

Discriminative Validity and Clinical Utility of an Abuse-Neglect Interview for Adolescents With Conduct and Substance Use Problems

Thomas J. Crowley, M.D.

Susan K. Mikulich, Ph.D.

Kristen M. Ehlers, B.A.

Shannon K. Hall, B.A.

Elizabeth A. Whitmore, Ph.D.

Objective: Many youths with conduct and substance use problems experience abuse and neglect. A valid measure of the severity of abuse-neglect events could facilitate research and clinical care. The authors' goal was to examine the discriminative validity, clinical utility, and severity correlations of the Colorado Adolescent Rearing Inventory, a structured, 20–45-minute abuse-neglect interview in the assessment of adolescents with conduct and substance use problems.

Method: Ninety-eight adolescent patients with conduct and substance use problems and 102 comparison subjects (about 40% of the subjects in each group were female) completed the Colorado Adolescent Rearing Inventory, the Diagnostic Interview Schedule for Children, and the Composite International Diagnostic Interview—Substance Abuse Module.

Results: Although the subjects were advised that reports of abuse-neglect would be communicated to child welfare agencies, nearly two-thirds of the patients with conduct and substance use problems endorsed items indicating probable abuse-neglect, compared with about a third of

the comparison subjects, a highly significant difference. Clinicians judged that 68%–80% of the cases of the patients and comparison subjects who endorsed such items warranted reporting to child welfare agencies. Scores on the Colorado Adolescent Rearing Inventory correlated significantly with severity of substance involvement, conduct disorder, and major depression. Compared to males, significantly more females (including 15% of comparison females) reported sexual abuse. Patients were significantly more likely than comparison subjects to attribute adverse life effects to their reported abuse-neglect experiences.

Conclusions: Colorado Adolescent Rearing Inventory scores revealed many cases of serious abuse-neglect, generated many reports to child welfare agencies, demonstrated discriminative validity, correlated with clinical measures, and reflected important gender differences. The Colorado Adolescent Rearing Inventory can contribute to clinical evaluation and research involving youths with conduct and substance use problems.

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More than 3 million American children annually are subjects of abuse-neglect reports (1). However, actual victimization of minors is much more common (1). Drug-dependent adolescents are at high risk for abuse-neglect. A statewide survey of 123,000 students found strong associations between self-reported substance use and child abuse (2), and other reports have found that drug-using youths are more likely than others to be victimized (1). More extensive abuse-neglect has been associated with more severe substance use problems (3, 4).

Since adolescent substance involvement is associated with abuse-neglect, and since substance involvement is also associated with conduct disorder and delinquency (5, 6), it is not surprising that abuse-neglect is associated with conduct disorder or delinquency (7–9). For example, among abused youths, substance use disorders were 18 times more common and conduct disorder was nine times more common than among comparison subjects (10).

Among both adolescents and adults, prior child abuse has been associated with substance use disorders and numerous other psychiatric problems (11–14).

More than 180,000 American adolescents enter substance treatment programs annually (15). For the reasons just discussed, all deserve abuse-neglect assessments. Abuse-neglect researchers have used several assessment instruments that show various kinds of validity (16–22). However, such assessments may not address issues specific to substance-involved adolescents, whose family members often themselves have substance use or antisocial problems (23). Such issues include whether family members provided drugs or used them with the youth. Did family members neglect the youth because they were “high”? Were perpetrators or victims intoxicated? Did the victim's intoxication elicit further abuse from poorly controlled adults? Were drugs exchanged for sexual favors?

Did the abuse include antisocial cruelty or introduction to crime?

Many researchers have called for improved assessments with standardized instruments that minimize biases and utilize simple objective questions to address the severity (beyond mere occurrence) of abuse-neglect (9, 13, 24–26). Wide-ranging assessments are needed, since various types of maltreatment and deprivation may co-occur in families (27).

An instrument shows “discriminative validity” if a patient group expected to have worse scores has scores worse than those of comparison subjects. The instrument thus “discriminates” between the groups. Controlled assessments of instrument validity, while essential, are rare in the abuse-neglect field (28, 29).

The Colorado Adolescent Rearing Inventory (30) addresses these various issues. This study examined the ability of the Colorado Adolescent Rearing Inventory to discriminate between adolescents with conduct and substance use problems and comparison adolescents without court convictions or substance use problems. The correlation of scores on the inventory with measures of the severity of clinical problems is also reported.

Researchers can circumvent requirements to report abuse-neglect by using anonymous, unsigned questionnaires (4, 31), but clinicians cannot circumvent these requirements. The Colorado Adolescent Rearing Inventory clearly informs respondents that suspected abuse-neglect will be reported to child-welfare agencies. In this study, we also examined the Colorado Adolescent Rearing Inventory’s usefulness for generating such reports.

Method

Subjects

Recruitment occurred from September 1996 to July 2000. The number of subjects in the analyses reported here differed modestly from that in a related report (32) due to the inclusion of additional subjects.

Patients. Patients (60 males, 38 females), ages 14–18 years, were referred for treatment of conduct and substance use problems. Girls received intensive day treatment. Boys received either intensive day treatment or residential treatment. Initially, the treatment program obtained written, informed consent from the parent or guardian and assent from the patient for treatment, including the assessments reported here. Regulations permit research analyses of previously collected clinical data without consent. After approving that plan, the Colorado Multiple Institutional Review Board later required, and we obtained, written informed assent from patients and consent from their parents to conduct these assessments as research.

For admission to treatment, patients were required 1) to have significant conduct and substance use problems, 2) to have been judged by clinical staff to have no current psychosis, no mental retardation, and no risk of homicide, suicide, or arson, and 3) to have no physical illness (including intoxication) preventing participation in treatment. For study admission, patients were further required 4) to be in treatment 7–30 days before the study evaluation and to have recent drug-free urine tests.

We assessed all eligible day-treatment patients because there were fewer of them; four refused. Patients were also selected from a pool of 429 residential male candidates (none refused) to maintain racial/ethnic and age distributions similar to those of the female day-treatment patients. The 51 residential male subjects who were selected did not differ significantly in age and racial/ethnic distribution from those who were not selected.

Comparison subjects. Community comparison subjects (62 males, 40 females) were recruited by direct home phoning by a market research firm, advertisements, flyers, and word of mouth, mostly targeted in patients’ neighborhoods. Comparison subjects were selected to match the gender, racial/ethnic, and age distributions in the patient group. Researchers screened applicants and parents by phone and then in person. These screening interviews mentioned that the study involved many questions about personal matters, but abuse and neglect were not specifically mentioned during the screening. The inclusion criteria were 1) either gender, ages 14–18 years, 2) no court convictions (except minor traffic or curfew offenses) or substance-related arrests, treatment, school expulsions, etc., and 3) drug-free urine tests before assessments began. The comparison subjects provided written, informed assent, and their parents or guardians provided written, informed consent for research participation.

After the initial screening, the assent and consent forms for both patients and comparison subjects included the statements that the interviews included questions about abuse and neglect and that if subjects reported abuse or neglect, the investigators would inform the appropriate authorities. A Federal Certificate of Confidentiality protected comparison subjects’ other data.

Assessments

One to two subjects at a time completed a battery of assessments detailed elsewhere (32), including those described here, during a 26-hour stay (with sleep time) in a home-like building. Subjects received approximately minimum-wage compensation for their time.

Colorado Adolescent Rearing Inventory. The Colorado Adolescent Rearing Inventory is available free of charge at: http://ibgwww.colorado.edu/cadd/a_drug/links/cari_home.html.

The inventory is composed of questions drawn from the literature and other questions appropriate to these youths. The questions were pilot tested and revised. In this study, the 20–45-minute fully structured interview was given by a trained nonclinician, who first stated, as indicated in the consent form, that abuse-neglect endorsements would be communicated to the appropriate authorities. The interviewer then read the 50 fully structured interview items (examples follow).

The Colorado Adolescent Rearing Inventory presents 15 questions on physical, emotional, and educational neglect (e.g., “Did the adults who were responsible for you always push you to go to school on time, to stay there, and to do your homework?”). Eight questions address caretakers’ “antisocial/cruel” behavior (or “emotional” abuse [1]). These behaviors include both introduction to crime (e.g., “Did the adults who were responsible for you ever encourage you to break the law or help you break the law? For example, tell you to steal things, or give you drugs to sell [not just to use yourself, but to sell], or do other illegal things?”) and psychological abuse (e.g., “Did any of the adults who were responsible for you ever punish you by confining you in dark places like a closet?”). Thirteen questions concern physical abuse (e.g., “Were you ever purposely kicked?”). Finally, 14 questions address sexual abuse (e.g., “Has anyone rubbed their genitals against yours or had intercourse with you?”). Each section of the inventory requests estimated lifetime days of occurrence as a frequency measure, but analyses of those data are not included in this report.

"Yes" answers to some questions and "no" answers to others are "indicator responses" that suggest abuse-neglect. Each response suggesting abuse-neglect is followed by a structured probe. Probes address the subject's relationship to the perpetrator, the subject's age at onset, the duration or frequency of abuse-neglect, injuries received, treatments rendered, support by others, and the living situation at the time (with parents, in a foster home, etc). On the basis of responses to the probes, the Colorado Adolescent Rearing Inventory excludes as abuse-neglect indicators any "fights with other kids, gang fights, or girlfriend/boy-friend fights" but includes abuse by caretaker siblings at least 4 years older than the respondent. Sexual abuse probes exclude events unless any of the following conditions obtained: 1) the victim was younger than 12 years and the perpetrator was more than 2 years older, 2) the victim was age 12–13 years and the perpetrator was more than 3 years older, 3) the victim was age 14–16 years and the perpetrator was more than 4 years older, 4) "you felt uneasy with that, or didn't want that done, or were forced into it," or 5) the perpetrator was "responsible for taking care of you, like a teacher, babysitter, camp counselor, or relative."

Responses to 18 "red-flag" questions reveal flagrant abuse (mostly physical and sexual) that nearly always requires reporting to a child welfare agency (e.g., "Did anyone ever intentionally burn you, for example, with cigarettes, or matches, or scalding water, or a stove top?"). However, for the 32 non-red-flag questions (e.g., "Did the people you lived with always try to keep your house clean and free of insects, rats, or mice?"), the clinician is required to evaluate the responses to the probes and make a clinical judgment about whether abuse-neglect occurred.

The bachelor's-level interviewers in this study read the instrument's Manual for Interviewers (available at the previously mentioned web site), watched training videos, and practiced the interview five times with an experienced interviewer. The trainees then did a certification interview in which a trained supervisor acted as a "subject." Trainees began independent interviewing only if all 50 stem questions (and any probes) in the certification interview exactly matched the supervisor's concurrently recorded data. Supervisors thereafter reviewed all records to ensure continued compliance with procedures.

Colorado Adolescent Rearing Inventory scores of 0–50 are the number of indicator responses representing the number of different types of abuse-neglect experienced. The scores disregard frequency of the events, clinicians' judgments about them, or other probe information beyond certain exclusions (e.g., age of sex partner) mentioned earlier.

A 51st question invites subjects to select from a list of 10 possible ways of "how I was affected" by any reported abuse-neglect experiences. Respondents provide a first choice and may provide a second and third choice if desired. Choices (abbreviated here) include "one reason for my taking drugs or alcohol," "more angry or violent," "more depressed, nervous, or anxious," or "didn't affect me."

The clinical program hosting the study used responses to the Colorado Adolescent Rearing Inventory to prompt immediate reporting of appropriate cases to child welfare agencies. Separately, for this study, two clinicians (E.A.W., T.J.C.) independently reviewed probes to judge whether they met the legal criteria for reporting suspected abuse-neglect. Those criteria, delineated in the Colorado Child Protection Act of 1987, include physical trauma, malnutrition, failure to thrive, sexual assault or molestation, or a need for services because caretakers failed to provide food, clothing, medical care, or supervision as "a prudent parent would."

National Institute of Mental Health Diagnostic Interview Schedule for Children Version IV. The fully structured National Institute of Mental Health Diagnostic Interview Schedule for Children Version IV (DISC-IV) (33) generates DSM-IV psychi-

atric diagnoses. Youth-only reports of conduct disorder symptoms have been shown to have excellent discriminative validity (32), and the reported test-retest reliability is acceptable (33). For subjects who were recruited later in the study (58 patients and 66 comparison subjects), some questions from DISC version 2.1 were included for comparison with previous findings; we report only the DISC-IV data from those subjects. We did not examine the effects of that modification.

The DISC-IV's interrater reliability has not been reported, but it should be acceptable, since the instrument is fully structured. Moreover, the training and supervision of the interviewers in this study were very systematic. The interviewers read the interviewer's manual for the DISC-IV, watched training videos, and observed and recorded five interviews done by supervisors before conducting at least five supervised interviews themselves. Trainees began independent interviewing only after they recorded two consecutive interviews in which their records exactly matched the supervisor's concurrently recorded data on all 113 stem and (usually) many branching questions from the DISC modules we used. Supervisors reviewed all records to ensure continued compliance with procedures.

Social class. From parents' reports, we estimated subjects' two-factor social class by using a method based on the work of Hollingshead and Redlich (34). We also compared median household income of subjects' home census tracts (35).

Composite International Diagnostic Interview—Substance Abuse Module. The structured Composite International Diagnostic Interview—Substance Abuse Module (36) provides valid (32) diagnoses of adolescent substance abuse or dependence. The substance abuse module shows good to excellent agreement when the same subjects are interviewed by different interviewers 1 week apart, demonstrating both test-retest and interrater reliability (37). Interviewer training and supervision were like those for the DISC. As with the DISC, trainees' recorded answers for their two certification interviews had to correspond exactly to supervisors' answers on all 24 stem questions and all (and usually numerous) branching probe questions. We interviewed only the youths, since parents' reports of adolescents' substance problems often are inaccurate (38, 39).

Statistical Methods

We report two-tailed *p* values. Kappa statistics were used to compare the two clinicians' independent judgments about the presence or absence of reportable abuse-neglect, based on the subjects' responses to the Colorado Adolescent Rearing Inventory. Logistic regression analysis and analysis of variance (ANOVA) were used to assess group and sex differences. Spearman rank-order correlations (40) were used to compare Colorado Adolescent Rearing Inventory scores with scores on other clinical measures, which included a dependence vulnerability index, based on responses to the Composite International Diagnostic Interview—Substance Abuse Module. The dependence vulnerability index quantifies multisubstance involvement, discriminates patients with conduct and substance use problems from comparison subjects, correlates significantly with conduct disorder symptom counts, and shows heritability of about 0.5 in twins (41). The dependence vulnerability index is calculated by dividing the cross-drug total number of DSM-IV substance dependence symptoms by the number of substances used at least several times (as defined by the Composite International Diagnostic Interview—Substance Abuse Module), with the effects of gender and age corrected, since younger adolescents have had less time to accumulate symptoms. The dependence vulnerability index equals zero in youths who have tried no substance several times.

TABLE 1. Characteristics of Adolescent Patients With Conduct and Substance Use Problems and Comparison Subjects Without Conduct or Substance Use Problems in a Study of the Discriminative Validity and Clinical Utility of the Colorado Adolescent Rearing Inventory

Characteristic	Patients				Comparison Subjects				Analysis					
	Male (N=60)		Female (N=38)		Male (N=62)		Female (N=40)		Gender			Group		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	p	F	df	p
Age (years)	16.4	1.1	15.8	1.1	16.1	1.1	15.9	1.2	6.49	1, 197	<0.02	0.89	1, 197	n.s.
	N	%	N	%	N	%	N	%				χ^2	df	p
Ethnicity/race												2.25	6	n.s.
White, Anglo	32	53.3	19	50.0	34	54.8	24	60.0						
Hispanic	19	31.7	12	31.6	20	32.3	13	32.5						
Black or other	9	15.0	7	18.4	8	12.9	3	7.5						
Diagnostic prevalence														
Conduct disorder (lifetime ^a)	50	83.3	27	71.1	6	9.7	0	0.0				111.20	3	<0.0005
Any substance dependence	50	83.3	29	76.3	5	8.1	1	2.5				114.99	3	<0.0005
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	p	F	df	p
Conduct disorder symptom count	5.7	2.3	4.4	3.1	0.97	1.4	0.68	0.8	6.28	1, 197	<0.02	223.29	1, 197	<0.0005
Substance dependence vulnerability index ^b	3.3	1.9	2.9	1.6	0.01	1.3	-0.01	0.7	1.32	1, 197	n.s.	222.18	1, 197	<0.0005

^a Three or more lifetime conduct disorder symptoms derived from the National Institute of Mental Health Diagnostic Interview Schedule for Children Version IV.

^b Cross-drug total number of DSM-IV substance dependence symptoms divided by the number of drugs used several times (derived from the Composite International Diagnostic Interview—Substance Abuse Module), with the effects of age and gender corrected.

Results

Characteristics of Subjects

Table 1 summarizes the subjects' characteristics. The patients did not differ significantly from the comparison subjects in age, gender, or ethnicity. The boys were slightly but significantly older than the girls. Symptom counts and diagnostic prevalence for conduct disorder, diagnostic prevalence of substance dependence, and the dependence vulnerability index were greater for the patients than for the comparison subjects, and the differences between groups were highly significant.

We sought comparison subjects in patients' neighborhoods, and 82% of the subjects lived in zip code zones that contributed both patients and comparison subjects to the study. The census tracts of the patients and the comparison subjects did not differ significantly in the proportions of persons living below the poverty level (comparison subjects: mean=9.04%, SD=8.11%; patients: mean=10.44%, SD=7.54%) ($t=-1.27$, $df=198$, $p=0.21$), although the difference in median incomes in the census tracts of the two groups approached significance (comparison subjects: mean=\$52,214, SD=\$19,280; patients: mean=\$47,229, SD=\$16,420) ($t=1.97$, $df=198$, $p=0.051$). Despite reasonable similarities between the neighborhoods, the mean social class scores of the patients' and comparison subjects' families were significantly different, indicating that the patients' families overall represented a lower social class (patients' families: mean=45.55, SD=14.21 [social class V]; comparison subjects' families: mean=34.33, SD=14.02 [class IV]) ($t=-5.49$, $df=189$, $p<0.0005$).

Indicator and Red-Flag Responses

The Colorado Adolescent Rearing Inventory question about sometimes being left alone before age 12 years old received the highest group response rate (male patients: 23%). Three questions received no indicator responses.

Table 2 reports results for the indicator and red-flag responses (the latter are included among the former). Overall (Table 2, total), significantly more patients than comparison subjects made both indicator and red-flag responses. More girls than boys made red-flag responses. The patients made more indicator responses per adolescent than the comparison subjects, and the difference between groups was highly significant. Moreover, among subjects who made any indicator responses, the patients made significantly more than the comparison subjects. However, among those who made red-flag responses, there was no significant difference between groups in the number of responses.

Significantly more patients than comparison subjects had indicator responses in the neglect, antisocial/cruel, and physical abuse sections of the Colorado Adolescent Rearing Inventory, but not in the sexual abuse section. In each section, patients had significantly more total indicator responses per adolescent than comparison subjects. Significantly more patients also made red-flag responses in the physical and sexual abuse sections (the neglect section had no red-flag questions). There were no gender differences in responses, except in the sexual abuse section.

Relative to the comparison subjects, patients made significantly more sexual abuse indicator responses per ado-

TABLE 2. Responses to Colorado Adolescent Rearing Inventory Items That Are Indicators or Red Flags for Abuse-Neglect Among Adolescent Patients With Conduct and Substance Use Problems and Comparison Subjects Without Conduct and Substance Use Problems^a

Colorado Adolescent Rearing Inventory Section and Response Variable	Patients				Comparison Subjects				Analysis ^b			
	Male (N=60)		Female (N=38)		Male (N=62)		Female (N=40)		Gender		Group	
	N	%	N	%	N	%	N	%	Wald χ^2	Odds Ratio	Wald χ^2	Odds Ratio
Total												
Subjects making response	N	%	N	%	N	%	N	%	F	df	F	df
At least one indicator response	37	61.7	25	65.8	18	29.0	16	40.0	1.21	1.40	17.49	3.48***
At least one red-flag response	16	26.7	17	44.7	5	8.1	7	17.5	5.33	2.29*	13.13	3.97***
Number of responses	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	F	df
Indicator responses per subject	3.0	4.2	3.1	3.7	0.7	1.8	1.2	2.7	0.33	1, 197	22.18***	1, 197
Indicator responses per subject among subjects with any indicator responses	4.9	4.3	4.6	3.6	2.5	2.7	3.1	3.5	<0.01	1, 92	6.53*	1, 93
Red-flag responses per subject among subjects with any red-flag responses	2.7	2.2	2.4	1.9	1.8	0.8	2.4	1.9	0.02	1, 42	0.28	1, 42
Neglect												
Subjects making at least one indicator response	N	%	N	%	N	%	N	%	Wald χ^2	Odds Ratio	Wald χ^2	Odds Ratio
	27	45.0	14	36.8	12	19.4	9	22.5	0.13	0.89	10.22	2.78***
Number of indicator responses per subject	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	F	df
Antisocial/cruel	1.1	1.7	0.9	1.7	0.3	0.7	0.5	1.2	<0.01	1, 197	11.77***	1, 197
Subjects making response	N	%	N	%	N	%	N	%	Wald χ^2	Odds Ratio	Wald χ^2	Odds Ratio
At least one indicator response	24	40.0	15	39.5	4	6.5	6	15.0	0.50	1.29	21.30	6.12***
At least one red-flag response	2	3.3	1	2.6	0	0.0	0	0.0	0.04	0.78	0.04	—
Number of indicator responses per subject	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	F	df
Physical abuse	0.7	1.0	0.6	0.9	0.1	0.5	0.2	0.4	0.05	1, 197	20.49***	1, 197
Subjects making response	N	%	N	%	N	%	N	%	Wald χ^2	Odds Ratio	Wald χ^2	Odds Ratio
At least one indicator response	20	33.3	14	36.8	9	14.5	3	7.5	0.10	0.89	13.70	3.99***
At least one red-flag response	12	20.0	7	18.4	5	8.1	1	2.5	0.89	0.20	7.50	3.85**
Number of indicator responses per subject	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	F	df
Sexual abuse	0.8	1.4	0.7	1.1	0.2	0.7	0.1	0.4	0.43	1, 197	14.62***	1, 197
Subjects making response	N	%	N	%	N	%	N	%	Wald χ^2	Odds Ratio	Wald χ^2	Odds Ratio
At least one indicator response	9	15.0	11	28.9	5	8.1	6	15.0	3.86	2.19*	3.53	2.16
At least one red-flag response	7	11.7	10	26.3	1	1.6	6	15.0	8.26	3.84**	5.16	3.01*
Number of indicator responses per subject	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	F	df
	0.5	1.5	0.9	1.9	0.1	0.3	0.5	1.3	3.89*	1, 197	5.16*	1, 197

^a Indicator responses suggest abuse-neglect and are followed with structured probe questions that allow the clinician to determine whether abuse-neglect is likely to have occurred. Red-flag responses reveal flagrant physical or sexual abuse.

^b Logistic regressions for the percentages making responses, with comparison subjects and male subjects as the reference groups; analyses of variance for number of responses.

* $p \leq 0.05$. ** $p \leq 0.01$. *** $p \leq 0.001$.

lescent, and significantly more patients made sexual abuse red-flag responses (Table 2). Significantly more girls than boys made sexual abuse indicator and red-flag responses, and girls made more sexual abuse indicator responses per adolescent. Six of the 40 girls in the comparison group made sexual abuse red-flag responses. We excluded from consideration reports of sexual contact unless the partner

was considerably older or met certain other criteria (see Method section). Nevertheless, 12.5% of the girls in the comparison group responded "yes" to the question "Did anyone ever touch your breasts, buttocks, or genital area when you had your clothes on or off?," and one female comparison subject endorsed "Did anyone ever encourage you to have sex with them either for money or drugs?"

TABLE 3. Correlations of Colorado Adolescent Rearing Inventory Indicator Responses (Indicator and Red-Flag) With Dependence Vulnerability and Clinical Symptom Counts Among Adolescent Patients With Conduct and Substance Use Problems and Comparison Subjects Without Conduct and Substance Use Problems

Colorado Adolescent Rearing Inventory Variable	r_s								
	All Subjects (N=200)			Patients (N=98)			Comparison Subjects (N=102)		
	Dependence Vulnerability Index ^a	Number of Conduct Disorder Symptoms	Number of Major Depression Symptoms	Dependence Vulnerability Index ^a	Number of Conduct Disorder Symptoms	Number of Major Depression Symptoms	Dependence Vulnerability Index ^a	Number of Conduct Disorder Symptoms	Number of Major Depression Symptoms
Total score	0.41***	0.45***	0.33***	0.29*	0.23*	0.23*	0.14	0.34***	0.15
Number of red-flag responses per subject ^b	0.32***	0.35***	0.39***	0.18	0.12	0.30**	0.20	0.41***	0.34***
Section scores									
Antisocial/cruel	0.41***	0.46***	0.28***	0.34**	0.35***	0.21	0.09	0.26**	0.13
Neglect	0.31***	0.33***	0.16*	0.21*	0.22*	0.07	0.12	0.21*	0.06
Physical abuse	0.31***	0.36***	0.22**	0.25*	0.15	0.05	-0.02	0.32**	0.19
Sexual abuse	0.26***	0.25***	0.33***	0.10	0.10	0.27**	0.36***	0.35***	0.28**

^a Dependence vulnerability index was the cross-drug sum of dependence symptoms divided by the number of drugs used several times, as defined by the Composite International Diagnostic Interview—Substance Abuse Module, with the effects of age and gender corrected.

^b Red-flag responses reveal flagrant physical or sexual abuse.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Reportable Cases

Of all 200 subjects, 96 made one or more indicator responses. Reviewing their probes, Clinician A found reportable abuse-neglect in 80% of the subjects (57 patients and 20 comparison subjects) and Clinician B in 68% (49 patients and 16 comparison subjects). Across these 96 subjects, the clinicians' agreement about reportable abuse-neglect was good ($\kappa = 0.68$) (42).

Both clinicians judged all 45 red-flag cases as reportable. Fifty-one youths made indicator, but not red-flag, responses; 63% of those cases were judged reportable by Clinician A and 39% by Clinician B.

Significantly more patients than comparison subjects had reportable cases of abuse-neglect (e.g., for Clinician A, 57 of 98 patients and 20 of 102 comparison subjects) ($\chi^2 = 31.38$, $df = 1$, $p < 0.0005$).

Intercorrelations of Colorado Adolescent Rearing Inventory Scores

Among patients, and separately among comparison subjects, the number of endorsed indicator items in each Colorado Adolescent Rearing Inventory section correlated significantly with the mean total Colorado Adolescent Rearing Inventory scores ($r_s = 0.50$ – 0.79 , $N = 98$, $p < 0.0005$). Subjects' responses in the neglect, antisocial/cruel, and physical abuse sections intercorrelated significantly (patients: $r_s = 0.47$ – 0.57 , $N = 98$, $p < 0.0005$; comparison subjects: $r_s = 0.25$, $N = 102$, $p < 0.01$, to $r_s = 0.44$, $N = 102$, $p < 0.0005$).

Relationships with sexual abuse indicators were less consistent. Patients' sexual abuse responses correlated significantly only with their physical abuse responses ($r_s = 0.29$, $N = 98$, $p < 0.004$). Comparison subjects' sexual abuse responses correlated with their responses in the antisocial/cruel and neglect sections ($r_s = 0.31$ and $r_s = -0.33$, respectively, $N = 102$, $p < 0.001$) but not with physical abuse responses.

Colorado Adolescent Rearing Inventory Scores and Clinical Status

Table 3 shows the correlations of number of indicator responses in each section of the Colorado Adolescent Rearing Inventory (disregarding probe information) with severity of dependence vulnerability and symptom counts for conduct disorder and major depression. Considering the patients and comparison subjects together, all correlations were significant and most were highly significant. Considering the patients and comparison subjects separately, many correlations remained significant despite reductions in both the symptom count range and the number of subjects. Especially durable were the comparison subjects' correlations of Colorado Adolescent Rearing Inventory total scores with the number of conduct disorder symptoms and of sexual abuse reports with dependence vulnerability and symptom counts for both conduct disorder and major depression.

Perceived Effects of Child Abuse or Neglect

The Colorado Adolescent Rearing Inventory includes questions about the major effect of reported maltreatment on the respondent. Among subjects who gave any indicator response, comparison subjects were significantly more likely than patients to report "no effect" (24 of 34 comparison subjects, compared with 20 of 60 patients) ($p < 0.001$, Fisher's exact test). However, the patients and comparison subjects who gave red-flag responses did not differ significantly in "no-effect" endorsements. Among the youths who reported adverse effects, externalizing behaviors (school problems, running away, anger, or substance use) were endorsed only by patients; both patients and comparison subjects endorsed internalizing states of depression/anxiety and distrust. Just two comparison subjects endorsed self-harm.

Discussion

Using data from adolescents with serious conduct and substance problems and from comparison subjects with no conduct or substance use problems, we examined the clinical utility, discriminative validity, and clinical problem correlations of the Colorado Adolescent Rearing Inventory, a structured interview for adolescent reports of child abuse-neglect. Five main findings emerged.

First, the Colorado Adolescent Rearing Inventory elicited many self-reports of abuse-neglect. Nonclinicians with no prior or therapeutic relationship with the youths conducted the Colorado Adolescent Rearing Inventory interviews, and the youths knew that abuse-neglect responses would be relayed to authorities. Nevertheless, more than a quarter of the male patients and more than 40% of the female patients made red-flag responses. About two-thirds of the patients and one-third of the comparison subjects made some indicator response.

Second, the Colorado Adolescent Rearing Inventory had clinical utility for identifying reportable abuse-neglect. Clinicians judged that 68%–80% of the cases of the subjects who made indicator responses and all of the cases of those who made red-flag responses met the legal requirements for agency reports. The probes allowed clinicians to achieve “good” (42) agreement on reportability.

Third, the Colorado Adolescent Rearing Inventory showed discriminative validity. Many youths with conduct and substance problems have abuse-neglect risk factors (3), such as broken homes, conflicted parental relationships, frequent moves, and parental mental health problems, including alcoholism. The Colorado Adolescent Rearing Inventory detected the resulting expected excess of abuse-neglect among the patients, who made significantly more indicator and red-flag responses than the comparison subjects. Moreover, among those who made indicator responses, the patients (on average) made significantly more than the comparison subjects. In addition, a significantly greater proportion of patients than of comparison subjects perceived adverse emotional or behavioral effects from their abuse-neglect experiences.

Fourth, the Colorado Adolescent Rearing Inventory's quantitation of abuse-neglect correlated with clinical measures. More extensive abuse-neglect apparently is associated with greater clinical problems in adolescents (3, 4). However, quantifying the unthinkable may generate the unsolvable (“Are two beatings worse than one rape?”). The Colorado Adolescent Rearing Inventory's scores count indicator responses (the number of types, rather than the number of episodes or the severity, of abuse-neglect that has been experienced). These simple scores strongly and consistently correlated with severity of substance involvement and number of symptoms of conduct disorder and major depression. It is surprising that the comparison group showed many significant correlations between clinical measures and Colorado Adolescent Rearing Inventory

scores, despite having fewer subjects with clinical measures and a reduced range of scores, compared with the patient group.

Fifth, the Colorado Adolescent Rearing Inventory identified important gender differences. With different subject groups and using different criteria, earlier researchers have reported childhood sexual assault rates of 2%–32% (3, 43, 44); the proportion of subjects with red-flag responses in our study was in that range. Compared to the male subjects, a larger proportion of female subjects (including 45% of the female patients) made red-flag responses. Much of that difference was due to the significantly greater number of sexual abuse red-flag responses among females. Even among female comparison subjects, 15% had sexual abuse red-flag responses. Females do experience sexual abuse more than males (45); indeed, 30% of women in the general population are reported to have been sexually abused (46). Indicator responses generally were more common among patients than among comparison subjects but not in the sexual abuse section, perhaps because of the many sexual abuse reports by female comparison subjects.

As noted earlier, the prevalence of abuse-neglect reports among the comparison subjects in our study was, to the extent that prevalence can be compared between studies, within the range observed by others. Still, the prevalence reported here might raise concerns that abused youths differentially volunteered for the study in order to proclaim their maltreatment. However, one of our main aims was to determine whether the Colorado Adolescent Rearing Inventory discriminated between patients and comparison subjects. If abused youths were overrepresented among the comparison subjects, that would only reduce the extent of discrimination. Nevertheless, we showed that the Colorado Adolescent Rearing Inventory did significantly discriminate between the groups.

Limitations

We used many statistical tests. Thus, some could have achieved significance by chance alone. However, chance significance should be unsystematic, sometimes supporting and sometimes negating expected relationships. Accordingly, it is reassuring that even the more weakly significant findings presented in Table 2 and Table 3 are in the expected directions. Nevertheless, caution may be warranted when interpreting results in which, for example, *p* values are between 0.05 and 0.01, although the many very small *p* values that we found probably are not due to chance.

The patient and comparison groups were well-matched in age, gender, and ethnicity. They also came from neighborhoods that were reasonably comparable in socioeconomic characteristics. Nevertheless, patients' families, on average, were in a lower social class than those of the comparison subjects. Apparently, these patients' troubled families (23) were among the poorer, less educated per-

sons in their neighborhoods. Attempting to match comparison subjects to those families on socioeconomic status might have led to inclusion of other troubled neighbors (e.g., with mental retardation or psychosis) in the comparison group. Thus, our group matching for age, gender, ethnicity, and reasonably comparable neighborhoods, but not for individuals' social class, probably provided appropriate comparison subjects.

In this study, scores on the Colorado Adolescent Rearing Inventory correlated significantly with the severity of substance involvement, conduct disorder, and depression. Reported associations of abuse-neglect with such problems abound (e.g., references 3, 4, 16, 47). However, Briere (31) emphasized that correlations do not establish causation; other causes may underlie these associations.

The Colorado Adolescent Rearing Inventory's test-retest reliability needs study. Also, further validity tests might include comparisons between youths referred to child protection teams and nonreferred comparison subjects or between patients such as those in this study and other clinical groups. No "gold standard" exists to rule out false positive or false negative reporting on the Colorado Adolescent Rearing Inventory. Official records are poor validators, as only a small minority of abuse cases are reported to agencies (3, 12). False negative findings may result when youths underreport abuse to protect adult perpetrators (47, 48). Nevertheless, the high prevalence of reportable cases in this study showed that the Colorado Adolescent Rearing Inventory does identify many victims.

False positive findings may include those involving the "false memory syndrome," in which prolonged therapy "uncovers" supposedly repressed memories (31, 49, 50). However, recollections of abuse often can be verified (51), and reviewers find "little reason to think that the documented relation between adverse early experience, often involving severe parental maltreatment, and later psychopathology arises from patients' distorted perceptions" (52). Moreover, "false memory" cases differ from the cases of abuse reported by the subjects in our study. In our study, technicians without a therapeutic relationship with the youths they interviewed obtained the reports early in treatment. "False memory syndrome" seems unlikely in this situation.

Clinical Implications

Although all red-flag responses reflected abuse-neglect, the study clinicians concluded that some indicator responses did not. Thus, non-red-flag Colorado Adolescent Rearing Inventory scores can inform, but cannot replace, clinical judgment about the need for child protection reports.

Clinicians disagree about the usefulness of questioning young patients about abuse-neglect (53). Administration of the Colorado Adolescent Rearing Inventory was standard practice early in the treatment provided in our setting. Nearly two-thirds of patients made indicator re-

sponses despite receiving advice that reports to child welfare agencies would occur, and many reports were made. Such high response rates suggest that abuse-neglect questioning early on may protect many young patients and other children and adolescents.

Presented at the College on Problems of Drug Dependence, Scottsdale, Ariz., June 16–21, 2001. Received Aug. 27, 2001; revision received Nov. 22, 2002; accepted Feb. 12, 2002. From the Division of Substance Dependence, Department of Psychiatry, University of Colorado School of Medicine. Address reprint requests to Dr. Crowley, Division of Substance Dependence, Department of Psychiatry, Box C 268-35, University of Colorado School of Medicine, Denver, CO 80262; Thomas.Crowley@UCHSC.edu (e-mail).

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