confirmed by later studies including that of Chilcoat and Anthony 70 who studied youths and found children in the lowest quartile of parent monitoring initiated drug use at earlier ages. Community Environment The percentage of children aged 12 to 17 years who have seen people selling drugs is higher in the African American community than in communities with a majority of white or Hispanic children More African American children aged 12 to 17 years are exposed to people who are high or drunk Despite this exposure, African American adolescents have a lower reported rate of drug use than their white peers. Youths living in the most disadvantaged areas were more than 5 times as likely to be offered cocaine as compared with those in more advantaged areas. Protective factors for the pediatric population include growing up in a nurturing home with open communication with parents and positive parental support. Resiliency is the property of an individual to overcome a negative set of life circumstances. Adolescent resiliency is associated with high intelligence, low novelty-seeking behaviors, and avoidance of friendships with delinquent peers. A chaotic family environment does not necessarily cause a child to be forever damaged. Where the risk-protective equation implies the tallying of factors, the Challenge Model asserts that individuals can achieve beyond the negative factors in their lives; in essence, resiliency. These include insight, independence, relationships, initiative, humor, creativity, and morality. As conceptualized in the work of Newcomb and Felix-Ortiz, 83 consideration and attention to both protective factors and risk factors are fundamental in developing effective prevention strategies. Prevention interventions Prevention efforts prior to were based on an information-deficit approach. The assumption was that children lacked adequate knowledge regarding the effects of drug use. Thus, prevention efforts involved the dissemination of information. During the s through s, prevention efforts focused on social and interpersonal influence models. The theory underlying this approach postulated that youth experimented with drugs and alcohol because they had not fully developed their own internal value system to resist external pressures. The prevention programs of the s offer a comprehensive systems approach. They are research-based, age-appropriate, culturally relevant interactive resistance models. These prevention programs promote protective factors while reducing risk factors using school-based curricula that include social resistance skills training and normative education. Active learning techniques are the primary teaching modality, as opposed to passive didactics. Small-group, role-playing, and interactive learning techniques are imperative in these programs. Prevention curricula have been developed for children from preschool ages to young adulthood. Young children are increasingly likely to feel pressure to drink alcohol and use drugs. The adolescence period represents the greatest risk for substance abuse. Programs are designated as universal, selective, or indicated. Universal interventions are designed to address a general population, such as a community or school. Selective curricula target an at-risk population, such as those curricula that are designed for children whose parents have drug or alcohol dependence. Indicated programs target individuals who

already demonstrate the problem behavior or have other high-risk behaviors related to initiating the target behavior. Research on the effectiveness of prevention curricula have generally focused on universal programs that target children in junior high and high school. One researched intervention that targets the elementary school child is the Seattle Social Development Project. Based on the theory that the greater the number of childhood risk factors the greater the likelihood of child delinquency and drug use, the Seattle Social Development Project employed a model of intervention focusing on both family- and school-based interventions in grades 1 through 4 to enhance protective factors against delinquency and substance abuse. The study by Hawkins et al 98 supports the presence of reduced incidents of drug use, antisocial and disruptive behaviors, and improved school performance following the implementation of the Seattle Social Development Project. Life Skills Training was found to be effective in lowering tobacco, alcohol, and marijuana use in a 6-year long-term randomized field trial involving New York State students in 56 high schools. Life Skills Training uses resistance skill training in a broader framework of self-improvement and interpersonal social skills development. Recent studies supported the effectiveness of the program in minority inner-city populations. Project ALERT includes normative education and resistance skills development to promote drug abstinence. Project STAR , using a resistance skills model, was integrated into 15 Kansas City, Mo, communities, involving more than adolescents. Interestingly, the programs both have a classroom component. In addition, Project STAR endeavors to involve the media, community organizations, and health policy officials as well as parents in a comprehensive network of activities. Efficacy of preschool prevention curricula are largely undocumented in controlled randomized outcome studies. Curricula that target elementary school students have not been studied with the same fervor as curricula designed for adolescents. Included in Table 1 are a representative sample of some of the more widely available and used prevention materials as noted in Center for Substance Abuse Prevention and National Institute on Drug Abuse publications. An asterisk has been placed by curricula that have proven efficacy in peer-reviewed outcome studies. There are many sources for obtaining information regarding available prevention materials for children and adolescents. Inclusion of prevention programs in Table 1 is not meant to represent endorsement or approval of programs by the authors or this journal. View Large Download Pediatric Substance Abuse Prevention Programs Knowledge development and dissemination in the field of substance abuse prevention relies, in part, on the review of studies outside general pediatric literature. Multiple disciplines, including public health, psychiatry, psychology, education, and criminal justice have participated in developing a body of knowledge on the risk and protective factors and the effectiveness of prevention programs. This review provides a synopsis of pertinent studies and available prevention programs for the pediatric population. Although much is known about the risk factors that lead to initiation of drug abuse, early intervention strategies targeting preschool and elementary school students are underrepresented in research literature. Further studies are necessary to develop alcohol and drug prevention programs that will have sustained effects across the age continuum. Understanding the risk factors that lead to substance abuse is paramount for the early identification and prevention of substance abuse in children. Active participation by pediatric health care providers in promotion of programs that enhance protective factors and social skills development through interactive child and parent curricula, while collaborating with communities and schools, will indemnify children against drug abuse. Careful evaluation of prevention program effectiveness for preschool to high school students is of utmost importance. Finally, to echo the words of Johnston, substance abuse in children is a complex multifactorial challenge that requires "consistent and unremitting attention.

Understanding which adolescents remain in substance abuse treatment may facilitate the development of effective strategies for enhancing engagement and retention. Using clinical service data from a large naturalistic sample of adolescents, we examined whether client characteristics predict retention.

Abstract Adolescence is a unique period in neurodevelopment. Alcohol and marijuana use are common. Recent research has indicated that adolescent substance users show abnormalities on measures of brain functioning, which is linked to changes in neurocognition over time. Heavy marijuana users show some subtle anomalies too, but generally not the same degree of divergence from demographically similar non-using adolescents. This article reviews the extant literature on neurocognition, brain structure, and brain function in adolescent substance users with an emphasis on the most commonly used substances, and in the context of ongoing neuromaturational processes. Methodological and treatment implications are provided. This review will present the current research regarding typical adolescent brain development and the subtle but significant abnormalities in indices of brain functioning associated with alcohol and drug use during this critical developmental period. Studies using neuropsychological assessment and structural and functional imaging will be discussed to help elucidate the relationship between neurocognition with alcohol and marijuana use. Additionally, methodological issues in neuroimaging and neuropsychological assessment research will be reviewed. While several decades of research with adults have shown that chronic heavy drinking is associated with adverse consequences on the adult brain¹, this relationship has only recently been explored in the adolescent brain. Understanding the effects of alcohol and drug use on adolescent neurocognition is crucial, being that rates of use increase dramatically between ages 12 and 18. While the developing brain may be more resilient to neurotoxic effects, exposure to alcohol and drugs during a period of critical neurological development may interrupt the natural course of brain maturation and key processes of brain development. Cognitive deficits resulting from these alcohol and drug related neural insults have potentially harmful implications for subsequent academic, occupational, and social functioning extending into adulthood. Therefore, neurocognitive sequelae from heavy drinking and drug use are important to elucidate. The interactions of these multidimensional factors have considerable implications for adolescent development. Included in these alterations are substantial changes in the efficiency and specialization of the adolescent brain, which is accomplished through synaptic refinement and myelination⁸. Synaptic refinement involves reductions in gray matter by eliminating unnecessary neural connections⁹. During adolescence, this synaptic pruning occurs primarily in the prefrontal and temporal cortex¹⁰ and in subcortical structures such as the striatum, thalamus, and nucleus accumbens¹¹. The adolescent brain also undergoes increased myelination, which allows for improved integrity of white matter fiber tracts and efficiency of neural conductivity¹³. Higher-order association areas appear to develop only after lower-order sensorimotor regions fully mature¹⁷, with frontal lobes being the final areas of the brain to complete development. Along with these neuromaturational changes, it is suggested that increased myelination allows for smoother, more efficient communication between frontal-subcortical brain regions, allowing for better top-down cognitive control in adolescence. In conjunction with these numerous brain transformations, shifting social influences and peer group affiliation heavily impact adolescent behaviors¹⁹. This may place youth at a particularly heightened risk for initiating and continuing alcohol and drug use. Studies have found that adolescent heavy drinkers exhibit decrements in memory²⁴, attention and speeded information processing^{25, 26}, and executive functioning²⁷. In a study comparing alcohol dependent and healthy control adolescents, Brown et al. A similar degree of reduction was found on attentional and speeded information processing tasks in abstinent adolescent drinkers. These findings are consistent with literature examining neurocognitive deficits in young heavy drinkers, which found similar decreases on attention and information processing, along with deficits in language competence and academic achievement. Deficits in executive functioning, specifically in future planning, abstract reasoning strategies, and generation of new solutions to problems, have also been found. While it has often been assumed that marijuana use is not linked to long-term cognitive deficits, recent data

suggest that even after four weeks of monitored abstinence, adolescents who regularly smoke marijuana performed poorer on performance tests of learning, cognitive flexibility, visual scanning, error commission, and working memory. Further, the number of lifetime marijuana use episodes was significantly related to overall poorer cognitive functioning, even after controlling for lifetime alcohol use. We prospectively examined neuropsychological functioning in 26 youths with no histories of alcohol or drug problems, and compared them to 47 youths with histories of heavy adolescent alcohol, marijuana, and stimulant use. Follow-up neuropsychological tests were given to the subjects seven different times across 8 years, on average between the ages of 16 to 25. While there were no significant differences between users and non-users on neurocognitive test scores at the first time point, heavy drinkers performed worse on cognitive tasks at age 24 than light drinkers. In particular, those who had a history of alcohol withdrawal symptoms. Overall, heavy drinking during adolescence was linked to a reduction in keeping up with age expectations. In summary, adolescence is characterized by dramatic increases in rates of substance use concurrent with ongoing neuromaturation. While neuropsychological studies have shown that adolescent substance use is linked to poorer spatial, inhibitory, and learning and memory functioning, neuroimaging techniques may elucidate the neural mechanisms of these performance deficits. Hippocampal Volume Magnetic resonance imaging MRI was used to examine structural differences in the hippocampus, an area of the brain crucial to intact memory functioning. Participants were classified as:

Chapter 8 : The Influence of Substance Use on Adolescent Brain Development

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