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Childhood Trauma Enhances the Association Between Age of Cigarette Smoking Initiation and College Drug Use Frequency

Tara Cossel, Alicia Klanecky, and Dennis E. McChargue

Introduction

Previous research has reported that across the nation 29% of college students engage in cigarette smoking while four out of five students who have reported smoking in the past 30 days have also binge drank or used an illicit substance. In turn, 70% of students who described using an illicit substance in the past month have smoked cigarettes as well. Because the number of college students abusing substances continues to increase, the prevalence of both cigarette and illicit substance use denotes a major health concern.

Developed to explain the rate and onset of specific use patterns, the "gateway" hypothesis posits that individuals who use licit drugs (cigarettes or alcohol) are more likely to progress to illicit drug use later in life. While current smoking status and the amount of cigarettes smoked per day have been predictive of the progression to illicit substances (i.e. marijuana, cocaine, crack, and heroin) across age strata, some inconsistencies exist maintaining cigarettes may not precede marijuana use. Further, research has reported that with earlier age of onset of licit drug use, individuals are the more likely to transition to illicit drug use although the differentiation between alcohol or cigarettes as well as the progression to specific illicit drugs has not been fully assessed.

A distinct but not mutually exclusive body of literature has reported that individuals who experience trauma are two times more likely to have current alcohol dependence and eight times more likely to be drug dependent compared to those without trauma exposure. With the majority of studies suggesting substance use is associated with an attempt to alleviate symptoms of trauma, most research indicates trauma exposure precedes substance use. However, the onset pattern of substance use, particularly the "gateway" hypothesis, has yet to be explored in individuals with trauma exposure.

The current study sought to assess the "gateway" hypothesis by examining the relationship between age of first cigarette and subsequent use of illicit substances in college. Additionally, a second aim of the current study was to explore the "gateway" hypothesis in individuals with previous trauma exposure.

It was hypothesized that age of first cigarette would predict current use patterns of illicit substances among college students. Further, this hypothesis was explored in individuals who self-reported varying levels of early trauma exposure.

Method

Participants

N = 160 (Female = 68%)
Age: M = 19.79 (S = 2.33) Range: 18 – 37 (95% ≤ 22)
Ethnicity: Caucasian = 138 (86.8%), African American = 6 (3.8%)
Hispanic = 4 (2.5%), Asian American = 5 (3.1%)

Measures

Early trauma exposure was measured via the Early Trauma Inventory Self Report - Short Form (ETISRF; Bremner, Vermetten, & Mazure, 2000) which includes 29-items incorporating 4 scales examining general traumas, physical punishment, emotional abuse, and sexual events before the age of 18. The questionnaire has shown good internal consistency (Cronbach's alpha = .75) as well as predictive and convergent validity with other measures (i.e. CTQ – SF) in obtaining specific types of early trauma exposure (Hyman, Garcia, Kemp, Mazure, & Sinha, 2005).

Descriptions of the onset and pattern of substance use were obtained with the Canadian Survey, a 78-item questionnaire measuring substance use, consequences of use, and other risky behaviors (i.e. gambling). Participants answered questions such as "How old were you when you had your first cigarette?" and "How often have you used any of the following drugs in the last 12 months?" with choices ranging from never to daily.

Procedure

The current study utilized Experimetrix to recruit college students interested in participating in research to earn extra credit in various undergraduate psychology classes. After receiving informed consent from each participant, research assistants distributed a battery of questionnaires examining items such as substance use, risky behaviors, family characteristics, and affect. Each session took approximately 90 minutes.

Table 1

Age of First Cigarette Predicting Current Substance Use Per Drug

Dependent Variable	*b*	*B*	*p*
Cannabis	-.260	-.266	.038
Cocaine	-.062	-.390	<.001
Ecstasy	-.042	-.339	.004
Oxycontin*	-.074	-.246	.036
Other Prescription	-.116	-.429	<.001

Note. * = Full model not significant (p = .06)

Table 2

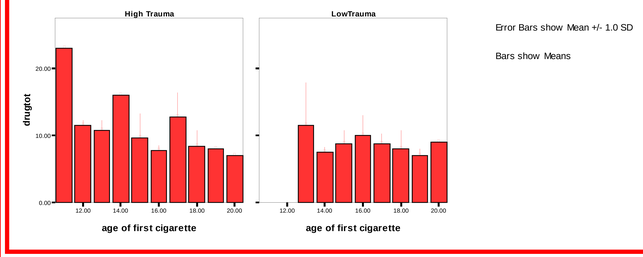
Hierarchical Regression Examining Trauma by Age of First Cigarette Interaction

Variables	*b*	*B*	*p*	R^2
Step 1				
Age	-.318	-.138	.289	
Gender	-3.30	-.427	.002	
All variables in Step 1				.200
Step 2				
Age of first cig	-.522	-.331	.010	
Trauma	-.177	-.197	.118	
All variables in Step 2				.374
Step 3				
Cig x Trauma	.084	3.23	.033	
All variables in Step 3				.434

Note. Cig x Trauma = Interaction between age of first cigarette and trauma exposure total

Figure 1

Depiction of Interaction Based on High and Low Trauma Reports



Results

A series of separate hierarchical regression analyses were performed to assess the predictive value of age of first cigarette in college students' current use of cannabis, cocaine, ecstasy, oxycontin, and "other people's prescriptions" after controlling for age and gender.

Findings indicated that after accounting for age and gender in step one, each full model including age of first cigarette predicted current use of cannabis (ΔR^2 = .067, F(3, 51) = 5.681, p = .002), cocaine (ΔR^2 = .148, F(3, 70) = 8.927, p>.001), ecstasy (ΔR^2 = .112, F(3, 69) = 3.525, p = .019), and other prescriptions (ΔR^2 = .180, F(3, 69) = 6.354, p = .001) with the exception of oxycontin (p>.05). Further, age of first cigarette was a significant contributor to each model (See Table 1).

Additionally, a hierarchical regression analysis was implemented to test the interaction between age of first cigarette and level of trauma exposure after again controlling for age and gender (See Table 2). Results indicated the full model significantly predicted total monthly drug use including age of first cigarette, total trauma score, and the resulting interaction as significant contributors to the model (R^2 = .434, F(5, 45) = 6.915, p<.001). Age of first cigarette predicted total drug use among individuals who reported higher levels of early trauma; however, this finding was not replicated in those reporting low levels of early trauma (See Figure 1).

Discussion

Controlling for age and gender, age of first cigarette predicted college use patterns of cannabis, cocaine, ecstasy, and other people's prescriptions. Specifically, those with earlier exposure to nicotine were more likely to use illicit drugs in college than individual's with later nicotine exposure. These results lend support to the "gateway" hypothesis that licit drug use at an earlier age is predictive of the progression to illicit drug use later in life.

Interestingly, the significant interaction between trauma exposure and age of first cigarette indicated that the "gateway" hypothesis was supported in individual's with high levels of early trauma exposure such that age of first cigarette was predictive of total monthly drug use. In contrast, the "gateway" hypothesis detailing an onset pattern of substance use based on age of first cigarette was not descriptive for those reporting low levels of early trauma.

Gateway theorists suggest that early exposure to certain drugs may "sensitize" the dopamine system and make other drugs disproportionately rewarding when individuals are exposed to such drugs at a later date. Nicotine is one such "gateway" drug. However, research to date has been inconsistent in whether early nicotine exposure produces a sensitizing effect to further drug use. Indeed, our data may suggest that nicotine becomes a "gateway" drug only among a certain vulnerable population, particularly those who have experienced a traumatic event before the age of 18. We speculate that trauma alters the reward brain system that enhance nicotine's sensitizing effects.

Limitations of the current study include a predominantly Caucasian sample as this may weaken generalizability to more diverse populations. In addition, the sample was relatively healthy. Further, replication with a larger community sample size may be warranted.

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