

REVIEW

Substance use and risk-taking among adolescents

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Abstract

Background: Among adolescents, substance abuse often occurs in conjunction with risk-taking behaviors.

Aims: This review explores the nature and etiology of concomitant risk-taking behaviors, addressing behavioral, genetic, temperamental, and family factors that accompany adolescent substance use.

Method: A literature review was conducted to determine the breadth of factors that contribute to adolescent substance abuse and correlated risk-taking behaviors, and to identify relevant evidence-based treatments.

Results: The literature review revealed that among adolescents, substance abuse occurs as part of a cluster of problems and risk-taking behaviors. Predisposing factors include temperament, genetics, neurobehavioral disinhibition, social competencies, parenting, abuse/neglect, and peer behaviors. Various interventions, including individual therapies, parent training, and family therapies comprise the empirically-supported treatments for these co-occurring behaviors.

Conclusions: The literature indicates that adolescents being seen for substance-related problems should be evaluated for engagement in other risk-taking behaviors, and school, peer, and social functioning. In addition, the data support that family, versus individual, interventions should be the norm for substance-abusing adolescents.

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Introduction

Adolescent developmental tasks include challenges of identity, autonomy, sexuality, academic functioning, and peer relationships (Cicchetti & Rogosch, 2002; Erikson, 1968). For many, this period includes normative experimentation with perceived facets of adult life, such as experimentation with substances (Jessor, 1987; Shedler & Block, 1990). Many adolescents who use substances also try out other risk-taking behaviors (RTBs) including

antisocial behaviors, delinquency, and high-risk sexual behavior (Ellickson et al., 2005; Wu et al., 2005). Such behaviors raise concern due to their potentially adverse consequences.

Aim of this review

This review explored the nature and etiology of adolescent risk-taking behaviors, specifically addressing factors that accompany substance use and interventions that have gained empirical support. This review contains three parts. The first section provides an overview of the convergence of substance use and risk-taking behaviors, including information on substance use disorders, risk-taking behaviors, high-risk sexual activity, and externalizing behaviors. The second component focuses on the etiology of substance use and risk-taking behaviors, containing information regarding “problem behavior syndrome”, temperament, genetics, neurobehavioral disinhibition, avoidant coping, competency in mainstream culture, genetics, parenting, abuse/neglect, and peer influences. The third section is dedicated to interventions for adolescent substance use and related risk-taking, with empirical support provided for individual, parent training, and family therapies.

Studies were collected by entering relevant keywords (i.e., “adolescents”, “substance use”, “risk behavior”, “treatment”) through a search engine (PsychInfo/EbscoHost). Additional studies were gathered through bibliography searches of the included studies.

Convergence of substance use and risk-taking behavior in adolescents

Substance use disorders

Though rare during early and middle adolescence, towards late adolescence, rates of diagnosable alcohol dependence start approaching those of adulthood (Clark, 2004). Yet, there are notable differences between adolescent and adult drinking patterns (Clark, 2004; Colby et al., 2004). Comparing adolescents and adults, Deas et al. (2000) found that adolescents drink less frequently than adults and have fewer physiological symptoms of alcohol dependence, but consumed similar quantities of alcohol per occasion.

Most adolescents who experiment with substances do not progress to adult substance dependence (Clark, 2004; Shedler & Block, 1990). Rather, substance-related problems naturally remit for most adolescents (Chassin et al., 2004; Colby et al., 2004). Several factors appear to increase the risk of adult dependence, including beginning regular or binge drinking at a younger age (Chassin et al., 2002; Clark, 2004), drinking larger amounts per occasion (Wells et al., 2004), and progressively escalating one’s alcohol use (Chassin et al., 2004; Chassin et al., 2002). Others have argued that adolescent characteristics, rather than drinking patterns, best predict later alcohol problems (Wells et al., 2004). In particular, comorbid psychopathology may increase adolescents’ risk of developing alcohol dependence (Clark et al., 1998).

Risk-taking behavior

Sexual activity. Like substance use, sexual experimentation during adolescence is normative and arguably, adaptive (Cooper et al., 2003). While not inherently dangerous, some sexual behaviors (namely, “high-risk sexual behaviors”) increase an adolescent’s risk of unplanned pregnancy, contraction of sexually transmitted diseases, and sexual violence. In high school samples, alcohol (Poulin & Graham, 2001; Stueve & O’Donnell, 2005), tobacco, and

marijuana use (Poulin & Graham, 2001) have been correlated with sexual activity. Moreover, for many adolescents, adverse sexual consequences occur while drinking, including unplanned sexual intercourse, multiple partners, and inconsistent condom use (Bonomo et al., 2001; Poulin & Graham, 2001). These risks are heightened for adolescents with comorbid psychopathology, who are 2–4 times more likely to engage in high-risk sexual behavior while drinking (Bonomo et al., 2001).

The constellation surrounding adolescent high-risk sexual activity is complicated. Genetics and parenting influence early maturation (Hetherington & Kelly, 2002). In addition, girls who undergo precocious puberty (Clark, 2004), or who look or feel older (Stueve & O'Donnell, 2005), attract the attention of older boys (Werner & Smith, 2001), who may invite girls to engage in substance use, delinquency, and high-risk sexual activities (French & Dishion, 2003). In addition, adolescents' high-risk sexual activity has evidenced independent associations with parents' alcohol use (Bonomo et al., 2001). Furthermore, adolescents with comorbid internalizing disorders may believe that using alcohol will facilitate enjoyable sexual encounters and the development of intimate relationships (Bonomo et al., 2001).

Externalizing behaviors

Adolescent substance use significantly overlaps with externalizing disorders. In a sample of adolescents with attention-deficit/hyperactivity disorder (ADHD), three times as many adolescents had comorbid substance use disorders (SUDs) as adolescents without ADHD (Kuperman et al., 2001). In addition, ten times as many adolescents with conduct disorder (CD) displayed comorbid SUDs compared with adolescents without CD (Kuperman et al., 2001). The pattern for oppositional defiant disorder (ODD) was different, however; adolescents with ODD were less likely to have comorbid SUDs than those without ODD (5.7% versus 8.9%, respectively; Kuperman et al., 2001). Frequently, the onset of the externalizing disorders precedes SUDs (Chassin et al., 2002; Kuperman et al., 2001).

Not only do adolescents with externalizing disorders have behavioral difficulties, they also initiate substance use earlier (Lillehoj et al., 2005). Moreover, their prognosis is consistently poorer. Specifically, in a sample of adjudicated delinquents, adolescents with SUDs and comorbid externalizing disorders engaged in higher levels of criminality and substance use than adolescents with only SUDs (Randall et al., 1999). In addition, adolescents with comorbid externalizing disorders displayed poorer family functioning and academic achievement, and greater susceptibility to antisocial peer influence.

Etiology of substance use and risk-taking behaviors

Problem behavior syndrome

This concomitance of substance abuse with RTBs led to the postulation of a problem behavior syndrome. With a sample of high school drinkers, Jessor (1987) found that problematic drinking was linked to other deviant behaviors and inversely related to "conventional" behaviors. From this, Jessor reasoned that adolescent problem drinking was embedded in a syndrome, reflecting a proclivity to engage in problem behavior. Jessor found that this syndrome accounted for 55% of the variance in male and 31% of female problem drinking. In a later study, he found that this syndrome predicted problem drinking seven to nine years later (Jessor, 1987).

While many studies containing diverse samples have found a confluence of adolescent problem behaviors (e.g., Bonomo et al., 2001; Jessor et al., 2003; Wu et al., 2005), Jessor's theory has been critiqued for its simplicity (McMahon & Luthar, 2006), weak correlations among the problem behaviors (Guilamo-Ramos et al., 2005), and poor fit of a "one-factor" solution (Gillmore et al., 1991; Willoughby et al., 2004). Specifically, with a sample of Canadian students, Willoughby et al. (2004) found that a three-factor model of problem behaviors (substance use and sexual activity), aggression, and delinquency provided the best fit. Similarly, with a slightly younger sample, Gillmore et al. (1991) found evidence for a three factor solution containing problem behaviors, delinquent behaviors, and substance use. However, while both Willoughby et al. (2004) and Gillmore et al. (1991) found that a single factor did not provide adequate fit, both also found substantial intercorrelation among their factors. Notably, while these studies failed to support a "one-factor" solution, they also did not yield a reliable multidimensional solution for intercorrelated problem behaviors.

If substance use is indeed part of a more generalized cluster of RTBs, what accounts for this concomitance? There are several hypotheses.

Personality predisposition

Temperament. Several temperamental features may predispose an adolescent to participate in RTBs. The temperamental characteristic of impulsivity interferes with an adolescent's ability to make wise decisions around RTBs, due to the inability or reluctance to enter into a cost/benefit analysis around the behavior, to resist the temptation of engagement, or to foresee any potential negative consequences (Cooper et al., 2003). In contrast, some adolescents have temperamental features that favor thrill and risk, such as high levels of sensation seeking. Temperamental characteristics of anger and negative affect are also thought to put adolescents at risk for RTBs. These various temperamental characteristics may not be mutually exclusive; rather, adolescents with difficult temperaments, poor self-control, high levels of sensation seeking, neuroticism, aggression, anger, and impulsivity, may be at particular risk of engaging in RTBs (Bonomo et al., 2001; Chassin et al., 2004; Cooper et al., 2003).

Neurobehavioral disinhibition. Tarter and colleagues (2003) have collapsed several risk features into a factor they have titled "neurobehavioral disinhibition" (ND). Comprised of indicators of executive cognitive functioning, emotional regulation, and behavioral control, they posit that this factor reflects the integrity of the prefrontal cortex. Moreover, when contrasted with externalizing disorders, Tarter and colleagues (2003) found ND to be a significantly stronger predictor of later involvement in SUDs (ORs = 4.74 vs. 6.83, respectively).

Avoidant coping. Avoidant coping encompasses responses to stressors that orient one away from the stressor, and away from related thoughts and emotions (Ebata & Moos, 1991). Avoidant coping has been found to predict involvement in substance use (Cooper et al., 2003), high-risk sexual behavior, substance use, delinquency, and educational underachievement (Cooper et al., 2003). Negative emotionality may particularly influence participation in RTBs among individuals prone to avoidant coping (Cooper et al., 2003).

Competency in mainstream culture. Excelling in academics and high IQs may protect adolescents from engaging in RTBs (Whitmore et al., 2000; Wills et al., 2004). Adolescents who engage in lower levels of RTBs tend to be smart (Masten, 2001;

Masten & Coatsworth, 1998), academically connected (Jessor et al., 1998a), and achievement-oriented (Werner & Smith, 2001). Academic connection is particularly protective for the most disadvantaged (Jessor et al., 1998b) and low-achieving youth (Bryant et al., 2003).

Genetic predisposition

Data have supported the strong influence that genetics have in the development of SUDs (Chassin et al., 2004; Libby et al., 2005), comorbid disorders (Kendler et al., 2003), and other psychopathology (Chassin et al., 2004; Clark et al., 2004), surpassing the influence of environmental factors (Haber et al., 2005; Heath et al., 1997). Moreover, evidence has indicated a shared genetic path whereby having a father with alcohol dependence places adolescents at increased risk for developing SUDs as well as conduct disorder (Haber et al., 2005).

Environmental predisposition

Parenting. In addition to genetics, parenting contributes to the generational transmission of SUDs (Nilsson et al., 2005). Stressors in parents' lives disrupt healthy parenting (Hetherington & Kelly, 2002; Patterson, 2002). Adolescents living in families replete with stress and conflict, but without discipline and nurturance, may be more likely to use substances (Chassin et al., 2002). In addition, parents who use substances have adolescents who use more substances (Li et al., 2002) and engage in other RTBs (Bonomo et al., 2001).

While children of overloaded parents may display greater adjustment and discipline problems (Patterson, 2002), parents who maintain effective communication and monitoring (Clark et al., 2005) have adolescents who engage in lower levels of RTBs. Parents who are available and attentive (French & Dishion, 2003) have good communication skills (Oman et al., 2004), and who clearly state their expectation that their children are not to use substances (Kosterman et al., 2000) have children better able to decline peer offers of substance use and high-risk sexual activity (French & Dishion, 2003; Wills et al., 2004). In addition, effective parenting may help protect against genetic liabilities for SUDs (Nilsson et al., 2005).

Physical abuse, sexual abuse, and neglect. Adolescents with histories of violence and neglect are at higher risk for SUDs, RTBs, and comorbid internalizing disorders (Clark et al., 2003; Kilpatrick et al., 2003). Some have posited that victimized adolescents may use substances to cope with the anxiety, depression, and post-traumatic stress symptoms that emerge from abuse (Simpson & Miller, 2002). Consistently, sexual abuse histories have been linked with SUDs in women (Simpson & Miller, 2002).

Peer network. During their teenage years, most adolescents form small social groups within which they explore behaviors, identities, and values (Erikson, 1968). Moreover, peer influences often overshadow those of parents (Chassin et al., 2002), especially when parent-child relationships are strained (Jaccard et al., 2005). Rarely do adolescents engage in RTBs alone; adolescents who experiment with substances (McCambridge & Strang, 2004b; Schulenberg & Maggs, 2002), high-risk sexual behaviors, and delinquency, frequently have friends who participate in the same RTBs (Dishion et al., 1999; Kosterman et al., 2000).

Where peers may draw adolescents toward risk-taking, peers may also provide protection against RTBs (Hetherington & Kelly, 2002). Adolescents surrounded by prosocial peers are less likely to engage in RTBs (Oman et al., 2004; Werner & Smith, 2001).

Common interventions for substance abuse and risk-taking behaviors

Various forms of psychotherapy with adolescents have addressed substance abuse and RTBs. Evidence-based treatment approaches currently include individual therapies for adolescents, training for parents, and family therapies.

Individual therapies

Several individual therapies help adolescents reduce substance use and improve psychosocial functioning. Three types of individual therapies have gained empirical support with adolescents: cognitive-behavior therapy (CBT; Webb et al., 2002), motivational interviewing (MI; Miller & Rollnick, 2002), and the adolescent community reinforcement approach (ACRA; Godley et al., 2001; Meyers & Smith, 1995). Across studies, individual CBT has demonstrated efficacy in reducing substance use (Dennis et al., 2004; Waldron et al., 2005). Adolescents receiving MI have demonstrated reductions in alcohol use, related risk behaviors (Barnett et al., 2001; Monti et al., 1999), marijuana use (Strang & McCambridge, 2004), and poly-substance use (McCambridge & Strang, 2003, 2004a).

Parent training

Noting the relationship between parenting and adolescent substance use, Patterson and colleagues have assessed parent training since the 1960s. Recently, studies have found that participation in parent training increased parental monitoring (Dishion et al., 2003), and decreased family conflict (Dishion & Andrews, 1995), adolescent substance use (Dishion et al., 2003), and adolescent behavior problems (Dishion & Andrews, 1995).

Family interventions

Several researchers have emphasized the importance of multi-level interventions for adolescents with SUDs and comorbid externalizing disorders (Clark, 2004; McClelland et al., 2004). Three types of family-based interventions have gained support in treating families with substance abusing adolescents (Liddle, 2004): Brief Strategic Family Therapy (BSFT; Szapocznik et al., 2003), Multidimensional Family Therapy (MDFT; Liddle et al., 2001; Liddle & Hogue, 2001), and Multisystemic Therapy (MST; Henggeler & Borduin, 1990; Henggeler et al., 1998).

Developed for Hispanic and African-American youth with persistent conduct and substance-related problems (Szapocznik & Williams, 2000), BSFT emphasizes the behaviors and interactions of the family, culture, and key social systems (Szapocznik & Williams, 2000). During the last two decades, Szapocznik and colleagues have found that families receiving BSFT evidenced reduced adolescent substance use and improved family functioning (Szapocznik & Williams, 2000). In addition, when compared with adolescents who received group therapy, adolescents who received BSFT demonstrated significantly reduced conduct problems, delinquency, and self-reported substance use, and significantly improved family cohesion and interactions (Santisteban et al., 2003).

Like BSFT, MDFT was created as a developmentally-conscious intervention to reduce adolescent substance abuse (Liddle & Hogue, 2000). Like BSFT, MDFT aims to enhance intra-family interactions (Liddle et al., 2001; Liddle & Hogue, 2001). However, MDFT also operates at a larger systems level to enhance the relationships between the family and relevant social systems (Liddle et al., 2001). Adolescents receiving MDFT have displayed

sustained reductions in substance use at 6 and 12 month follow-ups (Liddle, 2004; Liddle et al., 2001), as well as improvements in externalizing symptoms, family cohesion, and school behavior (Liddle, 2004).

Like BSFT, MST is a strength-based approach, aiming to empower families of adolescents engaged in substance use and delinquency (Cunningham et al., 1999). Like MDFT, MST focuses on the interface between the adolescent, family, peer, school, and social networks (Henggeler, 1999). Across evaluations, MST has gained support with adolescent offenders, showing improved caregiver functioning, family cohesion, caregiver supervision of the adolescent (Cunningham et al., 1999), and reduced adolescent criminality (Henggeler et al., 2002). With respect to substance use, Henggeler and colleagues (2002) have found mixed results, potentially explained by low treatment fidelity in their MST condition.

All three empirically-supported family interventions approach adolescent SUDs and RTBs with a similar theoretical framework (Liddle, 2004). This stance posits that family functioning and adolescent development are intimately interconnected; adolescents who are emotionally labile, impulsive, and/or prone to avoidant coping are difficult to parent and provoke less supportive parenting styles. Moreover, intra-family conflict, coercive, and permissive parenting styles negatively affect adolescent behavior and development. Not only do struggling adolescents negatively influence the health of their family system, but antisocial, and frequently substance-abusing, peers also surround them. Ultimately, these family interventions seek to create a positive cascade; when family interactions change for the better (Kumpfer & Alvarado, 2003), so do other aspects of the adolescents' and parents' lives. When compared with other interventions, such as individual therapy, adolescent group therapy, family psychoeducational drug counseling (Liddle, 2004), parent education, family education, family support, and family preservation efforts (Kumpfer & Alvarado, 2003), family therapy has consistently evidenced greater reductions in adolescent SUDs.

Research is only beginning to explore factors that may mediate the effectiveness of family therapies. Many questions remain regarding how family-focused factors affect treatment outcome (Diamond & Josephson, 2005). However, as posited in the adult treatment literature (Hubble et al., 1999), factors common across these family treatments may be responsible for their efficacy, such as the emphasis on alliance, strength-based and non-confrontational approaches, and the fundamental belief that changing family interactions initiates a cascade of positive benefits across the systems in which a child is embedded. These factors common to family therapies may help shift the family functioning from one that supports and maintains discord, to one that unifies and supports healthier interactions.

Future directions

Adolescent substance use frequently co-occurs with several other risk-taking and externalizing behaviors. However, while some of the interventions help decrease adolescent substance use, some of the family therapies appear better equipped to intervene with facets of comorbid risk-taking behaviors. Specifically, evidence supports BSFT's ability to reduce comorbid conduct issues, MDFT's ability to decrease externalizing symptoms, and MST's efficacy in reducing delinquency. However, as delineated in this review, several of these behaviors co-occur; therefore, at this time, the literature is missing a rigorous evaluation of family therapies across a number of co-occurring behaviors, such as conduct disorders, externalizing symptoms, *and* delinquency. Moreover, interestingly, none of these trials evaluated the efficacy of these interventions with high-risk sexual behavior. As serious diseases from high-risk sexual behavior are both relatively easy to contract and

straightforward to prevent, an important next step for the field of adolescent health is to determine the efficacy of family interventions to reduce concomitant high-risk sexual behavior.

Conclusion

Substance abuse rarely occurs in isolation. Hence, adolescents being seen for alcohol/drug problems should also be evaluated for other RTBs, including high risk sexual activity, delinquency, and conduct problems at home and school, and for a history of sexual or physical abuse. It is common for RTBs to co-occur, though patterns are variable and do not seem to support a single problem-behavior syndrome. With comorbidity well-established, research needs to move past demonstrations of concomitance, to address protective personal, family, and environmental attributes (e.g., Jessor et al., 2003; Masten et al., 2005; Oman et al., 2004).

The close relationships of adolescent substance abuse with family functioning suggest that family, rather than individual evaluation, should be the norm when seeing youth in trouble with substances. Broader evaluation of functioning across school, peer, social, and environmental domains is also warranted.

There is good news in the range of available evidence-based treatments. There are effective treatment approaches for the adolescent, for parents, and for the family together. Outcome data favor inclusion of the family in treatment when addressing adolescent SUDs and co-occurring RTBs. Parental monitoring, stating clear expectations, and open family communications favor better outcomes. Parents' own use of alcohol and other drugs is an important risk factor that should be considered in treatment.

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