A Comparison of Three Vulnerability Models for COA Substance Use

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Figure 1
A Test of the Negative Affect Regulation Model

Notes. Standardized regression coefficients are presented. Only significant paths (*p*<.05) are shown. For presentation purposes, correlations between errors are not included.

Abstract

This prospective study compared the following three vulnerability models for early onset substance use in a high-risk sample: The negative affect regulation model, the deviance proneness model, and a comprehensive model including both delinquency and negative affect. At Time 1, the sample included 249 15-19 year-old adolescents (57% COAs) and their fathers. All participants were followed-up five years later (Time 2). Although all of the models fit the data well, the deviance proneness model was parsimonious and provided the best fit. Of note, delinquency played a significant mediating role in the relationship between paternal alcoholism and substance use age of onset, whereas negative affect did not. Moreover, negative affect and delinquency were not significantly associated with one another. These results suggest that the deviance proneness model provides a more useful theoretical framework than the negative affect regulation model or a comprehensive model when examining the onset of substance use, particularly in a high-risk sample.

RISK Project

- A longitudinal project designed to follow offspring of alcohol and drug dependent fathers over time from adolescence into adulthood

- RISK began in 1993 and is currently ongoing (the present study is based on Time 1 data collected between 1993-1998 and Time 2 data collected between 1998-2003)

- Adolescents for the RISK project are recruited directly through the community (e.g., high schools, YMCA/YWCA) and indirectly through their parents (e.g., newspaper advertisements, presentations at alcohol/drug treatment programs)

Sample

- 249 adolescent girls and boys (60% girls) and their fathers

- Age range = 15-19 years old; mean age = 16.70 (SD = 1.36)

- 62% Caucasian; 25% African-American; 10% Hispanic; 3% other

- Participants were from working class families from inner-city Hartford

Measures

Paternal Substance Dependence

The Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA) was administered to obtain lifetime diagnoses of alcohol dependence. The SSAGA is a clinical, diagnostic psychiatric interview with good psychometric properties (kappas range from .74-1.00). Based on the SSAGA, fathers were classified as having a history of alcohol dependence (57%) or no history of alcohol dependence (43%).

Measures

Adolescent Personality

The *NEO-FFI* (Costa & McCrae, 1992) was used to assess agreeableness, extraversion, and neuroticism. These scales have been shown to have good psychometric properties (Costa & McCrae, 1992; Scandell, 2000).

The *Sensation Seeking Scale* (Zuckerman et al., 1984) was used to assess disinhibition and boredom susceptibility. Both of these scales have been shown to be reliable and valid (Roberti et al. 2004; Zuckerman et al., 1980).

Negative Affect

The Positive and Negative Affect Schedule (Watson et al., 1988) was administered to assess negative affect. In the present study, the Cronbach alpha coefficient for this measure was .83.

Delinquency

Twenty items from the SSAGA were summed to create a delinquency total score. Representative items are "Have you ever been suspended or expelled from school?" and "Have you ever physically injured anyone on purpose?". The Cronbach alpha coefficient for this scale was .74.

Onset of Substance Use

Participants were asked how old they were when they first used tobacco, began drinking regularly, and first used marijuana. Based on their responses to these questions, they were classified as follows:

Age Began Regular Drinking	Age 1st Used Tobacco and Age 1st Used Marijuana
0=have not begun to drink regularly	0=never used
1=19-22 years of age	1=19-22 years of age
2=17-18 years of age	2=17-18 years of age
3=15-16 years of age	3=15-16 years of age
4=14 years of age or younger	4=13-14 years of age
	5=11-12 years of age
	6=10 years of age or younger

* Paternal substance dependence, temperament, delinquency, and negative affect were assessed at Time 1 and the substance use measures were assessed at Time 2.

Analyses

- Structural equation modeling was used to examine the three vulnerability models.

- Three series of models were run – testing the negative affect regulation model, the deviance proneness model, and a comprehensive model.

- For each model, errors with modification indices greater than 4 were allowed to be correlated and all non-significant paths were set to 0.
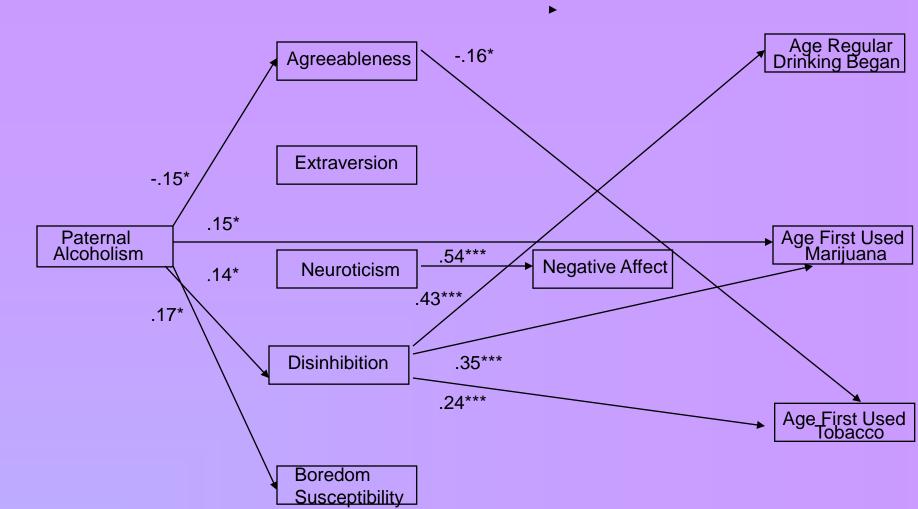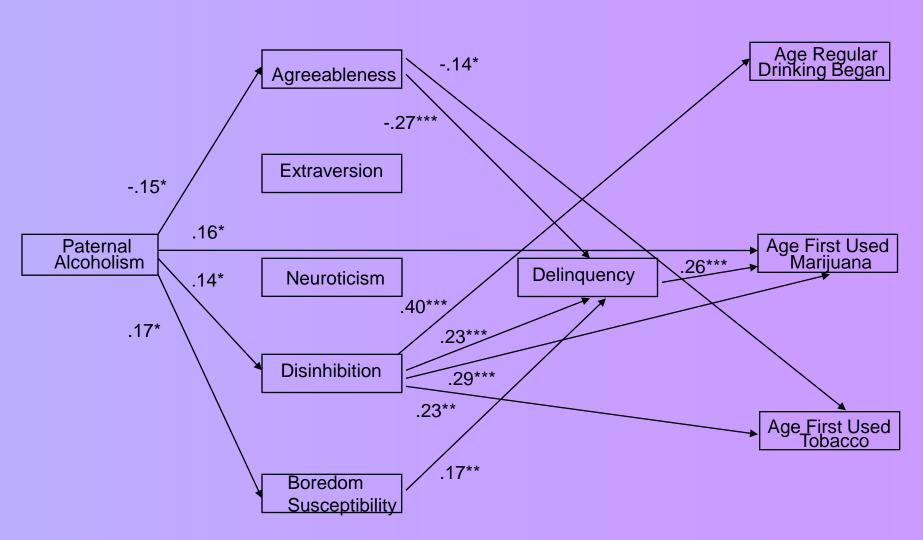
Results

- The negative affect regulation model fit the data well {X^2(26)=22.18, *p*=.68; NFI=.94; RMSEA=.00). Paternal alcoholism significantly predicted age first used marijuana (β=.16, *p*<.05). Many significant indirect paths between paternal alcoholism and the substance use variables also were found. More specifically, paternal alcoholism was significantly related to lower levels of agreeableness (β=-.15, *p*<.05) and to higher levels of disinhibition (β=.14, *p*<.05) and boredom susceptibility (β=.17, *p*<.05). In turn, lower agreeableness was associated with an earlier age of onset for tobacco use (β=-.16, *p*<.05). Higher disinhibition also was significantly associated with an earlier age of onset for tobacco use, regular drinking, and marijuana use (β=.24, *p*<.001; β=.43, *p*<.001; β=.35, *p*<.001, respectively). Negative affect was not a significant mediator in this model (see Figure 1).

- The deviance proneness model also fit the data extremely well {X^2(23)=16.56, *p*=.83; NFI=.96; RMSEA=.00). The paths between paternal alcoholism, temperament, and substance use were similar to those observed in the previous model. However, delinquency also was a significant mediator. More specifically, lower levels of agreeableness (β=-.27, *p*<.001) and higher levels of disinhibition (β=.23, *p*<.001) and boredom susceptibility (β=.17, *p*<.01) significantly predicted delinquency; which in turn, significantly predicted earlier age of onset for marijuana use (β=.26, *p*<.001) (see Figure 2).

- The comprehensive model also provided a good fit with the data {X^2(25)=19.59, *p*=.77, NFI=.95; RMSEA=.00). As found in the previous models, delinquency was a significant mediator, whereas negative affect was not. Of note, negative affect and delinquency were not significantly related to one another (see Figure 3).

Figure 2
A Test of the Deviance Proneness Model

Notes. Standardized regression coefficients are presented. Only significant paths (*p*<.05) are shown. For presentation purposes, correlations between errors are not included.

Figure 3
A Comprehensive Model

Notes. Standardized regression coefficients are presented. Only significant paths (*p*<.05) are shown. For presentation purposes, correlations between errors are not included.
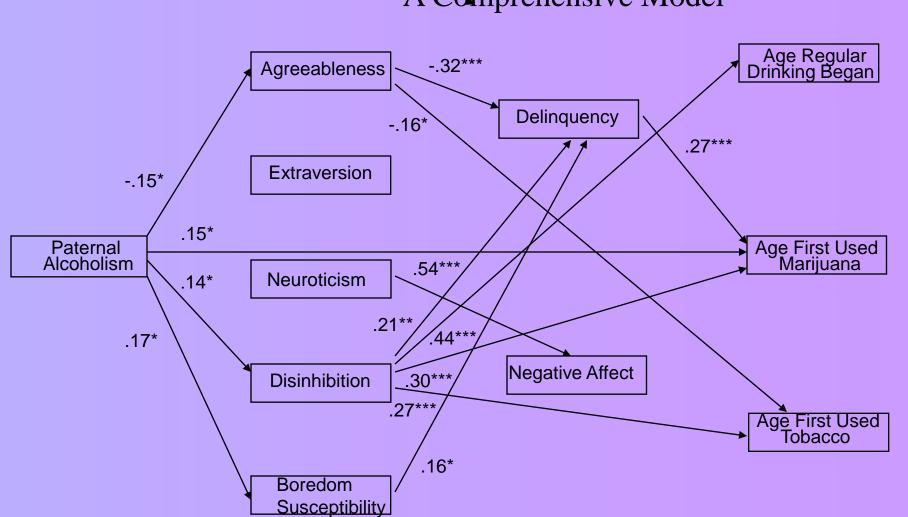
Conclusions

Consistent with previous research, adolescent COAs were found to have lower levels of agreeableness and higher levels of disinhibition and boredom susceptibility than non-COAs. They also were found to have an earlier age of onset for marijuana use. In addition, lower levels of agreeableness and higher levels of disinhibition were associated with earlier substance use. Importantly, delinquency played a significant mediating role in the present study, whereas negative affect did not. Moreover, delinquency and negative affect were not significantly associated with one another. Although all of the SEM models fit the data data quite well, the parsimonious deviance proneness model provided the best fit, suggesting that it is a more useful theoretical framework than the negative affect regulation model or a comprehensive model when examining the onset of substance use in COAs.

Table 1
Means, Standard Deviations, and Correlations among Study Variables

Measure	1	2	3	4	5	6	7	8	9	10	11
1. Paternal Alcohol Dependence											
2. Agreeableness	-.15*										
3. Extraversion	-.05	.27***									
4. Neuroticism	-.03	-.27***	-.23**								
5. Disinhibition	.14*	-.27***	.15*	.09							
6. Boredom Susceptibility	.17*	-.30***	.05	-.01	.33***						
7. Delinquency	.10	-.40***	-.14*	.12	.33***	.31***					
8. Negative Affect	.08	-.21**	-.15*	.55***	.14*	.09	.17*				
9. Tobacco Age of Onset	.09	-.23**	.05	.10	.31***	.14*	.22**	.18**			
10. Regular Drinking Age of Onset	.12	-.16*	.02	.01	.44***	.18**	.25***	.08	.39***		
11. Marijuana Age of Onset	.22**	-.23**	-.01	.15*	.41***	.21**	.39***	.17*	.49***	.45***	
Mean	.87	29.15	29.21	21.57	4.67	3.43	19.62	21.74	2.83	1.68	2.23
SD	.85	6.46	6.04	6.94	2.56	2.00	8.65	6.41	1.73	1.33	1.52

*p<.05; **p<.01; ***p<.001.