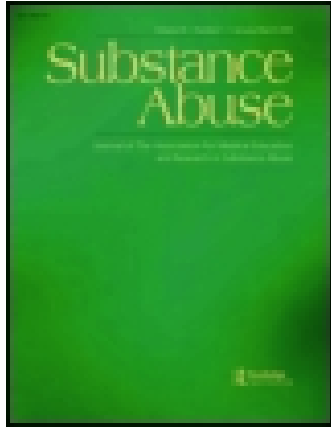


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A Review on Attachment and Adolescent Substance Abuse: Empirical Evidence and Implications for Prevention and Treatment

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A Review on Attachment and Adolescent Substance Abuse: Empirical Evidence and Implications for Prevention and Treatment

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ABSTRACT. *Background:* This paper reviews research on the relation of attachment and substance use disorders (SUD) in adolescence. Based on a theoretical introduction, we review evidence for a possible general link between SUD and insecure attachment, for links between specific forms of SUD and specific patterns of attachment, and for studies on family patterns of attachment in adolescence. *Methods:* Using medical and psychological databases, we identified 10 studies on adolescent SUD and another 13 studies on adult SUD. *Results:* Empirical evidence strongly supports the assumption of insecure attachment in SUD samples. With regard to specific patterns of attachment, results mainly point towards fearful and dismissing avoidance, while single studies report preoccupied and unresolved patterns. Results indicate different patterns of attachment in different groups of substance abusers. That is, fearful-avoidant attachment in heroin addicts and more heterogeneous results in abusers of other substances. Explorative data suggest different types of insecure family attachment patterns, which might imply different functions of substance abuse and lead to different treatment recommendations. Methodological problems such as poor assessment of SUD and the use of different measures of attachment limit comparability. *Conclusions:* Though a lot of research is still needed to address the unknowns in the relation between attachment and SUD, there is strong evidence for a general link between SUD and insecure attachment. Data on connections between different patterns of attachment and different pathways towards SUD are less conclusive but mainly point to disorganized and externalizing pathways. Evidence suggests that fostering attachment security might improve the outcome of state-of-the-art approaches in both early interventional treatment and prevention. Implications for individual and family approaches are outlined.

Keywords: Attachment, Adolescence, Substance Abuse, Prevention, Treatment

INTRODUCTION

Adolescence is a significant period of life regarding the development of substance use disorders (SUD). The vast majority of substance use is initiated in this time¹. Recent reviews on advances in the study of the developmental psychopathology in substance use^{2,3} highlight the need for studying multiple pathways toward SUD and the importance of adolescence as a crucial developmental period in which SUD trajectories escalate. These multilevel analyses attempt to integrate the host of (genetic, neural, socio-emotional, cognitive, environmental) antecedents and consequences of SUD. A discussion of these multiple facets is beyond the scope of this paper. Instead, we will focus on attachment as one potentially organizing influence on socio-emotional antecedents of SUD and as a developmental theory with great explanatory power with regard to the massive emotional and relational changes during adolescence. To date, the role of attachment in developing substance use problems is understudied. Though insecure attachment is an important risk factor for a host of adolescent mental health problems⁴, we still lack an overview of existing research linking insecure attachment with SUD. This paper attempts to close this gap by gathering, examining and structuring available empirical evidence in order to guide future research in the field, and in order to discuss implications for treatment and prevention. Interventions for SUD in adolescence are of special importance because they can help to prevent long-lasting addictive disorders.

Attachment

Attachment is defined as a motivational, behavioral, and interactional system that provides security for immature offspring. The attachment system regulates distance and closeness of parents (or “attachment figures”) and children. The child will seek closeness to its parents whenever it feels in danger. Ideally, parents will then comfort the child, calm it, and give it a feeling of security. This feeling of security or “secure base” helps the child to regulate its affects and is an important step on the way to acquiring its own coping strategies when facing fear or distress. Against the backdrop of a “secure base,” the child can explore its environment^{5 6 7 8}. At the same time, secure attachment is the base for an exploration of its own inner world and that of others, i.e., for the ability to “mentalize”⁹ and for gaining a coherent picture of mental processes. Over time, experiences with attachment figures are internalized. The child develops cognitive representations, (“inner working models,” “IWM”) of him-/herself and of his/ her attachment figures. If positive IWMs are developed, other persons than the original attachment figures can also become a secure base. Additionally, positive IWMs make it possible to regulate affective states autonomously without depending on another person. In this sense, “secure attachment liberates.”¹⁰

Besides this secure pattern, attachment theory defines different insecure patterns. These include different ways of coping with negative experiences in close relationships, as well as different means of regulating negative affect and expressing attachment needs. Children with ambivalent (also called: preoccupied/ enmeshed/ anxious) patterns use maximizing, affectively hyper-activating strategies. They focus on their own distress and on the availability of caregivers. This strategy places them at risk for a pathway towards internalizing disorders. Children with

dismissing-avoidant strategies on the other hand tend use minimizing, affectively deactivating strategies. They defensively turn their attention away from their emotional distress and their attachment figures, therefore running a higher risk for a pathway towards externalizing disorders¹¹. There is a third group of patterns lacking functioning coping strategies and implying the strongest risk for the development of severe psychopathology: disorganized patterns of attachment. These are associated with parental psychopathology (substance use disorders among others), with traumatic experiences (sexual abuse and maltreatment), as well as loss and neglect¹².

Attachment research has developed different measures (see Table 1). These share the basic distinction between secure and insecure attachment, but differ in the definition and labeling of specific patterns. While attachment interviews assess representations, self-report questionnaires assess attachment styles. Another important difference is the distinction between dismissing- and fearful-avoidance as defined by the Bartholomew model¹³, with the first one corresponding to dismissing attachment in the Adult Attachment Interview (AAI)¹⁴ and the second one to avoidant attachment in the Hazan & Shaver Self Report (HSSR)¹⁵. Fearful-avoidance describes individuals without functioning attachment strategies and is therefore considered to be on a level of disorganized attachment¹⁶, together with disorganized-unresolved, hostile-helpless, and cannot-classify representations in the AAI. These four concepts are different from each other but share the lack of coping strategies and the heightened risk for developing mental disorders.

[TABLE 1 HERE]

Attachment in adolescence

Adolescence is a transitional period in which the exploratory system is highly activated. Step by step, adolescents gain a new degree of autonomy – they spend less time with their parents and the relationship moves from dependency to mutual reciprocity. However, “adolescent autonomy is most easily established not at the expense of attachment relationships with parents, but against the backdrop of secure relationships that are likely to endure well beyond adolescence.”¹⁹(p.319). Byng-Hall²⁰ coined the term “secure family base” to describe this backdrop. Keeping the balance of autonomy and relatedness to parents on an age-appropriate level is characteristic for secure attachment in adolescence¹⁷. This in turn predicts positive adolescent adjustment with regard to problem behavior, mental health and relationships with family and peers¹⁸. Insecure attachment on the contrary is a risk factor for a host of problems in all of these areas⁴. Longitudinal as well as cross-sectional studies have shown that dismissing-avoidant attachment is linked to externalizing disorders while preoccupied attachment in adolescence is linked to internalizing disorders, with specific family contexts mediating this relation. Though disorganized attachment is assumed to be the pattern that is linked with the most severe forms of psychopathology, there is little empirical research on this in adolescent samples⁴.

Attachment and adolescent SUD

Attachment processes are seen as one influence among others within a multi-factorial model of adolescent substance abuse. Their potential importance for the understanding of substance abuse

lies in their focus on emotion regulation, relationship behavior and coping strategies^{21 22}. This corresponds to approaches viewing substance abuse in adolescence as an attempt to cope with emotional instability and lack of control²³ and with an overall pattern of affective, cognitive and behavioral dysregulation²⁴. Insecure individual patterns of attachment might be an important risk factor for these dysregulations, and “insecure family bases” might help to explain the problems in relationships with parents and peers, which often are connected with adolescent SUD. An open question is: is there a general relation between attachment and substance abuse, or are there more specific links between specific patterns of attachment and the abuse of specific substances? Though SUD has often been considered an externalizing disorder, recent multilevel analyses have identified two prototypic pathways to SUD. The externalizing pathway²⁷ is characterized by a tendency toward disinhibited behavior leading to risk-taking behavior in adolescence. The internalizing pathway²⁸ is characterized by impaired emotion regulation capabilities from early childhood on, possibly leading toward the desire to self-medicate when facing negative affect^{2 25}. If attachment was related to these pathways, research should show dismissing attachment to be linked to the externalizing pathway and preoccupied patterns to the internalizing pathway^{4 11}. Research in clinical SUD samples shows high rates of individuals who have suffered sexual abuse or maltreatment (30-50%²⁹) as well as other risk factors for disorganized attachment like parental psychopathology, loss, or neglect¹². This should lead to high rates of disorganized attachment in SUD samples^{12 30}. Here, substance abuse might be an attempt to self-medicate PTSD-symptoms, and an attempt to substitute for a lack of coping strategies. Additionally, the abuse of specific substances might be an attempt to cope with, to “self-medicate”²⁵, specific forms of emotional distress²⁶. Findings of a relation between specific forms of SUD and specific

patterns of attachment would support this assumption. For example, the abuse of stimulants might be linked to more hyper-activating, maximizing attachment strategies, while the use of sedatives might be linked to deactivating, minimalizing strategies.

The relation between attachment and SUD probably is interactional. Substance abuse in adolescence has a host of well-known developmental consequences^{31 32}. From an attachment perspective, three mental processes are directly affected. First, exploration of the environment is reduced, distorted, or risks are taken that would never have been taken in a state of sobriety. Second, mentalization, the exploration of the inner, mental world of self and others is reduced. This even might be a possible motive for substance abuse: non-mentalization and non-perception of distress and painful memories. Third, age-appropriate experiences in relationships often are inhibited or even prevented. In sum, substance abuse in adolescence might have a negative impact on attachment in adulthood.

Brain substrates of attachment and substance abuse

Psychotropic substances link into the same mesolimbic and mesocortical circuits that are also the foundation of attachment processes. Animal studies have demonstrated that attachment processes are largely transmitted by the endogenous opioid system (EOS)³³ (as well as dopamine, oxytocin, and vasopressin). Endorphin deficits create emotional distress not unlike insecure or lacking attachment. For example, distress vocalizations of young animals (as a measure of separation protest) increase with a lack of opioids and decrease with opioid administration³⁴. On the other hand, the experience of a “secure base” is linked to endorphin release³⁵. This emotional state of a child finding security and comfort in his or her mother’s “safe haven”^{5 36} is similar to that of

opioid consumption. In humans the latter leads to a mixture of euphoria and sedation, described as “contentedness, well-being and feeling carefree” and as “a feeling of calm, a relief from fear and sorrow”³⁴. Both emotional experiences are transmitted by the same brain circuits³⁷, prompting Insel³⁸ to ask, if “social attachment was addictive disorder?” Psychotropic substances are attractive and dangerous because they are able to “hijack” brain circuits that transmit attachment needs. Deficits in the EOS might be a bio-chemical substrate of insecure attachment, and they have been assumed to be a key influence on substance abuse³⁹. While different substances are able to link into these brain circuits, exogenous opioids then might be the most efficient “attachment substitutes” and the most attractive substances for individuals with very insecure patterns of attachment.

Research questions on attachment and substance abuse in adolescents

Our review of empirical studies is guided by three research questions.

1. Is there evidence for a general link between substance abuse and insecure attachment?
2. Is there evidence for more specific relations between specific patterns of insecure attachment and specific forms of substance abuse (e.g., opioid abuse)?
3. Is there evidence for specific patterns of attachment within the families of substance abusing adolescents, such as secure or insecure “family bases”?²⁰

REVIEW

Methods

Literature for this review was scanned in PubMed, PsycArticles, PsycInfo and Psynex databases for “all years,” with a final update on February 24th, 2014, using the keywords of this paper (plus variations such as “attachment theory”, “substance use”, “addiction,” etc.). Additionally, references in relevant papers and presentations were tracked. We were able to identify 10 studies on adolescent SUD and another 13 studies (in 15 articles) on adult SUD. Though we only included studies grounded in attachment theory, the use of different attachment measures made results difficult to compare¹⁶ (see Table 1). Additional methodological problems arise from flaws in the assessment of substance abuse and in sample selection. Samples were very heterogeneous, and the numbers of participants with SUD were small or not even reported. Authors often do not report which substances were consumed in which frequency and amount. Only very few studies tried to validate their data by the use of urinalyses or similar measures. Furthermore, high rates of comorbid mental disorders make it difficult to define the specific impact of substance abuse⁴⁰.

Results

A vast body of research has established the links between attachment, affect regulation, IWM, and developmental consequences⁴¹. In the following, our interest lies in examining the link between attachment patterns and substance abuse. We will describe studies in adolescent

samples and additionally summarize briefly results of studies on adults. Table 2 gives an overview over all studies on attachment and SUD in adolescence.

[TABLE 2 HERE]

Question 1: Insecure attachment and substance abuse

All studies in the review show a link between insecure attachment and SUD. A longitudinal study demonstrated that securely attached adolescents (as assessed with an adolescent version of the HSSR¹⁵) at age 14 consumed a lesser amount of substances at age 16. This effect was moderated by maternal monitoring⁴². In a second study, attachment security at age 13 prevented heavy drinking episodes at age 15 in the presence of other risk factors⁴³. These longitudinal studies support the assumption that secure attachment is a protective factor *against*, while insecure attachment is a risk factor *for* substance abuse. Odds ratios for this effect have been estimated between OR = .60 to .70 in a meta-analytic calculation⁴⁴. Thus, the risk for substance abuse is about one third lower for securely attached adolescents. These results do not mean, however, that secure attachment is linked to complete abstinence. It has been found to be linked to experimental substance use in adolescence⁴⁵. This substance *use* was related to the developmental task of learning to handle culturally accepted substances. But whenever research goes beyond experimental use and investigates substance abuse and addiction, the relation to insecure attachment is unambiguous^{45 40 41}.

Question 2: Specific patterns of attachment and specific types of substance abuse

Three AAI-studies have examined adolescent samples. A small German study⁴⁶ found dismissing, unresolved, and cannot-classify (CC) representations in adolescent drug addicts using cannabis, alcohol, and multiple substances. Two other studies examined samples of adolescents in psychiatric inpatient treatment with SUD and other psychiatric diagnoses. The first of these studies⁴⁷ found dismissing attachment in substance abusers with conduct disorders (externalizing), while substance abusers with affective disorders (internalizing) were partly classified dismissing and partly preoccupied. There was no association between substance abuse and unresolved attachment. The second study⁴⁸ reports a relation between “hard drug use” and dismissing attachment, but no association with preoccupied or unresolved attachment. Unfortunately, there is no further information on the number of substance users, on the nature of the “hard drug use,” or on its assessment. Studies in adult samples additionally found hostile-helpless representations^{49,50} among Afro-American mothers in methadone maintenance treatment, a general link to insecurity in a sample of adults who had been adopted in childhood⁵¹⁵², and unresolved representations among expecting parents⁵³ and among psychiatric inpatients⁵⁴. In sum, AAI-studies indicate insecure attachment in substance abusers, and in adolescent samples, dismissing attachment seems to be most frequent, but results also show preoccupied and disorganized (unresolved and CC) representations.

Self-report studies based on the HSSR¹⁵ mainly examined non-clinical samples. While a high-school study reported a link between anxious attachment and “problematic” substance abuse,⁴⁵ the majority of adolescent and adult substance abusers in a large representative US-wide

sample described themselves as avoidant⁵⁵. So did the majority of “heavy drinkers” in college⁵⁶ and young adult samples⁵⁷ and even Israeli adult long-term heroin-addicts⁵⁸, while another college study reported a link with anxious attachment⁵⁹.

A study using the Bartholomew Attachment Interview¹³ in a sample of drug dependent, heroin abusing adolescents in outpatient family treatment⁴⁰ showed a strong link between fearful-avoidant attachment and heroin abuse as well as comorbid psychiatric disorders. Severity of drug use was positively correlated with fearful-avoidant attachment, but inversely correlated with dismissing attachment. A second study⁶⁰ replicated the finding of fearful-avoidant attachment in adolescent and young adult heroin-abusers, but found different patterns in other groups. While controls were mainly secure, cannabis abusers tended to be dismissing-avoidant. Ecstasy (MDMA) abuse was related to insecure attachment, but not to a specific attachment strategy. This contradicts the expected link between the stimulating and “entactogenic” drug MDMA and preoccupied attachment. Additionally, self-report studies working with the Bartholomew model report insecure attachment in adult alcoholic inpatients^{61 62}, fearful-avoidant and preoccupied attachment in college samples with “drinking related problems”^{63 64}, and fearful-avoidant and dismissing-avoidant attachment in clinical samples⁶⁵. Though most self-report studies indicate a link of substance abuse and fearful-avoidant attachment, there are some exceptions. The Bartholomew interview studies might provide an explanation for these differences: they point to a link between fearful-avoidance and opiate abuse, and to more heterogeneous attachment patterns in abusers of other substances.

Question 3: Attachment and substance abuse in a family context

Though attachment processes in adolescence suggest family-based research, there are almost no studies using this approach. Several authors have drawn analogies between dysfunctional patterns of family relationships and specific attachment representations^{66 67 20}. To date, only one explorative study links attachment research to research on family relations in the area of substance abuse⁶⁸. A sample of families with a heroin abusing adolescent was explored with a composite measure of individual attachment representations assessed with the Bartholomew Attachment Interview¹³. The combination of these individual measures basically yielded two different patterns of family attachment: “triangulated” (mothers: preoccupied; fathers: dismissing; adolescents: fearful-avoidant) and “insecure” (mothers, fathers and adolescents: fearful-avoidant). Groups did not differ in addiction severity but did differ in almost every other respect. In “triangulated” families, conflicts seemed to disturb the development of autonomy. These families had relatively good outcomes of family therapy. “Insecure” families on the contrary were more severely affected in several regards. All family members were very insecure on a level of disorganized attachment, had high levels of comorbid psychiatric disorders, low levels of individual and family functioning and poorer treatment outcomes. Though both types of families can be understood as “insecure family bases”²⁰, results indicate a need to differentiate treatment according to differences in family attachment patterns. Especially very insecure families seem to need additional individual treatment for adolescents and as well as their parents⁶⁸.

CONCLUSIONS

Discussion

Empirical evidence strongly supports the assumption of insecure attachment in samples of adolescent substance abusers. Meta-analytic calculations and two longitudinal studies show that insecure attachment is a risk factor for substance abuse. The closeness of attachment and substance abuse is underpinned by animal studies, showing that psychotropic substances (especially opioids) have a strong impact on brain circuits regulating attachment processes. Based on these data, substance abuse in adolescence can be understood as an attempt to regulate affective states, as a means of self-medication for individuals with insecure attachment.

Results concerning specific patterns of attachment and different groups of adolescent substance abusers are more complex. All but two studies are cross-sectional, providing only correlational data without information on causal relationships. A major part of clinical studies in adolescent as well as adult samples report a link with fearful-avoidant attachment. Additionally, one adolescent and two adult studies indicate unresolved attachment. Though fearful avoidance is not necessarily linked to trauma, both of these patterns show a lack of coping strategies, so both are considered to be on a level of disorganized attachment. However, we still lack research on disorganized developmental pathways in adolescence, as well as on the relation of fearful-avoidance and specific developmental trajectories. A possible explanation for the function of substance abuse in these groups might be a substitute for lacking coping strategies and the attempt to self-medicate PTSD-symptoms and other types of distress. The second major group of studies points towards dismissing-avoidant patterns. This suggests that a large part of

adolescent SUD is linked to externalizing pathways. Here substance abuse seems to have a function within a wider pattern of adolescent problem behavior, impulsivity, and deviant peer affiliations, distracting the adolescent from unmet attachment needs. One non-clinical study and a clinical sub-sample point to preoccupied (anxious) attachment. So, there is very limited evidence for an association with internalizing pathways. Here, substances might be used in an attempt to self-medicate negative affect. A model of the relations between different patterns of attachment and pathways towards SUD is sketched out in Table 3

[TABLE 3 HERE]

With regard to specific substances, studies indicate fearful-avoidant patterns of attachment in heroin abusers and more heterogeneous results in abusers of other substances. This might imply that there is no general link between substance abuse and a single specific pattern of attachment. This renders future research more complex, facing a variety of substances and patterns of consumption. Several important substances (e.g., alcohol, cocaine, benzodiazepines, methamphetamines) have not even been compared systematically.

Limitations and implications for future research

Future research will have to assess substance abuse according to research standards in the field. It also should compare different groups of substance abusers systematically, and it should include severity of substance use as an important factor. Brain substrates of attachment and substance abuse have largely been studied in animal models. Advances in neuro-imaging make it

possible to expand this work to humans. Though SUD samples usually have high proportions of traumatized individuals, no study so far has systematically explored the relations between trauma, substance abuse, and unresolved attachment. We have assumed fearful-avoidance to be on a level of disorganized attachment, but we still lack empirical evidence linking it to specific, possibly disorganized developmental pathways. We will need more longitudinal studies covering longer periods of time to examine the role of attachment in developmental pathways towards SUD. We also need to explore possible consequences of substance abuse for the further development of attachment and relationship behavior. Future research will have to integrate family context into the study of adolescent attachment, linking attachment representations with relationship behavior and substance abuse.

Implications for treatment

With insecure attachment being a risk factor for SUD, and secure attachment being a protective factor against SUD, treatment outcome should benefit from fostering attachment security. Adolescence is the most promising target age for early interventions that can prevent the development of long-term SUD. There are three basic approaches to integrate attachment aspects into state-of-the-art treatment of SUD. First, the therapeutic alliance can be established in a way to become a correcting relationship experience that helps to develop more attachment security. This will often require specific engagement strategies which have to be adapted to the specific pattern of attachment. Second, attachment-based approaches of individual treatment should be adopted for the treatment of SUD. To date, the most promising approach is Mentalization-Based Therapy (MBT⁹). It is currently being evaluated in an ongoing RCT in a

sample of opioid dependent adults in Sweden⁶⁹. It is focused on the vicious circle between insecure attachment, anxiety, and other negative emotions, a subsequent loss of mentalization, and substance abuse as a self-medication. Third, family therapy approaches are of special importance. The family of origin is where attachment relationships develop and can most easily be transformed. Family therapy approaches for adolescent substance abuse are among the best evaluated treatments^{70 71}. There are two explicitly attachment-based approaches, which have not yet been used in the field of adolescent substance abuse: Mentalization-Based Family Therapy (MBFT⁷²) and Attachment Based Family Therapy (ABFT⁷³). MBFT tries to promote mentalization in a family context. It works in an attachment theory framework combined with family therapy setting. ABFT tries to re-establish lost emotional contact between depressed and suicidal adolescents and their parents. It might be more easily adapted for youths on an internalizing pathway. It seems very possible to integrate aspects of MBFT and ABFT into family therapy approaches designed for adolescent substance abusers. Most of these do not mention attachment explicitly, but also work on emotional problems between parents and youths. Multi-systemic^{74 75}, structural^{76 77} and systemic⁷⁸ approaches try to stop substance abuse by strengthening family communication, emotional ties, and parental control. Autonomy then can be developed gradually from a more “secure family base”²⁰. Explorative data hint at different patterns of attachment in the families of adolescent substance abusers, indicating a need for different treatment approaches⁶⁸. However, further research is warranted to gain a clearer picture of attachment patterns in these families.

Implications for prevention

Secure attachment patterns and their resulting positive effects on exploration, mentalization, and relationships can be seen as potent protective factors acting against vulnerabilities toward SUD⁷⁹. Accordingly, preventive efforts aimed at improving attachment-relevant abilities and types of behaviors, especially caregiving and sensitivity in parents of at-risk children seem highly relevant. In addition to improving parenting behaviors, meta-analyses also document the developmental benefit of parents reflecting their own attachment experiences with caregivers and of exploring this history's impact on their own parenting^{80 81}. Several preventive interventions grounded in attachment theory and findings have evolved that apply these findings to general and at-risk populations, including depressed mothers and lower class mothers with irritable infants^{82 83 84 85}. These programs emphasize the importance of a "secure" counsellor-client relationship as a basis for exploration and apply a variety of didactic methods, such as videotaping and discussing mother-child interaction sequences. Parental substance abuse holds a particularly large risk potential for child developmental problems and SUD pathways⁸⁶. First attachment-based preventive interventions for substance-abusing mothers with small children currently also are being tested⁸⁷. In contrast, only a minority of existing group programs for children from substance-affected families include parents in their intervention. Usually, they tend to focus on attachment-related processes such as emotion regulation and stress-coping strategies⁸⁸. On a lower-threshold level, a growing number of prevention measures recognize the importance of targeting relationship processes in families with children of different age groups. This approach has proved generally effective⁸⁹, especially in at-risk populations^{90 91 92}. However,

family-based preventive measures remain a minority within the prevention field. To our knowledge, no attachment-oriented preventive program for at-risk adolescents exists to date.

In view of the empirical evidence presented here, an attachment perspective holds the promise of making treatment and prevention of substance abuse in adolescence more efficient. Extensive basic research is needed to address the many unknown details in the relation between attachment and substance abuse. Future research should aim at integrating aspects of attachment into individual and family therapy, at applying attachment-based approaches in the field of substance abuse and at developing more specific preventive programs for adolescents at risk.

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AUTHOR CONTRIBUTIONS

Andreas Schindler contributed to research conception and design, collection and review of studies, interpretation, writing, revision. Sonja Bröning provided collection and review of studies, interpretation, writing, revision.

REFERENCES

- 1: World Health Organization. *The world health statistics 2012 report*. WHO, Geneva, Switzerland, 2012.
- 2: Chassin L, Sher KJ, Hussong A, Curran P. The developmental psychopathology of alcohol use and alcohol disorders: Research achievements and future directions. *Development and psychopathology*, 2013, 25(4pt2), 1567-1584.
- 3: Hussong AM, Burns AR, Solis JM, Rothenberg WA. Future Directions in the Developmental Science of Addictions. *Journal of Clinical Child & Adolescent Psychology*, 2013, 42(6), 863-873.
- 4: Allen JP. The attachment system in adolescence. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford; 2008:419-435.
- 5: Bowlby J. *Attachment and loss. Vol.1: Attachment*. New York: Basic Books; 1969.
- 6: Bowlby J. *Attachment and loss. Vol.2: Separation: anxiety and anger*. New York: Basic Books; 1973.
- 7: Bowlby J. *Attachment and loss. Vol.3: Loss: sadness and depression*. New York: Basic Books; 1980.
- 8: Ainsworth MDS, Blehar MC, Waters E, Wall S. *Patterns of attachment*. Hillsdale: Erlbaum; 1978.
- 9: Bateman AW, Fonagy P, eds. *Handbook of mentalizing in mental health practice*. Washington: American Psychiatric Publishing; 2012.

- 10: Holmes J. *Attachment, intimacy, autonomy: Using attachment theory in adult psychotherapy*. Northville: Jason Aronson; 1996.
- 11: Dozier M, Stovall-McClough KC, Albus KE. Attachment and psychopathology in adulthood. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford; 2008:718-744.
- 12: Lyons-Ruth K, Jacobvitz D. Attachment disorganization. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford; 2008:666-697.
- 13: Bartholomew K, Horowitz LM. Attachment styles among young adults: A test of a four-category model. *J Pers Soc Psychol*. 1991;61(2):226-244.
- 14: Hesse E. The Adult Attachment Interview: Protocol, method of analysis, and empirical studies. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford; 2008:552-598.
- 15: Hazan C, Shaver P. Conceptualizing romantic love as an attachment process. *J Pers Soc Psychol*. 1987;52:511-524.
- 16: Shaver PR, Mikulincer M. Attachment-related psychodynamics. *Attach Hum Dev*. 2002;4(2):133-161.
- 17: Kobak RR, Sceery A. Attachment in late adolescence: Working models, affect regulation and representations of self and others. *Child Dev*. 1988;59:135-146.
- 18: Doyle AB, Moretti MM. *Attachment to parents and adjustment in adolescence: Literature review and policy implications*. Ottawa, Health Canada, Child and Family Division; 2000. CAT number 032ss. H5219-9-CYH7/001/SS.
- 19: Allen JP, Land D. Attachment in adolescence. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford; 1999:319-335.

- 20: Byng-Hall J. Family and couple therapy: Toward greater security. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford; 1999:625-645.
- 21: Magai C. Affect, Imagery and Attachment: Working Models of Interpersonal Affect and the Socialization of Emotion. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford; 1999:787-802.
- 22: Newcomb MD. Identifying High-Risk Youth: Prevalence and Patterns of Adolescent Drug Abuse. In: Rahdert E, Czechowicz D, eds. *Adolescent Drug Abuse: Clinical Assessment and Therapeutic Interventions*. Rockville: NIDA Research Monograph Series 156; 1995:7-38.
- 23: Petraitis J, Flay BR, Miller TQ, Torpy EJ, Greiner B. Illicit substance use among adolescents: A matrix of prospective predictors. *Subst Use Misuse*. 1998;33(13):2561-2604.
- 24: Dawes MA, Antelman SM, Vanyukov MM, Giancola P, Tarter RE, Susman EJ, et al. Developmental sources of variation in liability to adolescent substance use disorders. *Drug Alcohol Depend*. 2000;22;61(1):3-14.
- 25: Khantzian EJ. The self-medication hypothesis of substance use disorders: A reconsideration and recent applications. *Harv Rev Psychiatry*. 1997;4:231-244.
- 26: Frosch WA, Milkman H. Ego functions in drug users. In: Blaine JD, Julius DA, eds. *Psychodynamics of drug dependence*. Rockville: NIDA Research Monograph 12; 1977: 142-156.
- 27: Zucker RA, Heitzeg MM, Nigg, JT. Parsing the undercontrol–disinhibition pathway to substance use disorders: A multilevel developmental problem. *Child development perspectives*, 2011, 5(4), 248-255
- 28: Hussong AM, Jones DJ, Stein GL, Baucom DH, Boeding S. An internalizing pathway to alcohol use and disorder. *Psychology of Addictive Behaviors*, 2011, 25(3), 390.

- 29: Schäfer I. Traumatisierung und Sucht [Trauma and addiction] In: Seidler G, Freyberger H, Maercker A. eds. *Handbuch Psychotraumatologie*. Stuttgart, Germany: Klett-Cotta, 2011, 255-263.
- 30: Kendler, KS, Bulik, CM, Silberg, J, Hettema, JM, Myers J, Prescott CA. Childhood sexual abuse and adult psychiatric and substance use disorders in women: An epidemiological and cotwin control analysis. *Arch Gen Psychiatry*, 2000, 57(19), 953-959.
- 31: Adamaszek M, Khaw AV, Buck U, Andresen B, Thomasius R. Evidence of neurotoxicity of ecstasy: Sustained effects on electroencephalographic activity in polydrug users. *PloS One*. 2010;5:e14097.
- 32: Julien RM, Advokat CD, Comaty J. *A primer of drug action*. New York: Worth Publishers; 2010.
- 33: Depue RA, Morrone-Strupinsky JV. A neurobehavioral model of affective bonding: Implications for conceptualizing a human trait of affiliation. *Behav Brain Sci*. 2005, 28:313-395.
- 34: Panksepp J. *Affective neuroscience - The foundations of human and animal emotions*. Oxford: Oxford University Press; 1998.
- 35: Dunbar RI. The social role of touch in humans and primates: behavioural function and neurobiological mechanism. *Neurosci Biobehav Rev*. 2010; 34(2):260-268.
- 36: Cassidy J. The nature of the child's ties. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford; 2008:3-22.
- 37: Panksepp J, Knutson B, Burgdorf J. The role of brain emotional systems in addictions: a neuro-evolutionary perspective and a new "self-report" animal model. *Addiction*. 2002;97(4):459-469.

- 38: Insel TR. Is social attachment an addictive disorder? *Physiol Behav.* 2003;79:351-357.
- 39: Trigo JM, Martin-García E, Berrendero F, Robledo P, Maldonado R. The endogenous opioid system: A common substrate in drug addiction. *Drug Alcohol Depend.* 2010;108(3):183-194.
- 40: Schindler A, Thomasius R, Sack PM, Gemeinhardt B, Kuestner UJ, Eckert J. Attachment and substance use disorders: A review of the literature and a study in drug dependent adolescents. *Attach Hum Dev.* 2005;7(3):207-228.
- 41: Mikulincer M, Shaver PR. *Attachment in adulthood.* New York: Guilford; 2007.
- 42: Branstetter SA, Furman W, Cottrell L. The influence of representations of attachment, maternal-adolescent relationship quality, and maternal monitoring on adolescent substance use: a two-year longitudinal examination. *Child Dev.* 2009;80(5):1448-1462.
- 43: Danielsson AK, Romelsjö A, Tengström A. Heavy episodic drinking in early adolescence: gender specific risk and protective factors. *Subst Use Misuse.* 2011;46(5):633-643.
- 44: Jordan S, Sack PM. Schutz- und Risikofaktoren. [Protective factors and risk factors]. In: Thomasius R, Schulte-Markwort M, Kuestner UJ, Riedesser P, eds. *Suchtstörungen im Kindes- und Jugendalter – Das Handbuch: Grundlagen und Praxis* [Handbook of addictive disorders in childhood and adolescence]. Stuttgart, Germany: Schattauer; 2009:127-138.
- 45: Cooper ML, Shaver PR, Collins NL. Attachment styles, emotion regulation and adjustment in adolescence. . *J Pers Soc Psychol.* 1998;74(5):1380-1397.
- 46: Amann U. *Bindungsrepräsentationen suchtmittelabhängiger Jugendlicher und ihrer Eltern* [Attachment representations of addicted adolescents and their parents]. Norderstedt, Germany: GRIN-Verlag; 2009.

- 47: Rosenstein DS, Horowitz HA. Adolescent attachment and psychopathology. *J Consult Clin Psychol.* 1996;64(2):244-253.
- 48: Allen JP, Hauser ST, Borman-Spurell E. Attachment theory as a framework for understanding sequelae of severe adolescent psychopathology: An 11-year follow-up study. *J Consult Clin Psychol.* 1996;64(2):254-263.
- 49: Finger B. *Exploring the intergenerational transmission of attachment disorganization* [dissertation]. Chicago: University of Chicago; 2006.
- 50: Melnick S, Finger B, Hans S, Patrick M, Lyons-Ruth K. Hostile-helpless states of mind in the Adult Attachment Interview: A proposed additional AAI category with implications for identifying disorganized infant attachment in high-risk samples. In: Steele H, Steele M, eds. *Clinical applications of the Adult Attachment Interview.* New York: Guilford; 2008:399-423.
- 51: Caspers KM, Cadoret RJ, Langbehn D, Yucuis R, Troutman B. Contributions of attachment style and perceived social support to lifetime use of illicit substances. *Addict Behav.* 2005;30(5):1007-11.
- 52: Caspers KM, Yucuis R, Troutman B, Spinks R. Attachment as an organizer of behavior: implications for substance abuse problems and willingness to seek treatment. *Subst Abuse Treat Prev Policy.* 2006;1(32):doi:10.1186/1747-597X-1-32.
- 53: Riggs SA, Jacobvitz D. Expectant parents' representations of early attachment relationships: Associations with mental health and family history. *J Consult Clin Psychol.* 2002;70(1):195-204.
- 54: Fonagy P, Leigh T, Steele M, Steele H, Kennedy R, Mattoon G, et al. The relation of attachment status, psychiatric classification and response to psychotherapy. *J Consult Clin Psychol.* 1996;64(1):22-31.

- 55: Mickelson KD, Kessler RC, Shaver PR. Adult attachment in a nationally representative sample. *J Pers Soc Psychol.* 1997;73(5):1092-1106.
- 56: Brennan KA, Shaver PR, Tobey AE. Attachment styles, gender and parental problem drinking. *J Soc Pers Relat.* 1991;8:451-466.
- 57: Senchak M, Leonard KE. Attachment styles and marital adjustment among newlywed couples. *J Soc Pers Relat.* 1992;9:61-64.
- 58: Finzi-Dottan R, Cohen O, Iwaniec D, Sapir Y, Weizman A. The drug-user husband and his wife: Attachment styles, family cohesion and adaptability. *Subst Use Misuse.* 2003;38(2):271-292.
- 59: Kassel JD, Wardle M, Roberts JE. Adult attachment security and college student substance use. *Addict Behav.* 2007;32(6):1164-76.
- 60: Schindler A, Thomasius R, Petersen KU, Sack PM. Heroin as an attachment substitute? Differences in attachment representations between opioid, ecstasy and cannabis abusers. *Attach Hum Dev.* 2009;11(3):307-330.
- 61: DeRick A, Vanheule S. Attachment styles in alcoholic inpatients. *Eur Addict Res.* 2007;13:101-108.
- 62: DeRick A, Vanheule S, Verhaeghe P. Alcohol addiction and the attachment system: an empirical study of attachment style, alexithymia, and psychiatric disorders in alcoholic inpatients. *Subst Use Misuse.* 2009;44(1):99-104.
- 63: McNally AM, Palfai TP, Levine RV, Moore BM. Attachment dimensions and drinking-related problems among young adults: The mediational role of coping motives. *Addict Behav.* 2003;28(6):1115-27.

- 64: Molnar DS, Sadava SW, DeCourville NH, Perrier CP. Attachment, motivations, and alcohol: testing a dual-path model of high-risk drinking and adverse consequences in transitional clinical and student samples. *Can J Behav Sci.* 2010;42(1):1-13.
- 65: Thorberg FA, Livers M. Attachment, fear of intimacy and differentiation of self among clients in substance disorder treatment facilities. *Addict Behav.* 2006;31(4):732-737.
- 66: Marvin RS, Stewart RB. A family systems framework for the study of attachment. In: Greenberg MT, Cichetti D, Cummings EM, eds. *Attachment in the preschool years.* Chicago: University of Chicago Press; 1990:51-86.
- 67: Stevenson-Hinde J. Attachment within family systems: An overview. *Infant Ment Health J.* 1990;11:218-227.
- 68: Schindler A, Thomasius R, Sack PM, Gemeinhardt B, Kuestner U. Insecure family bases and adolescent drug abuse: A new approach to family patterns of attachment. *Attach Hum Dev.* 2007;9(2):111–126.
- 69: Philips B, Kahn U, Bateman AW. Drug addiction. In: Bateman AW, Fonagy P, eds. *Handbook of mentalizing in mental health practice.* Washington, London: American Psychiatric Publishing; 2012: 445-462.
- 70: Rowe CL. Family therapy for drug abuse: Review and updates 2003-2010. *J Marital Fam Ther.* 2012;38(1):59-81.
- 71: von Sydow K, Retzlaff R, Behr S, Haun ML, Schweitzer J. The efficacy of systemic therapy for externalizing disorders of childhood and adolescence: A meta-content analysis of 46 randomized trials. *Fam Process.* 2008; DOI: 10.1111/famp.12047 .

- 72: Asen E, Fonagy P. Mentalization-Based Family Therapy. In: Bateman AW, Fonagy P, eds. *Handbook of mentalizing in mental health practice*. Washington, London: American Psychiatric Publishing; 2012: 107-128.
- 73: Diamond GM, Diamond GS, Hogue A. Attachment-based family therapy: Adherence and differentiation. *J Marital Fam Ther*. 2007;33:177-191.
- 74: Liddle H. Multidimensional Family Therapy: A science-based treatment system for adolescent drug abuse. *Sucht*. 2010;56(1):43-50.
- 75: Henggeler SW. Multi-systemic therapy: an overview of clinical procedures, outcomes, and policy implications. *Child Psychol Psychiatry Review*. 1999;4(1):2–10.
- 76: Stanton MD, Todd TC. *The family therapy of drug abuse und drug addiction*. New York: Guilford; 1982.
- 77: Szapocznik J, Williams RA. Brief Strategic Family Therapy: Twenty-five years of interplay among theory, research and practice in adolescent behavior problems and drug abuse. *Clin Child Fam Psychol Rev*. 2000;3:117–134.
- 78: Schindler A, Sack PM, Gemeinhardt B, Kuestner U, Thomasius R, Eppendorfer. Familientherapiestudie bei jungen Drogenabhaengigen: Ergebnisuebersicht und klinische Implikationen. [The Eppendorf family therapy study on adolescent substance use disorders: Results and clinical implications]. *Sucht*. 2010;56(1):61-70.
- 79: Sroufe LA, Egeland B, Carlson EA, Collins WA. *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. New York: Guilford; 2005.
- 80: Wolff MS, Ijzendoorn MH. Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Dev*. 1997;68(4):571-591.

81: Van IJzendoorn MH. Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview.

Psychol Bull. 1995;117:387-387.

82: Juffer F, Bakermans-Kranenburg MJ, van IJzendoorn MH, eds. *Promoting positive parenting: An attachment-based intervention.* New York: Routledge Academic; 2007.

83: Toth SL, Rogosch FA, Cicchetti D. Attachment-theory-informed intervention and reflective functioning in depressed mothers. In: Steele H, Steele M, eds. *The adult attachment interview in clinical contexts.* New York: Guilford; 2008:154-172.

84: Boom DC. The influence of temperament and mothering on attachment and exploration: an experimental manipulation of sensitive responsiveness among lower-class mothers with irritable infants. *Child Dev.* 1994;65(5):1457-1477.

85: Egeland B, Erickson MF. Lessons from STEEP: Linking theory, research, and practice for the well-being of infants and parents. In: Sameroff AJ, McDonough SC, Rosenblum KL, eds. *Treating parent-infant relationship problems. Strategies for intervention.* New York: Guilford; 2004: 213-242.

86: Eiden RD, Ostrov JM, Colder CR, Leonard KE., Edwards EP, Orange-Torchia T. Parent alcohol problems and peer bullying and victimization: child gender and toddler attachment security as moderators. *J Clin Child Adolesc Psychol.* 2010;39(3):341-350.

87: Suchman NE, Decoste C, Rosenberger P, McMahon TJ. Attachment-based intervention for substance-using mothers: A preliminary test of the proposed mechanisms of change. *Infant Ment Health J.* 2012;33(4):360-371.

- 88: Bröning S, Kumpfer K, Kruse K, et al. Selective prevention programs for children from substance-affected families: a comprehensive systematic review. *Subst Abuse Treat Prev Policy*. 2012;7-23.
- 89: Foxcroft DR, Tsertsvadze A. Universal family-based prevention programs for alcohol misuse in young people. *Cochrane Database Syst Rev*. 2011;9:CD009307.
- 90: Kumpfer KL, Alvarado R. Family-strengthening approaches for the prevention of youth problem behaviors. *Am Psychol*. 2003;58(6/7):457-465.
- 91: Gates S, McCambridge J, Smith LA, Foxcroft DR. Interventions for prevention of drug use by young people delivered in non-school settings. *Cochrane Database Syst Rev*. 2006;1:CD005030.
- 92: Stolle M, Stappenbeck J, Wendell A, Thomasius R. Family-based prevention against substance abuse and behavioural problems: culture-sensitive adaptation process for the modification of the US-American Strengthening Families Program 10-14 to German conditions. *Public Health*. 2011;19:389-395.

TABLE 1 Corresponding patterns of attachment across concepts and measures

Measure:	Strange-Situation-Test ⁸	Adult Attachment Interview (AAI) ¹⁴	Hazan & Shaver Self Report (HSSR) ¹⁵	Bartholomew Interview / Relationship Questionnaire ¹³
Age:	infants	adolescents & adults	adolescents & adults	adolescents & adults
Level of Security:				
Secure attachment	secure (B)	secure-autonomous (F: free to explore)	secure	secure
Insecure attachment (insecure coping strategies)	insecure-avoidant (A)	insecure-dismissing (Ds)	-	dismissing-avoidant
	insecure-ambivalent (C)	insecure-preoccupied (E: enmeshed)	anxious-ambivalent	preoccupied
Lack of coping strategies / Disorganized attachment	-	-	avoidant	fearful-avoidant
	disorganized (D)	unresolved loss or trauma / disorganized (U/d) hostile-helpless (HH) ⁵⁰ cannot classify (CC) ¹⁴		

TABLE 2 Studies on Attachment and Substance Abuse in Adolescence

Authors, Year	Focus of study (Attachment and...)	Sample / Age	N (Total / Subst. users)	Substances / Severity	Measure of substance use	Measure of attachment	Attachment styles / representations linked to substance use
Danielsson et al., 2011 ⁴³	longitudinal, gender, risk factors of alcohol abuse	community / 13-15yrs.	1222 / n.i.	alcohol, drugs / non-clinical	interview	IPPA	insecure
Ammann, 2009 ⁴⁶	adolescent SUD, parental relationships	clinical / 16-18yrs.	15 / 15	alcohol, cannabis, polysubstance use /dependence	ASI	AAI	dismissing, cannot classify, unresolved
Branstetter et al., 2009 ⁴²	longitudinal, maternal relationship, substance abuse	community / 14-16yrs.	200 / n.i.	alcohol, drugs / non-clinical	DISA	AAI, HSSR (BSQ)	insecure (mediated by maternal monitoring)
Schindler et al., 2009 ⁶⁰	comparing different groups of drug users	(1) clinical; (2) & (3) nightclub / 14-25yrs.	94 / 72	(1) heroin; (2) ecstasy; (3) cannabis, (4) controls / dependence	DSM-IV, Addiction Severity Index, Urinalyses	Bartholomew Interview	(1) fearful; (2) insecure; (3) dismissing; (4) secure
Schindler et al., 2007 ⁶⁸	drug dependence, family attachment patterns	clinical, family therapy sample / 14-25yrs.	37 / 37	heroin and other drugs / dependence	DSM-IV, Addiction Severity Index, urinalyses	Bartholomew Interview, adolescents, mothers, fathers	fearful (triangulated and insecure family patterns)
Schindler	drug dependence	clinical,	71 / 71	heroin and	DSM-IV,	Bartholomew	fearful

et al., 2005 ⁴⁰		family therapy sample / 14-25yrs.		other drugs / dependence	Addiction Severity Index, urinalyses	Interview	
Cooper, et al., 1998 ⁴⁵	affect regulation, problem behaviour	representative community sample / 13-19yrs	2011 / 1151	alcohol, drugs / (1) experimental; (2) problematic	self-report (6-months prevalence)	HSSR	(1) secure, anxious; (2) anxious (avoidant)
Mickelson, et al., 1997 ⁵⁵	SES, childhood adversities, psychopathology, personality	US-wide representative / 15-54yrs	8098 / 2876	alcohol, drugs / abuse, dependence	DSM-III-R, CIDI, lifetime prevalence	HSSR	avoidant (anxious)
Rosenstein & Horowitz, 1996 ⁴⁷	psychopathology	psychiatric patients / 13-19yrs.	60 / 29	n.i. / abuse	DSM-III-R: (1) conduct disorder & SUD; (2) affective disorder & SUD	AAI	(1) dismissing; (2) preoccupied, dismissing
Allen et al., 1996 ⁴⁸	psychopathology, longitudinal	psychiatric patients / 14-25yrs.	66 / n.i.	“hard drug use” / n.i.	n.i.	AAI	dismissing

Note. n.i.: no information. IPPA = ; ASI = ; AAI: Adult Attachment Interview; DISA = ; HSSR: Hazan & Shaver Self Report

TABLE 3
Theoretical model of developmental pathways linking attachment and adolescent SUD

Antecedents	Attachment pattern	Attachment coping strategies	Developmental pathway	Expected consequences
sensitive, “good enough” caregiving	secure	flexible	resilience, protection against risk factors	mental health
incoherent, unpredictable caregiving	ambivalent/ preoccupied/ anxious/ enmeshed	maximizing attachment needs	internalizing	internalizing disorders, substance abuse as self-medication
rejection	dismissing-avoidant	minimizing attachment needs	externalizing	externalizing disorders, substance abuse in context of impulsivity and problem behavior
parental psychopathology (e.g. SUD), trauma, loss, neglect	disorganized (Fearful-avoidant, unresolved, hostile-helpless, cannot classify)	none	disorganized	severe psychopathology, severe SUD, e.g. self-medication of PTSD-symptoms