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Multivariate Comparison of Male and Female Adolescent Substance Abusers with Accompanying Legal Problems

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Abstract

Purpose—The factors that distinguish adolescent male and female substance abusers with and without legal problems were investigated.

Method—Youths (N = 4,071) admitted for substance abuse treatment were administered the revised *Drug Use Screening Inventory* (DUSI-R) to measure severity of health, behavior, and social adjustment problems.

Results—Legal problems were more frequent among boys; however, severity of disturbance was greater in girls on 9 of 10 scales. Substance abusing girls and boys with legal problems reported more severe behavior, substance abuse, family adjustment, and peer relationship problems than substance abusing peers without legal problems. Quality of peer relationship mediated the association of family dysfunction, substance abuse and behavior problems with legal problems in boys only.

Conclusions—Gender and legal status both need to be taken into account to potentiate treatment prognosis of substance abusing youths.

Keywords

adolescents; substance abuse; treatment; legal problems; delinquency

Introduction

The prevalence of substance use among youths remains high despite strong legal sanctions and social mores prohibiting consumption. Results of the most recent Monitoring the Future survey conducted in the U.S. indicate that 30-day frequency of alcohol, tobacco and marijuana use is 43.1%, 20.4% and 19.4% among 12th grade students (Johnston, O'Mally, Bachman, Schulenberg, 2009). Indeed, 27.6% of 12th grade students report “being drunk” in the 30-day period prior to the survey. Most likely, the actual prevalence is even higher

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considering that youths having the highest level of substance involvement, particularly dropouts and truants, are not in school the day the survey is administered.

Low adherence to societal mores and laws is a prominent characteristic of many youths who consume illegal drugs (Gordon, Kinlock, & Battjes, 2004; Kinlock, Battjes, & Gordon, 2004; Vander Waal, McBride, Terry-McElraht, & Van Buren, 2001). Accordingly, incarceration consequent to criminal activity (Gordon et al., 2004) and fighting (Vander Wall et al., 2001) is frequent among substance abusing youths. Notably, adolescents are more likely than any other age group to be referred to substance abuse treatment via the criminal justice system (Melnick, DeLeon, Hawke, Jainchil, & Kressel, 1997; Dennis, Scott, Godley, & Funk, 1999).

Etiology research employing adoption (Cadoret, Riggins-Caspers, Yates, Troughton, & Stewart, 2000) and twin (Hicks, Blonigen, Kramer, Krueger, Patrick, & Iacono et al., 2007) paradigms reveals substantial genetic overlap between substance abuse and antisociality. Indeed, the various categories of substance use disorder (SUD) in the DSM can be ordered on a scale measuring severity of externalizing behavior with the most negatively sanctioned drugs associated with greater disturbance (Krueger, Hicks, Patrick, Carlson, Iacono, & McGue, 2002). Without treatment it is thus not surprising that both antisociality and substance abuse usually remain stable during adolescence (D'Amico, Edelen, Miles, & Moral, 2008; Dembo, Wothke, Seebecker, Pacheco, Rollie, Schmeidler et al., 2002). However, many substance abusing youths do not have concomitant legal problems. The subset of substance abusers who are involved in the juvenile justice system are more likely to be male, older than peers who are not involved in the legal system, and members of ethnic minority groups (Cropsey, Weaver, & Dupre, 2008; Webb, Bursleson, Ungemack, 2002). Moreover, youths who have legal problems are more likely to be living with only one parent (Webb, Bursleson, & Ungemack, 2002).

The clinical and psychosocial characteristics of adolescent substance abusers with and without legal problems that inform treatment needs have, to date, not been delineated. Accordingly, the present study compared severity of medical disorder, psychiatric disturbance, behavior problems, and social maladjustment of adolescents grouped according to gender and presence/absence of legal problems using the revised Drug Use Screening Inventory (DUSI-R (Tarter, 1990)). In addition, this study, tested an etiological model, depicted in Figure 1, in which poor family system functioning is posited to portend behavior problems and substance abuse in offspring which, in turn, promotes affiliations with socially non-normative peers and legal problems. Currently, youths receiving treatment through the juvenile system interact mostly with peers who also violate the law, evince multifaceted behavior problems, and have a dysfunctional family. Hence, demonstrating that affiliation with deviant peers mediates the association of family adversity, substance abuse and behavior problems with legal problems underscores the importance of deploying interventions that promote normative socialization, including consolidation of friendships with socially normative peers.

Methods

Participants

The sample consisted of male (N=2,875) and female (N=1,196) substance abusing youths consecutively referred to the Addiction Foundation of Manitoba. Males were more frequently referred for treatment than females who had concomitant legal problems (58.4% vs. 41.6%). Table 1 summarizes the characteristics of the four groups comprising the sample. Boys and girls with legal problems were on average older and had more residence changes in the year prior to initiating treatment. In addition, a smaller proportion were

enrolled in school. Family context was also more compromised in youths with legal problems. Specifically, fewer lived with both parents and more youths with legal problems had parents who never married.

Instrumentation

The paper and pencil version of the revised *Drug Use Screening Inventory* (DUSI-R), a self-report questionnaire consisting of 159 true/false items (Tarter, 1990), was individually administered after obtaining informed consent during the initial phase of treatment. Reliability and validity of the DUSI-R have been documented (Kirisci, Mezzich, & Tarter, 1995; Kirisci, Tarter, & Hsu, 1994). Taking approximately 15 minutes to complete this inventory quantifies severity of problems in 10 domains: 1) Substance Use, 2) Health Status, 3) Behavior Problems, 4) Psychiatric Disorder, 5) School Performance, 6) Family System, 7) Work Adjustment, 8) Peer Relationships, 9) Social Competence, and, 10) Leisure/recreation. Disturbance in each domain, and the overall problem density (OPD) index, were determined in standard manner. The scores on each scale and the OPD index range between 0–100% severity. In addition, the DUSI-R contains a 10-item validity scale to detect intentional deception. A score of 7 or higher on this scale disqualified the person's data from analysis.

Statistical Analysis

Analysis of variance was used to compare the mean scores of the four groups. Main effects of gender and legal status were computed along with interaction effects for each DUSI-R scale and the overall problem density score. Multigroup path analysis was performed to elucidate the association of family system, substance abuse, behavior problems, and quality of peer relationships with presence/absence of legal problems. Regression coefficients in the model were estimated using Mplus (Muthén & Muthén, 2001). Mplus uses the weighted least square parameter estimation method with diagonal weight matrix with robust standard errors. Four indices of model fit were used: the χ^2 goodness-of-fit index, root mean square error approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI). A non-significant χ^2 value ($p \geq .05$) indicates that the data are consistent with the model. RMSEA values greater than .08 reflect poor model-data fit, values between .05 – .08 indicate acceptable fit, and values of less than .05 reflect good fit (MacCallum, Browne, & Sugawara, 1996). For the CFI and TLI, values greater than .90 and .95 indicate good model fit (Loehlin, 2004).

Mediated paths were tested using the method described by Sobel (Sobel, 1982) using the

following formula: $z = \frac{b_1 b_2}{\sqrt{b_2^2 \sigma_{b_1}^2 + b_1^2 \sigma_{b_2}^2}}$, where b_1 is the regression coefficient between predictor and mediator, b_2 is the regression coefficient between mediator and dependent variable, and σ^2 is the square of the estimate of the standard error of the corresponding regression coefficient. All of the variables used in the path analysis were manifest variables.

Results

Group Comparisons

Table 2 presents the mean scores of the four groups. A significant main effect for legal status was found on 7 of 10 scales. Legal problems were associated with more severe disturbance on scales measuring substance abuse, health status, behavior problems, family system, work adjustment, peer relationships, and leisure/recreation. Although fewer youths with legal problems were in school (Table 1), severity of school adjustment problems was not different from youths without legal problems. Furthermore, severity of psychiatric and

social competence disturbances did not distinguish substance abusing youths with and without legal problems. The overall problem density score was more severe in youths with legal problems.

Girls reported significantly more severe disturbance on 9 of 10 DUSI-R scales. Only the score on the Work Adjustment scale did not distinguish boys and girls. In addition, the overall problem density score was significantly higher in girls. A significant interaction between gender and legal status was not observed on any scale.

Gender-Specific Norms for Substance Abusing Youths With and Without Legal Problems

Norms were derived in male and female substance abusing youths with and without legal problems. In this manner, practitioners can gauge a particular individual's severity of disturbance referenced to his/her cohort. Percentile scores, shown in Table 3, indicate that girls are skewed toward more severe disturbance than boys. For example, at the 75th percentile, when treatment is clearly required, girls without legal problems have an average overall problem density score of 48.7 compared to 43.4 for boys without legal problems.

Modeling the Association between Family System, Substance Abuse, Behavior Problems, and Peer Relationships

The results of path analysis shown in Figure 2 reveal acceptable model-data fit ($\chi^2=7.21$, $df=5$, $p=.21$, $RMSEA=.017$, $CFI=.99$, $TLI=.99$). Standardized regression estimates for the boys and girls are shown at the top and bottom of the arrows. The direct paths indicate similar results in boys and girls with the exception of a direct path in boys only between peer relationships and legal problems. Family system disturbance predicted substance abuse (boys: $Beta=.48$, $z=25.62$, $p<.001$; girls: $Beta=.47$, $z=20.21$, $p<.001$), behavior problems (boys: $Beta=.50$, $z=29.54$, $p<.001$; girls: $Beta=.48$, $z=23.09$, $p<.001$), and peer relationships (boys: $Beta=.26$, $z=15.00$, $p<.001$; girls: $Beta=.22$, $z=11.05$, $p<.001$). Quality of peer relationships was directly predicted by substance abuse (boys: $Beta=.36$, $z=21.54$, $p<.001$; girls: $Beta=.34$, $z=26.74$, $p<.001$), and behavior problems (boys: $Beta=.17$, $z=10.02$, $p<.001$; girls: $Beta=.18$, $z=9.42$, $p<.001$). A difference was observed, however, between genders with respect to a direct path between quality of peer relationships and legal problems (boys: $Beta=.17$, $z=5.19$, $p<.001$; girls: $Beta=.07$, $z=1.53$, $p=.13$). As can be seen in Figure 2, family system disturbance, behavior problems, and substance abuse problems were not directly associated with legal problems in either boys or girls in the full mediation model. However, significant pairwise associations were observed between family system disturbance (boys: $r=.10$, $p=.001$, girls: $r=.13$, $p<.001$), behavior problems (boys: $r=.09$, $p=.003$, girls: $r=.10$, $p=.007$) and substance abuse problems (boys: $r=.09$, $p=.003$, girls: $r=.09$, $p=.019$) with legal problems.

In boys only, quality of peer relationships mediated the association of family system disturbance ($Beta=.05$, $z=4.98$; $p<.001$), behavior problems ($Beta=.03$, $z=4.52$, $p<.001$) and substance abuse ($Beta=.06$, $z=4.99$, $p<.001$) with legal problems. Thus, quality of peer relationships in boys is an integral intermediating variable linking family system adjustment, behavior problems, and substance abuse with legal problems.

A comparison model was also tested in which the peer relationships variable was omitted from analysis. The results, shown in Figure 3, indicate poor model data fit ($\chi^2=8.15$, $df=2$, $p=.017$, $RMSEA=.046$, $CFI=.99$; $TLI=.99$). These results indicate that affiliation with socially non-normative peers is essential to having legal problems.

Discussion

The results of this study demonstrate that substance abusing adolescent girls with and without concomitant legal problems report more health, behavior, social adjustment, psychiatric, school adjustment and family system disturbances than boys. Whereas boys have a higher rate of substance abuse and legal problems, the manifest disturbances are more severe in girls. Accordingly, it is concluded that substance abusing girls require more intensive and comprehensive treatment services. In each gender, youths with conjoint legal problems and substance abuse report more severe health and psychosocial disturbances than substance abusers without legal problems.

Model testing revealed that family system disturbance is a significant predictor of substance abuse, behavior problems and quality of peer relationships in boys and girls. In the full mediation model, family system disturbance is, however, not associated with presence/absence of legal problems in both genders. Furthermore, substance abuse and behavior problems were associated with quality of peer relationships but not associated with legal problems. Moreover, in the full model, legal problems were associated with peer relationships in boys only. The association between peer relationships and legal problems in boys but not girls concurs with findings obtained by Gorman-Smith and Loeber (Gorman-Smith & Loeber, 2005); however, it should be noted that Werner et al. (Werner & Silbereisen, 2003) and Simons et al. (Simons, Johnson, Beaman, Conger, & Whitbeck, 1996) found that peer relationships mediated the association between family adjustment and legal problems in both genders. At this juncture, it is not possible to specify the reasons for this discrepancy between studies, although sample characteristics and instrumentation likely contribute to the inconsistency in results.

The observation that boys have a higher rate of legal problems than girls conforms to results obtained in prior research (Werner & Silbereisen, 2003; Svensson, 2003; Giordano & Cernkovich, 1997; Rutter, Giller, & Habell, 1998). Juxtaposed against this finding is the demonstration that girls have more severe disturbance than boys. Notably, the girls in this study are younger, have greater residential instability and are less likely to be living with the biological parents compared to boys (Table 1). They also report more disrupted family system functioning (Table 2). Stress ensuing from an adverse family environment has been reported to induce precocious puberty (Belsky, Steinberg, & Draper, 1991; Ellis & Essex, 2007) which, in turn, augments risk for substance abuse (Mezzich, Tarter, Giancola, Lu, Kirisci, & Parks, 1997). Moreover, heightened emotion reactivity, which is frequently concomitant to early age onset puberty (Dahl, & Gunnar, 2009; Spear, 2009; Gunnar, Wewerka, Frenn, Long, & Briggs, 2009; Silk, Siegle, Shalen, Ostapenko, Ladouceur, & Dahl, 2009; Quevedo, Benning, Gunnar, & Dahl, 2009), amplifies risk for psychopathology (Steinberg & Morris, 2001; Graber, Brooks-Gunn, & Warren, 2008). Hence, whereas family system disturbance leading to legal problems in substance abusing boys is mediated by quality of peer relationships, the pathway to legal problems in girls is hypothesized to encompass more broad-based individual and contextual disturbances.

Several limitations of this study are noteworthy. For instance, the cross-sectional paradigm does not enable clarification of the temporal order of the variables. In addition, the sample is composed of adolescents at the time of commencing substance abuse treatment. Thus their responses to the questions may be biased. Also, information about frequency and severity of legal problems is not available on the sample. The above limitations notwithstanding, the present findings highlight the importance of taking into account gender and legal status to potentiate treatment prognosis of substance abusing adolescents. Girls require more intensive and broad-based intervention in view of the finding that severity and range of disturbances are greater than boys. Interventions for boys, especially when implemented

under the aegis of the juvenile justice system, need to give special attention to the salience of peer relationships. Specifically, the results obtained herein emphasize the need to promote in boys opportunities for affiliations with prosocial peers to inculcate and consolidate attitudes and behaviors that align with societal mores and laws.

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Figure 1.



Figure 2.



Figure 3.

Table 1
 Characteristics of substance abusing male and female adolescent with and without legal problems

	Males						Females					
	Legal Problems+			Legal Problems-			Legal Problems+			Legal Problems-		
	M	(SD)	F	M	(SD)	F	M	(SD)	F	M	(SD)	F
Age	16.14	(1.25)	15.73	(1.42)	87.12***	15.68	(1.37)	15.31	(1.43)	13.70***		
Number of places lived in past 12 months	2.07	1.23	1.51	.090	112.06***	2.52	1.48	1.74	1.10	85.76***		
	N	%	N	%	Chi ²	N	%	N	%	Chi ²	N	%
Living with both parents	442	70.6	875	82.7	234.96***	146	55.7	688	74.1	87.60***		
Adopted from biological parents	57	6.6	103	5.3	1.77	57	6.6	103	5.3	1.77		
Marital Status of Biological Parents	N	%	N	%	Chi ²	N	%	N	%	Chi ²	N	%
• Married	175	28.6	432	41.1	62.33***	55	21.2	334	36.5	32.18***		
• Separated	129	21.1	145	13.9		63	24.3	157	17.1			
• Divorced	107	17.5	245	23.5		52	20.1	211	23.0			
• Never married	97	15.8	95	9.1		64	24.7	142	15.5			
• Deceased	9	1.5	4	4		2	.8	4	.4			
• Widowed	20	3.3	33	3.2		5	1.9	15	1.6			
• Don't know	63	10.3	72	6.9		16	6.2	42	4.6			
• Other	12	2.0	18	1.7		2	.8	11	1.2			
Currently a student	406	65.5	994	94.2	234.96***	175	67.6	836	90.7	87.60***		

 p<.001

Table 2
Mean scores on the DUSIR scales in substance abusing male and female adolescents with and without legal problems

	Males				Females				F-value Gender	F-value Legal Problems	F-Value Interaction
	Legal Problems*		Legal Problems-		Legal Problems+		Legal Problems-				
	M	(SD)	M	(SD)	M	(SD)	M	(SD)			
Substance use	37.95	(23.39)	33.46	(23.54)	52.64	(26.09)	46.82	(26.91)	101.02	13.64***	.23
Health Status	28.87	(17.27)	27.05	(17.67)	40.06	(20.26)	37.45	(20.02)	106.52**	4.51*	.15
Behavior pattern	35.66	(18.86)	32.25	(17.85)	47.29	(19.64)	42.32	(19.75)	104.76	15.60**	.54
Psychiatric disorder	34.26	(19.55)	32.00	(19.29)	47.72	(22.94)	47.45	(21.95)	156.90**	1.21	.75
School Performance	55.64	(21.22)	53.23	(18.75)	59.75	(18.71)	59.38	(18.82)	22.22**	1.64	.88
Family System	37.12	(20.55)	32.68	(21.09)	52.66	(22.23)	45.11	(22.15)	130.90**	24.75**	1.66
Work Adjustment	25.18	(19.56)	17.82	(18.16)	21.66	(21.87)	17.37	(19.46)	3.35	28.95**	2.01
Peer Relationship	57.18	(20.24)	49.67	(21.38)	63.34	(18.76)	59.78	(19.59)	50.15**	23.19**	2.90
Social competence	23.76	(18.38)	21.21	(17.75)	35.22	(19.80)	33.95	(21.45)	124.22**	3.10	.35
Leisure/Recreation	41.05	(20.38)	39.14	(19.71)	52.38	(19.44)	48.77	(22.79)	79.08**	5.49*	.52
Overall Problem Density Score	37.69	(14.65)	33.87	(14.41)	47.31	(15.00)	43.88	(15.79)	136.47	18.64**	.05

* p<.05;

** p<.01

Table 3

Percentile ranks of DUSI-R Overall Problem Density (OPD) score of adolescent boys and girls with and without legal problems¹

Percentile	Boys		Girls	
	Without Legal Problems	With Legal Problems	Without Legal Problems	With Legal Problems
5	12.2	13.7	17.5	22.3
10	15.7	18.7	23.1	27.9
15	18.5	21.7	27.2	30.7
20	20.6	25.1	29.3	32.9
25	23.0	26.9	31.9	36.6
30	25.5	29.5	34.9	39.1
35	27.0	31.2	37.2	40.8
40	29.0	33.0	39.8	42.4
45	31.0	34.8	42.0	46.8
50	32.5	36.4	44.2	48.4
55	34.4	39.6	46.0	49.9
60	36.5	42.1	47.8	51.5
65	39.2	43.9	50.6	52.5
70	41.1	46.4	53.0	55.1
75	43.4	48.7	54.8	58.3
80	45.8	50.6	57.6	60.5
85	50.1	53.7	61.1	62.8
90	53.4	56.0	65.4	68.7
95	59.4	61.5	70.4	71.3

¹Score range is 0–100% severity