

Models of Substance Use in Adolescents With and Without Psychosis

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Abstract

Introduction: The use of substances is a major concern with adolescents with psychotic disorders, as it can have detrimental effects on psychotic symptoms and other aspects of functioning. The purpose of this study is to increase our understanding of the association between substance use and psychosis in adolescents by testing three models of substance use: the normative development model, the deviance-prone model, and the affect regulation model. **Methods:** Participants were 35 adolescents with a psychotic disorder, and 35 typically developing adolescents. Measures used: Personal Experience Screening Questionnaire, Youth Self-Report, Beck Depression Inventory, and the Beck Anxiety Inventory. **Results:** The normative development model, hypothesizing that mild substance use leads to better socio-emotional adjustment, was not supported for either group. The deviance-prone model was supported for both groups, indicating that rule-breaking behaviour and aggression significantly predicted substance use. The affect-regulation model was supported for adolescents with psychosis only, indicating that negative affect significantly predicted substance use. **Conclusions:** The treatment of substance misuse in adolescents with psychosis may be complicated by a number of factors including deviant behaviour and negative affective symptoms. Thus, the current results point to the importance of integrated treatments to help reduce substance misuse and associated problems.

Key words: substance use, psychosis, adolescence

Résumé

Introduction: La consommation de substances est un problème majeur chez les adolescents psychotiques, car elle peut avoir une incidence néfaste sur les symptômes de la psychose et sur d'autres aspects du fonctionnement. L'objet de cette étude est d'expliquer le lien qui existe entre la consommation de substances et la psychose chez les adolescents. Trois modèles ont été testés: le modèle de développement normatif, le modèle de prédisposition à la déviance et le modèle de régulation de l'affect. **Méthodologie:** trente-cinq adolescents souffrant de troubles psychotiques et 35 adolescents témoins ont participé à cette étude. Nous avons utilisé les outils suivants : *Personal Experience Screening Questionnaire*, *Youth Self-Report*, *Beck Depression Inventory*, et *Beck Anxiety Inventory*. **Résultats:** L'hypothèse du modèle de développement normatif selon laquelle une légère consommation de substance contribue à un meilleur ajustement socio-culturel n'a été confirmée dans aucun des deux groupes. Les deux groupes ont confirmé le modèle de prédisposition à la déviance, ce qui indique que le non-respect des règles et l'agression sont des prédicteurs de la consommation de substances. Le modèle de régulation de l'affect a été confirmé par les adolescents psychotiques seulement, ce qui signifie qu'un affect négatif est un prédicteur important de la consommation de substances. **Conclusion:** Le traitement des adolescents toxicomanes peut se voir compliqué par un certain nombre de facteurs comme un comportement déviant et un affect négatif. C'est la raison pour laquelle il convient de mettre en place des traitements intégrés visant à réduire la consommation de substances et les problèmes connexes.

Mots clés: consommation de substances, psychose, adolescence

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Introduction

It is well known that substance misuse is seen at higher rates among individuals with psychotic disorders than in the general population (Regier et al., 1990). A range of recent findings point to the importance of understanding the association between psychosis and substance use. These include growing evidence that cannabis use may precipitate the development of psychosis in biologically vulnerable individuals (Degenhardt and Hall, 2006; Moore et al., 2007), and that substance misuse can be a factor in problematic recovery from a first episode of psychosis (Wade et al., 2006).

There has been a paucity of research conducted specifically with adolescents with psy-

chosis. Furthermore, adolescence is a period with specific psychosocial challenges and specific changes in the brain that increase the probability of the onset of both psychosis and substance abuse, in predisposed people. One of the few studies examining substance use in adolescents with psychosis indicated that adolescents use more substances (particularly cannabis) than adults with psychosis (Pencer et al., 2005).

Therefore, to attempt to understand this better, the present study focused on three main theoretical models that specifically address the issue of substance use in adolescence. The models are the normative development model, the deviance-prone model, and the affect-regulation model of substance use.

These models have already been established in the general adolescent population and may also be particularly applicable to adolescents with psychosis.

The normative development model suggests mild levels of substance can be developmentally appropriate and although not necessary for good adjustment can facilitate developmental tasks such as establishing a separate identity from parents, assuming adult roles, and developing and maintaining peer relations. In this way, mild users or “experimenters” may potentially be better adjusted than abstainers who may be overly controlled, fearful of new experiences, asocial, and withdrawn (MacLean et al., 1999; Shedler and Block, 1990). The applicability of the normative development model to adolescents with psychotic disorders has not been examined in previous research. There are some findings suggesting that this model may be applicable to adolescents with psychosis including studies suggesting that individuals with psychotic disorders that use substances exhibit better pre-morbid adjustment (Arndt et al., 1992), better social functioning and less negative symptoms (Salyers and Mueser, 2001). However, persons with psychotic disorders may also be less capable of sustaining mild substance use over time without starting to experience negative consequences and may in fact be more vulnerable or sensitive to the negative effects of substance use (Kovaszny et al., 1997).

The deviance-prone model suggests that the misuse and abuse of substances is simply one aspect of general deviant behavior (Jessor, 1991). It is thought that deviant behaviors could be linked due to a “difficult” temperament, cognitive dysfunction, a disturbance in psychological self-regulation, and a deficient socialization process that begins in the family and is exacerbated through association with deviant peers (MacLean et al., 1999; Tarter, 2002). Conduct disorder symptoms have been found to be predictive of substance use disorders in individuals with psychosis (e.g., Mueser et al., 2000). Thus, previous research suggests that deviance-proneness may be no different in psychotic populations, and that deviant behavior may contribute to the increased rate of substance misuse among individuals with psychosis.

The affect regulation model proposes that individuals use substances to cope with their negative affect. Evidence for this model has been demonstrated in adolescents in the general population (Colder and Chassin, 1993; Diego et al., 2003; Hussong and Chassin, 1994; Wills et al., 1999). The affect-regulation model is also applicable to adolescents with psychotic disorders. Individuals with psychosis often have high rates of anxiety, dysphoria, and depression. Relief from depression and anxiety are often given as reasons for using substances by individuals with psychotic disorders (Addington and Duchak, 1997; Test et al., 1989).

The overall objective of the present study was to improve our understanding of substance misuse in adolescents with psychosis by examining these three models. In accordance with the normative development model, it was hypothesized that in adolescents without psychosis, mild substance use may be associated with better social and emotional adjustment than no use or frequent use; however, in adolescents with psychosis, given the use of substances may have a more negative impact on these adolescents, it was hypothesized that those who engaged in mild use would be less socially and emotionally adjusted than abstainers but better adjusted than frequent users. Given that the deviance-prone model has been demonstrated to predict substance use in both adolescents in the general population and in individuals with schizophrenia, it was hypothesized that in both adolescents with and without psychosis, delinquent and aggressive behavior would predict increased substance use. In accordance with the affect-regulation model, it was hypothesized that in both adolescents with and without psychosis, negative affect (depression and anxiety) would predict increased substance use.

Methods

Participants

First episode (FEP) participants were between 15 and 20 years of age and had to speak English. Thirty-five participants (28 males, 7 females, mean age = 17.94, *SD* = 1.14) were recruited through their case managers from the Calgary Early Psychosis Program (EPP). The majority of the sample was

Caucasian (77%) and was either in grade 12 (34%) or was not in school (31%).

Diagnoses were made according to the American Psychiatric Association's (APA) *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV; APA, 1994) criteria, using the Structured Clinical Interview for DSM-IV (SCID; Spitzer et al., 1992). DSM-IV diagnoses at the initial assessment were: 48.6% schizophreniform, 25.7% psychotic disorder NOS, 20.0% schizophrenia, 2.9% schizoaffective disorder, and 2.9% substance-induced psychotic disorder. All of the FEP participants were in a relative state of stable remission under the care of a psychiatrist.

A control group (advertised for) was selected from high school and university students, and consisted of 35 students (28 males, 7 females, mean age = 17.97, SD = 1.25) matched with the FEP participants on sex and age. The majority of the non-psychiatric control group (NPC) was Caucasian (65.7%) and was either in grade 12 (20%) or university (57%). These participants were excluded if they currently had or had had in the past an Axis I psychiatric disorder as assessed with the SCID Screen Patient Questionnaire (SSPQ; First et al., 1999).

Measures

The SCID Screen Patient Questionnaire is a computerized screening version of the widely used Structured Clinical Interview for DSM-IV.

The *Personal Experience Screening Questionnaire* (PESQ; Winters, 1991), a self-report scale specifically designed for use with adolescents, assesses problem severity and drug use history for a number of substances including alcohol and marijuana. The Problem Severity section measures the extent to which the respondent is psychologically and behaviourally involved with substances.

The Beck Depression Inventory-II (BDI-II; Beck et al., 1996), a self-report instrument, was administered to assess depression.

The Beck Anxiety Inventory (BAI; Beck and Steer, 1993), a self-report instrument, was administered to assess anxious symptomatology associated with negative affect.

The *Youth Self-Report* (YSR; Achenbach, 2001) was used to assess negative affect (anxious/depressed scale), deviance (rule

breaking behaviour and aggressive behaviour scales), and social (social problems and social competency scales) and emotional (withdrawn/depressed scale) adjustment.

Procedure

The present study was approved by the local ethics board and all participants signed consent forms. Either AP or a trained rater under the supervision of JA administered all self-report measures.

Results

Comparison of EPP Outpatients and Control Participants

Using independent samples t-tests, no significant differences between females and males were found on any of the variables for either the EPP outpatients or the control group. Chi-square analyses were conducted to compare ethnicity in the EPP outpatient and control groups. There was no significant association between having psychosis and ethnicity.

Independent samples t-tests were conducted to compare substance use levels, depression symptoms (BDI-II), anxiety symptoms (BAI), and the following scores on the YSR: Anxious/Depressed, Withdrawn/Depressed, Social Problems, Social Competency, Aggressive Behavior, and Rule-Breaking Behavior, in the EPP outpatient group and control group. EPP outpatients had significantly higher scores on the majority of variables. These results are presented in Table 1.

Model Analyses (EPP outpatients)

In order to test the hypotheses associated with the three models, a series of hierarchical multivariate regression analyses were conducted. The dependent variable substance use was assessed by three separate dependent variables: problem severity, frequency of alcohol use in the last 12 months, and frequency of marijuana use in the last 12 months, all measured on the PESQ. Alcohol and cannabis were chosen for the dependent variables as they were the most frequently used substances and other substances were used infrequently by the adolescent samples. The three substance use variables were regressed, using three separate regression analyses. Gender was entered in the first step of each

Table 1. Differences Between Mean Scores of Adolescents with and without Psychosis (t-tests)

	Adolescents with Psychosis	Adolescents without Psychosis	t-value
Problem Use (PESQ)	36.40 (13.64)	24.74 (6.08)	-4.62**
Marijuana use in 12 months	2.03 (2.28)	1.06 (1.73)	-2.01*
Depression (BDI-II)	15.80 (12.09)	7.26 (5.60)	-3.79**
Anxiety (BAI)	11.26 (9.88)	6.97 (6.71)	-2.12*
Anxious/Depressed (YSR)	62.71 (11.47)	56.57 (6.76)	-2.73**
Withdrawn/Depressed (YSR)	63.26 (9.86)	56.46 (6.50)	-3.41**
Social problems (YSR)	60.11 (9.50)	54.69 (5.81)	-2.88**
Social Competency (YSR)	40.56 (8.98)	44.66 (8.98)	1.90
Rule-breaking behaviour (YSR)	60.83 (8.91)	55.91 (7.03)	-2.56*
Aggressive behaviour (YSR)	56.51 (8.63)	54.37 (6.09)	-1.20

Note. BDI-II = Beck Depression Inventory; BAI = Beck Anxiety Inventory; YSR = Youth Self Report
 * $p < .05$. ** $p < .01$.

regression equation to control for the potential relationship between it and the variables of interest. In the second (and sometimes third) step of each of the analyses, the independent variables were entered.

Normative Development Model

For this model, the three substance use variables (problem severity, alcohol use in the last 12 months, and marijuana use in the last 12 months) were regressed, using six separate regression analyses, upon linear and quadratic terms for social and emotional adjustment (separately), as assessed by the YSR, to test for potential linear and curvilinear relationships. Overall, no regression analyses for this model were significant in the outpatient group.

Deviance-Prone Model

For this model, the three substance use variables were regressed, using three separate multiple regression analyses, upon the deviance prone variables: rule-breaking behaviour and aggressive behaviour, as assessed by the YSR.

Problem severity was the dependent variable in the first analysis. Overall, this model was significant for the EPP outpatients, and

52 percent of the variance in problem severity was explained by gender, rule-breaking and aggressive behaviour. After controlling for the effects of gender, rule-breaking and aggressive behaviour explained an additional 44 percent of the variance in problem severity. These results are presented in Table 2.

In the second analysis, alcohol use in the last 12 months was the dependent variable. This model was not significant for the EPP outpatients. In the third analysis, marijuana use in the last 12 months was the dependent variable. This model was also not significant.

In summary, hypothesis two was partially confirmed for adolescents with psychosis. Deviant behaviour was found to predict problem use.

Affect-Regulation Model

The three substance use variables were regressed, using three separate regression analyses, upon anxiety (assessed with the BAI), depression (assessed with the BDI-II), and mixed anxiety/depression (assessed with the YSR). In the first analysis, problem severity was the dependent variable. This model was significant for the EPP outpatients, and 39 percent of

Table 2. Hierarchical Regression Model for Predictors of Problem Severity in Outpatients (Deviance Prone Variables)

Measure	Model	R ²	R ² change
Problem Severity	Gender	.08	.08
	+Rule Breaking Behaviour	.52	.44**
	+Aggressive Behaviour		

Model is significant: $F(3, 31) = 11.00, p < .01$

** $p < .01$.

Table 3. Hierarchical Regression Model for Predictors of Problem Severity in Outpatients (Negative Affect Variables)

Measure	Model	R^2	R^2 change
Problem Severity	Gender	.08	.08
	+Anxiety	.39	.31**
	+Depression		
	+Anxious/Depressed		

Model is significant: $F(4, 30) = 4.73, p < .01$

** $p < .01$.

the variance in problem severity was explained by gender and negative affect (anxiety, depression, and mixed anxiety/depression symptoms). After controlling for the effects of gender, negative affect variables explained an additional 31 percent of the variance in problem severity. These results are presented in Table 3.

In the second analysis, the dependent variable was alcohol use in the last 12 months. This model was not significant. In the third analysis, marijuana use in the last 12 months was the dependent variable. The model was also not significant.

In summary, hypothesis three was confirmed for adolescents with psychosis, with negative affect (predominantly depression) predicting increased substance use, and in particular, problem use.

Model Analyses (Controls)

The same hierarchical multivariate regression analyses as described above were conducted with controls.

Normative Development Model

For this model, the three substance use

variables were regressed, using six separate regression analyses, upon linear and quadratic terms for social and emotional adjustment (separately), assessed by the YSR, to test for potential linear and curvilinear relationships. Overall, no regression analyses for this model were significant.

Deviance-Prone Model

The three substance use variables were regressed, using three separate regression analyses, upon rule-breaking behaviour and aggressive behaviour, as assessed by the YSR.

In the first analysis, problem severity was the dependent variable. Overall, this model was significant for the control group, and 25 percent of the variance in problem severity was explained by gender, rule-breaking and aggressive behaviour. After controlling for the effects of gender, rule-breaking and aggressive behaviour explained an additional 21 percent of the variance in problem severity.

In the next analysis, alcohol use in the last 12 months was the dependent variable. Overall, this model was also significant for the control group. Gender did not contribute any unique variance, and after controlling for the

Table 4. Hierarchical Regression Model for Predictors of Substance in the Control Group (Deviance-Prone Variables)

Measure	Variable	R^2	R^2 change
Problem Severity	Gender	.04	.04
	+Rule Breaking Behaviour	.25	.21*
	+Aggressive Behaviour		
Model is significant: $F(3, 31) = 3.42, p < .05$			
Alcohol Use	Gender	.00	.00
	+Rule Breaking Behaviour	.22	.22*
	+Aggressive Behaviour		
Model is significant: $F(3, 31) = 2.95, p < .05$			
Marijuana Use	Gender	.00	.00
	+Rule Breaking Behaviour	.32	.32**
	+Aggressive Behaviour		
Model is significant: $F(3, 31) = 4.88, p < .01$			

* $p < .05$. ** $p < .01$.

effects of gender, rule-breaking and aggressive behaviour explained 22 percent of the variance in alcohol use.

Lastly, marijuana use in the last 12 months was the dependent variable. Overall, this model was significant for the control group. Gender did not contribute any unique variance, and after controlling for the effects of gender, rule-breaking and aggressive behaviour explained 32 percent of the variance in alcohol use.

In summary, hypothesis two was confirmed for adolescents without psychosis. Rule-breaking behaviour and aggressive behaviour were found to predict problem use, alcohol use, and marijuana use. These results for the deviance-prone model are presented in Table 4.

Affect-Regulation Model

The three substance use variables were regressed, using three separate regression analyses, upon anxiety (assessed with the BAI), depression (assessed with the BDI-II), and mixed anxiety/depression (assessed with the YSR). Overall, no regression analyses for this model were significant for the control group. Thus, the results do not provide evidence that negative affect significantly predicts substance use for adolescents without psychosis.

Discussion

The results of this study indicated that substance use is a significant concern in adolescents with psychosis demonstrating that there are increased levels of substance use and misuse, particularly of cannabis, among adolescents with psychosis as compared to adolescents from the general population. To try and understand why adolescents with psychosis use more substances than typically developing adolescents we examined three models of substance use established in the general adolescent population.

Normative Development Model

The normative development model did not predict substance use patterns in adolescents with or without psychosis. That is, adolescents who experimented with substances had neither improved nor worsened social and emotional adjustment.

For adolescents with psychosis, this is consistent with the idea that individuals with psy-

chosis are less capable of tolerating mild to moderate substance use over time without starting to experience negative consequences (Kovacs et al., 1997). That is, although substance use may not have contributed to poor outcome, these adolescents may have a low tolerance to substance use and subsequently would not experience any positive outcomes from it. Contrary to expectations, the normative development model was also not confirmed in the typically developing adolescents. The current findings demonstrated that in typically developing adolescents, substance use has neither a positive nor a negative effect on emotional or social adjustment.

Deviance-Prone Model

As hypothesized, deviant behaviour predicted substance use in both adolescents with and without psychosis. In particular, rule-breaking or delinquent behaviour (e.g., lying, setting fires, stealing) was strongly associated with substance use. This has already been well established in adolescents without psychosis (e.g., Adalbjarnardottir and Rafnsson, 2002; Sutherland and Shepherd, 2001) and in adults with psychosis (Mueser et al., 2000). Given that deviant behaviour predicted substance use in both groups of adolescents, it may be that this association is typical of this developmental period.

Affect-Regulation Model

Consistent with previous research ((Blanchard et al., 2000; Hussong and Chassin 1994), negative affect in adolescents with psychosis, predicted problem use. The idea that adolescents would use substances to regulate their emotional distress makes intuitive sense, as many substances alter emotional states and should therefore be highly reinforcing to anxious or depressed adolescents. Increased levels of distress, depression, and anxiety in individuals with psychosis make the affect-regulation model particularly applicable for them.

In adolescents without psychosis, there was no relationship between negative affect and substance use. Although this finding is inconsistent with some studies (Diego et al., 2003), other studies have suggested that although emotional distress may play some role in adolescent substance use, it is not a

primary role (Wills et al., 1999). This finding may also be influenced by the fact that in the present study, adolescents without psychosis had low levels of depression and anxiety; significantly less than adolescents with psychosis.

Clinical Implications

The current findings support that substance misuse is an important area to address among adolescents with psychosis and that treating substance misuse in these adolescents may be complex. Not only do these adolescents have psychosis, which already complicates substance misuse treatment, but they may also have depression and anxiety symptoms associated with their illness and possibly with their substance use, as well as potentially engaging in deviant behaviours. Thus, the results point to the need of integrating substance misuse treatment into the treatment programs that the adolescents are already receiving for their psychosis. Indeed, many early psychosis/first-episode programs are attempting to integrate substance misuse treatment into their programs (Addington and Addington, 2001; Graham et al., 2003).

Strengths and Limitations of the Study

One of the strengths of the present study is the inclusion of a control group from the general population to whom levels of negative affect, deviant behaviour, social impairments, substance use, reasons for use, and predictors of substance use could be compared.

There are a number of limitations of the present study. First, this study has a relatively small sample size such that it may not have had enough power to detect some group differences. Secondly, no statements can be made regarding causation. That is, it is impossible to know the temporal order of occurrences of substance use, psychosis, depressive symptoms, or any other variables assessed, and therefore, we cannot determine whether one variable was the cause of the other (e.g., increased negative affect caused the adolescent to use substances).

Conclusions

This study represents an initial attempt to understand substance use in adolescents experiencing their first episode of psychosis.

The results suggest that substance use is a valid concern for a significant proportion of this population. These adolescents may also have depression and anxiety symptoms associated with their illness and possibly with their substance use, and may potentially be engaging in deviant behaviours. Thus, substance use and psychosocial difficulties should be routinely assessed and considered when developing a treatment plan for adolescents experiencing their first episode of psychosis.

Acknowledgements/Conflict of Interest

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