

The Carolina Child Checklist of Risk and Protective Factors for Aggression

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Objective: Extending the Social Health Profile and other instruments that measure problem behavior in childhood, the Carolina Child Checklist (CCC) was developed to measure risk and protective factors related to aggressive behavior in children ages 6 to 12. This study reports the psychometric properties of the CCC. Method: The measure's dimensionality, reliability (internal consistency and test-retest), standard error of measurement, and validity (convergent, concurrent, treatment sensitivity) were evaluated in a project involving 171 sixth-grade students. Results: Factor analysis indicated four dimensions called Learning Orientation (behaviors and attributes related to classroom success), Relational Aggression, Social Involvement, and Physical Aggression. The measure has high internal consistency with low measurement error. Test-retest findings suggest a stable measure. The CCC has good convergent and concurrent validity and appears sensitive to treatment effects. Conclusions: The CCC is a promising measure for social workers assessing risk and protective factors related to childhood aggression.

In efforts to develop more precise understandings of social problems and more effective social programs, researchers, educators, and practitioners are turning increasingly to epidemiological concepts such as risk, protection, and resilience (Fraser, 1997; Fraser, Richman, & Galinsky, 1999). If an epidemiological perspective is to prove useful, conceptually meaningful and psychometrically sound instruments must be developed to identify factors that place children, youth, and others at risk of social problems and,

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alternatively, that promote resilience in the face of high risk. The focus of this article is a behavior checklist under development in the Carolina Children's Initiative, an intervention research project designed to prevent childhood aggression. The article presents an overview of the Children's Initiative and describes the development of the Carolina Child Checklist (CCC), a measure of risk and protective factors related to aggressive behavior in childhood. In the article, we present the results of analyses examining the factor structure and psychometric properties of the CCC.

THE CAROLINA CHILDREN'S INITIATIVE

Purpose

The purpose of the Carolina Children's Initiative is to develop, test, and disseminate programs for promoting social competence and preventing aggressive behavior in children. Building on an ecological-developmental risk and protection framework, project staff are developing, testing, and refining a series of practice manuals that translate practice research into concrete resources for social work practice. The core of each resource or practice manual is a sequence of highly specified practice activities designed to interrupt risk processes and promote protection. In addition, the manuals include (a) a summary of theory and research related to risk and protective factors for childhood aggression, with a focus on individual-, peer-, and family-level factors; (b) strategies for enhancing cultural competence when working with children and families; and (c) practice tips on issues such as building relationships with family members and managing groups with children. The goal of the Children's Initiative is to produce manuals that are deeply rooted in current theory and research, that have been tested empirically, and that provide clear guidelines for culturally competent practice while permitting flexibility to fit a range of social work practice environments and consumer characteristics.

Within the larger purpose of the Children's Initiative, the CCC has two purposes. The first is to measure behavioral domains that correspond to key-stone risk and protective factors associated with aggressive behavior in childhood. The second purpose is to be sensitive to treatment effects.

Aggression in Childhood and Early Adolescence: Conceptual Framework

Risk and protective factors influencing the origins, onset, and course of childhood aggression are multisystemic in nature (Garbarino & Abramowitz,

1992; Germain & Gitterman, 1995). Although it is not the purpose of this article to review exhaustively the correlates of aggressive behavior (for a review, see Fraser, 1996), we briefly describe the broader social and political context of aggression because it contributes to the conceptual foundation that underpins the CCC. Societal factors associated with increased risk of childhood aggression include racism, poverty, and the nature of male socialization (Archer, 1994; Booth & Zhang, 1996; Gil, 1996; Harvey & Rauch, 1997; Hill, 1992; Rosenberg, 1995). Community-level factors include neighborhood social organization, the presence of gangs, and high rates of violence (Sampson, Raudenbush, & Earls, 1997). Family-level factors include poverty (McLanahan & Booth, 1989; Patterson, Forgatch, Yoerger, & Stoolmiller, 1998; Sampson, 1987, 1997) and a coercive style of parenting (Patterson, Reid, & Dishion, 1992). Described in more detail below, peer- and individual-level factors play a keystone role in risk processes that contribute to childhood aggression. They constitute the direct conceptual framework for the constructs of the CCC.

Peer factors. The importance of peer factors stems from the influence of the peer group in modeling, reinforcing, and establishing norms for social behaviors. Lack of involvement with prosocial peers denies children models of, and reinforcement for, nonaggressive strategies for solving social problems. Moreover, when children are isolated from—or rejected by—prosocial peer groups, they may be more likely to associate with peers who engage in delinquent and other nonconforming potentially harmful behaviors (Eron, 1997).

Individual factors. Although individual factors involving genetic, neurological, and physiological structures contribute to the risk process (Miczek, Mirsky, Carey, DeBold, & Raine, 1994; Rutter, 1997), a key individual-level factor in the conceptual framework for the Children's Initiative is the child's ability to process social information (Crick & Dodge, 1994). Information processing refers to a sequence of cognitive tasks that promote a child's ability to encode and accurately interpret social environments, to formulate social goals, and to formulate and carry out effective problem-solving strategies. A large body of empirical research suggests that deficits in information-processing skills are related to aggressive behavior (see, e.g., Crick & Dodge, 1994). This research is distinguished by adequate samples of African American as well as European American children. Moreover, it includes boys and girls. The relationship between information-processing skill deficits and children's use of aggression appears similar across these subgroups of children.

Course and consequences of aggression in childhood. Most, if not all, children use aggressive behavior at some point during childhood. There is increasing evidence that, for some children, aggressive behavior lies at the heart of a developmental trajectory with poor long-term outcomes. For “early start” children, family and individual risk factors produce an aggressive style of problem solving as early as the preschool years. Problematic in its own right, early aggression may also prevent preschool-age children from acquiring school readiness and cooperative problem-solving skills. These children are likely to bring an aggressive problem-solving style to elementary school, where, by about third grade, most children are learning to use nonaggressive strategies for solving problems and are beginning to expect peers to do likewise. Children who rely on aggression often experience peer rejection and isolation from the prosocial peer group. Aggressive and disruptive behavior in the classroom, exacerbated by poor readiness skills, interferes with learning. Low academic achievement and alienation from learning may result (Eron, 1997; Kelley, Huizinga, Thornberry, & Loeber, 1997).

Current theory and research strongly suggest that this cluster of behavior, social, and academic problems represents a powerful indicator of risk for severe, long-term problems. Absent effective intervention, children in the late-elementary and early-middle-school years with this risk profile face increased odds of persistent learning and behavior problems, isolation in self-contained classrooms or separate schools, association with delinquent peers, and a range of poor developmental outcomes in adolescence and beyond (Eron, 1997; Kelley et al., 1997).

BACKGROUND OF THE CAROLINA CHILD CHECKLIST

The CCC is completed by teachers or other practitioners to rate a child’s behavior. The checklist is a risk-based elaboration of the 37-item Social Health Profile (SHP) (Fast Track Project, 1997) that, in turn, is an adaptation of the 26-item Teacher Observation of Classroom Adaptation-Revised (TOCA-R) (Werthamer-Larsson, Kellam, & Wheeler, 1991). The original Teacher Observation of Children’s Adaptation (TOCA) was developed by Sheppard Kellam and colleagues in the 1970s as part of a community mental health initiative in the Woodlawn area of Chicago (Kellam, Branch, Agrawal, & Ensminger, 1975). The TOCA-R is a multidimensional scale assessing three dimensions: (a) classroom study skills and attention, (b) aggressive behavior, and (c) social contact. Previous research supported the dimensionality, internal consistency, and test-retest reliability of the TOCA-R, as well as its

concurrent and predictive validity (Fast Track Project, 1997; Kellam et al., 1975; Werthamer-Larsson et al., 1991).

Although the TOCA-R is a main source for the SHP, a number of SHP items were taken also from the 25-item, teacher-scored Social Competence Scale (SCS) (Karns & Conduct Problems Prevention Research Group, 1998). The original SCS domains included prosocial behaviors, communication skills, emotional regulation, and academic skills. SCS items, in turn, were drawn mostly from measures such as the Health Resources Inventory, the Teacher Rating of Social Skills, and the Matson Evaluation of Social Skills with Youngsters (Karns et al., 1998). The SHP includes nine SCS items that assess two dimensions of social competence: prosocial behavior (five items) and emotional regulation (four items) (Karns & Conduct Disorders Prevention Research Group, 1997).

Finally, two new items to assess children's sociometric status were added to the SHP by researchers in the Fast Track Project. These items were "liked by peers" and "disliked by peers" (Fast Track Project, 1997; Karns et al., 1997). Thus, as the basis for the CCC, the SHP incorporated items from a variety of sources to measure multiple dimensions of children's behavior and functioning.

Measuring Aggression in Girls: Relational Aggression

A great deal of work on childhood aggression has focused on overt physical acts (e.g., hitting or pushing) among boys; however, researchers are devoting increased attention to another form of aggression, known as relational aggression. Relational aggression may have origins in the same risk processes as physical aggression but is more typical of girls (Björkqvist & Österman, 2000; Crick, 1995; Crick & Bigbee, 1998; Crick & Grotpeter, 1995, 1996; Österman et al., 1997, 1998). Relational aggression refers to behaviors that are intended to harm others but do not involve physical force. Teasing, calling names, and excluding other children from groups or games can be relationally aggressive. There is evidence that relational aggression has negative consequences for both perpetrators and victims. In studies involving hundreds of elementary school students, relational aggression victimization was significantly related to socio-psychological adjustment problems such as depression and loneliness (Crick & Bigbee, 1998; Crick & Grotpeter, 1996). In an examination of relational aggression perpetration among elementary school students ($N = 491$), one study found that in comparison with their nonrelationally aggressive peers, relationally aggressive children had significantly higher levels of loneliness, depression, and isolation (Crick & Grotpeter, 1995).

To assess relational aggression, the CCC contains items derived from the Social Experience Questionnaire (SEQ) (Crick & Grotpeter, 1996). The SEQ includes 15 items in three 5-item subscales: Relational Victimization, Overt Victimization, and Target of Prosocial Behavior. Each subscale was determined using factor analysis and each had high internal consistency. The CCC contains the Relational Victimization subscale. Because the SEQ was a self-report measure assessing victimization, the subscale was adapted for scoring by teachers or others, such as social workers, who work closely with children.

The addition of items measuring relational aggression resulted in a prototype 42-item instrument. Drawn from a variety of sources but relying principally on the SHP, the CCC was designed to measure proximal treatment effects, to reflect teacher or worker ratings of the frequency with which discrete behaviors and attributes were present in a child (rather than reflecting global evaluations involving determination of whether a particular attribute characterizes a child), and to capture behavior patterns that might differ by gender. Thus, it was conceptualized as valid for use with girls as well as boys. The checklist does not directly tap all the keystone risk and protective factors in children and families who participated in the Children's Initiative programs. Other instruments were used that measure basic family needs, parenting strategies, and children's social information-processing skills.

PROCEDURES

Design of the Study

The data were collected in the context of a pilot study of Making Choices, a Carolina Children's Initiative program designed to teach social information-processing skills (Fraser, Nash, Galinsky, & Darwin, 2000). The study took place in a public middle school in the southeastern region of the United States and used a quasi-experimental research design. The entire sixth-grade student body of the school made up the study sample; these students had been assigned to one of two administrative teams prior to the 1997/1998 school year. During homeroom period, teachers on one team provided instruction in Making Choices twice weekly from January 1998 until May 1998. Teachers on the other team provided the regular homeroom program. Teachers on both teams completed the CCC at pretest and posttest.

Intervention: About Making Choices

Making Choices is a manualized guide to practice (Fraser et al., 2000). Making Choices was designed for use with small groups as well as entire classrooms. The target age range includes children from third to sixth grades (i.e., children from 8 to 12 years of age). The program manual provides practitioners with an overview of social information-processing theory and describes the links between information-processing deficits and aggression. The manual contains a sequence of units, each of which includes lessons and activities designed to teach children how to solve social problems by building skills in encoding and interpreting social cues in the environment. A social learning perspective that emphasizes the importance of peer-oriented learning (e.g., role plays, practicing skills with peers) informs the program (Rose, 1998). The manual has extensive documentation on groupwork strategies, including games and activities for each group or class session.

Sample

The sample included all enrolled sixth-grade students ($n = 184$), but missing data on 13 children resulted in an effective sample size of 171 students. Shown in Table 1, the sample was balanced with respect to gender. It reflects the racial/ethnic profile of the community. Almost half of the students (40.9%) carried a special education label. The mean age was 11.8 years (range = 11-13, $SD = .38$).

Measures

Teachers completed a two-page behavior checklist that included the CCC and the 24-item aggressive behavior subscale of the Teacher Report Form (TRF) (Achenbach & Edelbrock, 1986), an adaptation of the Child Behavior Checklist for school settings. Inclusion of the TRF permitted assessment of the construct validity of the CCC. The TRF is widely used in clinical and research settings and its psychometric properties are well established (see, e.g., Lowe, 1998).

The CCC contains a list of descriptors of behaviors and attributes related to classroom performance and social interaction with peers. A complete list of items appears in Table 2. For each item, teachers were instructed to circle the number that best described the frequency of that behavior (0 = *almost never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *very often*, 5 = *almost always*).

TABLE 1: Sample Characteristics

	% Intervention Group (n = 71)		% Comparison Group (n = 100)		% Total (n = 171)	
Gender						
Male	30	(42.3)	52	(52)	82	(48)
Female	41	(57.7)	48	(48)	89	(52)
Race/ethnicity ^a						
White	48	(67.6)	71	(71)	119	(69.6)
African American	11	(15.5)	20	(20)	31	(43.7)
Hispanic	1	(1.4)	3	(3)	4	(2.3)
Asian	9	(12.7)	5	(5)	14	(8.2)
Multiracial	2	(2.8)	1	(1)	3	(1.8)
Special education status ^a						
Academically gifted	33*	(46.5)	13*	(13)	46	(26.9)
Learning disabled	0*	(0)	16*	(16)	16	(9.4)
Other ^b	1*	(1.4)	7*	(7)	8	(4.7)

NOTE: Percentages are calculated on amounts within columns.

a. Fisher's exact test used to test null hypotheses of no difference across groups, due to cell sizes.

b. Includes Behaviorally/Emotionally Handicapped, Educable Mentally Handicapped, Speech Language Impaired, and Other Health Impaired.

* $p < .01$.

Data Analysis

Separate factor analyses of pretest and posttest scores were conducted using all 42 items. Items reflecting negative or problematic behaviors (e.g., fights, mind wanders) were reverse-coded so that higher scores reflected more competent behavior. To seek simple structure, an exploratory approach following the recommendations of Hatcher (1994) was adopted. That is, we sought a pattern wherein most items load highly on one and only one factor, most factors have high loadings for some items and negligible loadings for the remaining items, and factors are readily interpretable. This approach involves completing a structured sequence of steps, using principal factor analysis of all items with squared multiple correlations as prior communality estimates. The process of deciding how many factors to retain begins by examining the scree plot for obvious break points (i.e., where the curve flattens) and by setting a cutoff of approximately 5% for the proportion of variance explained by each retained factor.

A decision with regard to the number of factors to retain also depends on the interpretability of tentative solutions. This involves determining whether it is possible to interpret "the substantive meaning of the retained factors and verifying that this interpretation makes sense in terms of what is known about

TABLE 2: Items on the 42-Item Prototype CCC

Friendly	Plays with others
Works hard	Very good at understanding other people's feelings
Learns up to ability	Controls temper when there is a disagreement
Stubborn (R)	Has social contact with others
Is helpful to others	Excludes other kids from games or activities (R)
Shows poor effort (R)	Breaks things (R)
Teases classmates (R)	Takes others' property (R)
Initiates interactions with others	Fights (R)
Pays attention	Concentrates
Can give suggestions and opinions without being bossy	Resolves problems on his or her own
Avoids social contact (R)	Breaks rules (R)
Works well alone	Lies (R)
Is disliked by classmates (R)	Tells peers he or she won't like them unless they do what he or she says (R)
Lies to make peers dislike a student (R)	Has trouble accepting authority (R)
Self-reliant	Harms others (R)
Yells at others (R)	Can calm down when excited or all wound up
Easily distracted (R)	Thinks before acting
Mind wanders (R)	Is liked by classmates
Completes assignments	Excludes other kids from peer group (R)
Eager to learn	Says mean things about others (R)
Stays on task	
Expresses needs and feelings appropriately	

NOTE: Items that were reverse-coded for factor analysis are denoted with (R).

the constructs under investigation" (Hatcher, 1994, p. 85). Hatcher's interpretability criteria are as follows: (a) at least three items have significant loadings on each factor, (b) items loading on a single factor share conceptual meaning, (c) items loading on different factors appear to measure different constructs, and (d) the factor pattern demonstrates simple structure. The suggested cutoff for significance of a loading is .40.

All factor analyses were performed using SAS version 6.12 software (SAS Institute, 1988). The FACTOR procedure with the promax option produced both orthogonal and oblique rotations, along with statistics and scree charts with which to assess potential solutions. Based on theory, there was reason to believe that the dimensions measured in the prototype CCC would be intercorrelated; thus, there was special interest in solutions resulting from oblique rotation. Patterns with standardized regression coefficients as factor loadings were examined to assess the structure of solutions resulting from oblique rotations. The process of seeking a satisfactory solution involved

performing separate analyses using pretest and posttest scores and examining tentative solutions produced by each factor solution.

RESULTS

The Dimensionality of the CCC

Examination of the scree charts using pretest and posttest scores indicated that either a three- or four-factor solution would be appropriate. The fourth factor accounted for more than 4% of the explained variance in posttest scores and almost 4% in pretest scores. Thus, four-factor solutions with orthogonal and oblique rotations were estimated. Solutions with orthogonal rotations lacked simple structure for both pretest and posttest scores. In the pretest orthogonal solution, two items loaded on three factors and eight items loaded on two factors. Using posttest scores, four items loaded on three factors and five items loaded on two factors. Oblique rotations produced more satisfactory solutions, with one cross-loading using each type of score. However, multiple items failed to load on any factor in the solutions using oblique rotation.

Based on these results, nine items were dropped and new analyses were run separately with pretest and posttest scores. Inspection of the scree charts and examination of the proportion of variance explained again supported a four-factor solution. The orthogonal solutions once more displayed a lack of simple structure, with multiple items loading on more than one factor. The oblique solutions approached simple structure. However, two items failed to load on any factor. A third item loaded on a single factor at .42 in both the pretest and posttest solutions. There was a substantial gap between the magnitude of this loading and of the next highest loading on this factor (.51 using posttest scores, .61 using pretest scores). These three items were dropped.

Four-factor solution. The analyses were repeated using the remaining 30 items from the CCC. A four-factor solution was indicated and orthogonal solutions failed to display simple structure. The solutions using oblique rotations did, however, yield a solution with simple structure for posttest scores and a solution that approached simple structure for pretest scores. These solutions differed only slightly with respect to the magnitude of individual loadings. The solution using posttest scores appears in Table 3. Table 3 also displays interfactor correlations for the posttest and pretest solutions. Based on item content, the factors were named as follows: (a) Learning Orientation (12 items), (b) Relational Aggression (9 items), (c) Social Involvement

ment (6 items), and (d) Physical Aggression (3 items). Factor 1, Learning Orientation, accounted for the largest proportion of the variance—approximately 56% of the variance in pretest scores and 57% of the variance in posttest scores. Consistent with research on factors associated with the onset of delinquency (e.g., Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998), this factor measures children's skills, attitudes, and comportment in the classroom. The second factor, Relational Aggression, accounted for 18% of the variance in pretest scores and 17% of the variance in posttest scores. Factor 3, Social Involvement, accounted for 13% of the variance in pretest scores and posttest scores. Finally, the fourth factor, Physical Aggression, accounted for 4% of the variance in pretest and posttest scores.

Gender differences. Separate analyses by gender using 30 items and oblique rotation were performed, but caution in interpreting results is warranted due to sample sizes. For girls, Relational Aggression emerged as the first factor and contained 2 additional items with fairly weak loadings—"mind wanders" and "expresses needs appropriately." Learning Orientation was the second factor for girls, with 11 items, and Social Involvement was the third factor, with 5 items. For boys, the same basic structure as in the entire sample emerged, with some differences in the second, third, and fourth factors. The item "stubborn" loaded on the fourth factor (Physical Aggression) rather than on Relational Aggression. The item "gives suggestions without being bossy" failed to load above .36 on any factor for boys. Finally, the item "yells" loaded on both Physical and Relational Aggression, and "liked" loaded on Social Involvement and Physical Aggression.

Reliability

Following the factor analysis, the 30-item measure and subscales were tested for reliability and measurement error (Standard Error of Measurement). In examining reliability, both the internal consistency and the stability of the measure (test-retest reliability) were assessed. The internal consistency of the CCC was assessed using Cronbach's alpha with a standard of .80 or higher (Bloom, Fischer, & Orme, 1999). Stability was assessed by calculating the correlation between pretest scores and posttest scores. Over repeated administrations of any measure, random fluctuations of performance occur, in part, due to conditions in the participant (e.g., energy level, affect) and to conditions in the different test environments (e.g., lighting, temperature). A high correlation between test-retest scores indicates that observed changes are attributable more to real change in the underlying construct than to fluctuations due to different test conditions (Anastasi, 1988;

TABLE 3: Structure of Oblique Factor Solution Using Posttest CCC Scores

<i>Item</i>	<i>Factor 1 Loading</i>	<i>Factor 2 Loading</i>	<i>Factor 3 Loading</i>	<i>Factor 4 Loading</i>
Stays on task	.95	-.04	.07	-.02
Concentrates	.94	.05	.04	-.12
Works hard	.93	-.11	-.09	.10
Eager to learn	.86	-.01	-.09	.04
Learns to ability	.85	-.09	-.03	.14
Pays attention	.84	-.05	.01	.07
Works well alone	.80	.10	-.02	-.03
Completes work	.79	-.08	.07	.03
Easily distracted (R)	.76	.24	-.03	-.09
Mind wanders (R)	.69	.15	.02	-.11
Self-reliant	.65	.00	.16	.01
Shows poor effort (R)	.60	.11	-.10	.16
Excludes others from peer group (R)	.07	.97	-.11	-.15
Excludes others from games (R)	.04	.92	-.04	-.09
Lies to make others dislike (R)	-.08	.91	.08	-.12
Tells others he/she won't like them (R)	-.05	.90	-.01	-.11
Says mean things (R)	.00	.87	-.08	.06
Yells (R)	-.04	.67	.05	.28
Teases (R)	.16	.63	-.18	.19
Stubborn (R)	-.04	.56	.16	.32
Gives suggestions without being bossy	.17	.48	.19	.18
Plays well with others	.11	.04	.89	-.15
Initiates interactions with others	-.04	-.10	.87	-.05
Has social contact with others	.08	-.11	.86	.01
Avoids social contact (R)	-.16	-.04	.56	.11
Expresses needs appropriately	.11	.36	.51	.12
Liked by classmates	.00	.19	.49	.24
Harms others (R)	.07	.00	-.09	.78
Fights (R)	.04	.21	.07	.63
Breaks things (R)	.05	-.10	.06	.53
Interfactor correlations: pretest solution				
Factor 2	.42	—	—	—
Factor 3	.33	.33	—	—
Factor 4	.34	.45	.25	—
Interfactor correlations: posttest solution				
Factor 2	.44	—	—	—
Factor 3	.32	.25	—	—
Factor 4	.48	.51	.38	—

NOTE: Items denoted by (R) were reverse-coded. Factor loadings are standardized regression coefficients.

Groth-Marnat, 1997). Test-retest analyses used pretest and posttest data from the comparison group only. It was expected that the comparison group would have more stable scores over time because they would be unaffected by the

intervention. Standards for acceptable test-retest reliability vary, depending on issues such as length of time between tests, age of participants, and the nature of the target of measurement (i.e., stable or trait-like versus variable or state-like). In general, the test-retest reliability should be high (i.e., more than .40 across a 3-12 month period) (Robinson, Shaver, & Wrightsman, 1991). Using one-tailed Pearson correlation coefficients, assessments of test-retest reliability were performed on the entire measure and on subscales. Internal consistency was estimated on the entire sample and separately by gender.

The Standard Error of Measurement (SEM) was also calculated. The SEM provides a range within which an individual's true score falls (Anastasi, 1988). The SEM was hand-calculated using the following formula:

$$SEM = SDt\sqrt{1-rtt}$$

where SDt is the standard deviation of the test scores and rtt the reliability coefficient (Anastasi, 1988). As an index of error, the SEM should be low. Hudson (as cited in Faul & Hudson, 1997) has noted that a SEM should be no more than 5% of the range of scores when scored over a range of 0 to 100. Although the range of possible scores on the CCC and its subscales was greater than the range described by Hudson, the 5% standard was used in this study. The SEM was calculated on the entire checklist, on the subscales, and by gender.

Internal consistency. The values of Cronbach's alpha were high (> .80) on the entire CCC and on three of the four subscales, at pretest and posttest, and for boys and girls (see Table 4). The values for the Physical Aggression subscale were lower (.56-.73), a finding that may be partially due to the limited number of items that make up this subscale (Anastasi, 1988; Nunnally & Bernstein, 1994). The SEM scores were acceptable (within 5% of the theoretical range of scores) at both pretest and posttest and among boys and girls.

Test-retest stability. To assess test-retest reliability, correlations between pretest and posttest scores were calculated. Table 5 includes a summary of results using pretest and posttest data for the comparison group. Correlations between pretest and posttest scores were high, exceeding the .40 standard cited above.

Validity

Construct-convergent validity was assessed by comparing total CCC scores and subscale scores with the aggression subscale of Achenbach's TRF (Achenbach & Edelbrock, 1986). The TRF subscale includes a range of

TABLE 4: Internal Consistency and Standard Error of Measurement (SEM) of the Carolina Child Checklist (CCC)

CCC	n Items	Range	Coefficient Alpha ^a		SEM ^b	
			Pretest	Posttest	Pretest	Posttest
Entire measure	30	0-150	.95	.95	4.79	4.97
Boys			.95	.95	4.57	5.11
Girls			.96	.95	4.42	4.68
Subscales						
Learning orientation	12	0-60				
All students			.97	.96	2.25	2.57
Boys			.96	.96	2.61	2.74
Girls			.97	.95	2.13	2.48
Relational aggression	9	0-45				
All students			.93	.94	2.03	2.03
Boys			.92	.93	1.94	2.18
Girls			.95	.95	1.86	1.86
Social involvement	6	0-30				
All students			.90	.86	1.60	1.88
Boys			.92	.91	1.50	1.58
Girls			.87	.80	1.75	2.02
Physical aggression	3	0-9				
All students			.61	.73	.71	.78
Boys			.69	.73	.61	.85
Girls			.56	.70	.79	.73

a. Alphas are raw.

b. An index of measurement error; acceptable values are approximately 5% or less of the range of possible scores (Faul & Hudson, 1997).

TABLE 5: Stability and Sensitivity of the Carolina Child Checklist (CCC)

CCC	Intervention Group (n = 71)	Comparison Group (n = 100)
Entire measure	.75**	.86**
Subscales		
Learning orientation	.79**	.85**
Relational aggression	.78**	.84**
Social involvement	.39**	.64**
Physical aggression	.56**	.69**

NOTE: The time interval between pretest and posttest was approximately 3 1/2 months. Analyses used Pearson correlation and are one-tailed.

** $p < .001$.

aggressive behavior, from arguing to physically attacking others, and is often used in research on aggression and violence (e.g., Grossman et al., 1997). For this analysis and in contrast to factor analyses, certain items of the CCC were

reverse-coded. As a result, higher scores on the entire CCC and on the Learning Orientation and Social Involvement subscales reflect more competent academic and social behavior. In contrast, higher scores on the Relational and Physical Aggression subscales reflect more aggressive, less social competent behavior. It was hypothesized that (a) the entire CCC would be significantly negatively correlated with the TRF; (b) the Learning Orientation and Social Involvement subscales would each be significantly negatively correlated with the TRF; and (c) the Relational Aggression and Physical Aggression subscales would each be significantly positively correlated with the TRF. Furthermore, because of similarities in scale content, it was expected that the Relational Aggression and Physical Aggression subscales would have comparatively stronger correlations with the TRF.

Findings involving the TRF are based on one-tailed Pearson correlations. In interpreting these validity coefficients, Craft's guideline was adopted (Craft, 1990). All relationships had to be significant at $p < .05$. A coefficient from .20 to .40 was considered low, .40 to .70 was considered moderate, .70 to .90 was considered high, and .90 to 1.00 was considered very high.

Sensitivity to change represents another form of construct validity (Anastasi, 1988; Bloom et al., 1999). As the CCC was administered in the context of a quasi-experimental design, scores of students in the treatment group should reflect changes as a result—at least in part—of treatment when compared with scores of students in the untreated comparison group. The expectation was that test-retest correlations in the treatment group would be lower than those in the comparison group, which should have more stable scores from pretest to posttest. This analysis also used one-tailed Pearson correlation coefficients.

Criterion-concurrent validity was estimated using the Grade Point Average (GPA) of students. Early childhood aggression is related to poor academic achievement, as well as to other conduct problems (Hawkins et al., 1998; Huizinga & Jakob-Chien, 1998; Lipsey & Derzon, 1998; Loeber et al., 1998). Consequently, GPA scores were expected to correlate positively (i.e., at least .20) with the entire CCC and the subscales. More specifically, we proposed the following relationships: (a) the entire measure will be significantly positively correlated with GPA; (b) the Learning Orientation and Social Involvement subscales will be significantly positively correlated with GPA; and (c) the Relational Aggression and Physical Aggression subscales will be significantly negatively associated with GPA. It was expected also that the Learning Orientation subscale would have the highest correlation with GPA due to the similarity in the content of the two measures. These analyses used one-tailed Pearson correlation coefficients.

TABLE 6: Convergent and Concurrent Validity of the Carolina Child Checklist (CCC)

CCC	Measures		
	TRF Aggression		Grade Point Average
	Pretest	Posttest	
Entire Measure			
Pretest	-.77**	—	.64**
Posttest	—	-.74**	.63**
Subscales			
Learning orientation			
Pretest	-.55**	—	.66**
Posttest	—	-.58**	.70**
Relational aggression			
Pretest	.82**	—	-.37**
Posttest	—	.78**	-.31**
Social involvement			
Pretest	-.45**	—	.39**
Posttest	—	-.46**	.37**
Physical aggression			
Pretest	.68**	—	-.27**
Posttest	—	.71**	-.42**

NOTE: TRF Aggression = Teacher's Report Form, Aggression subscale. High scores are desirable except on Relational Aggression and Physical Aggression subscales and TRF Aggression. Analyses used Pearson correlation and are one-tailed.

** $p < .001$.

Concurrence and convergence. Table 6 displays findings of the analyses of convergent and concurrent validity. Higher scores on the entire CCC and on the Learning Orientation and Social Involvement subscales reflect greater social and academic competence. In contrast, lower scores on the Relational Aggression and Physical Aggression subscales, and on the TRF aggression subscale, reflect less aggressive (and, hence, more socially competent) behavior. As indicated in Table 6, all relationships were significant in the predicted directions. More specifically, with respect to the relationships between the CCC and the TRF proposed earlier, (a) the entire CCC was highly correlated with the TRF, (b) the Learning Orientation subscale was moderately correlated with the TRF, (c) the Social Involvement subscale was moderately correlated with the TRF, (d) the Relational Aggression subscale was highly correlated with the TRF, and (e) the Physical Aggression subscale was moderately to highly correlated with the TRF. As anticipated, the highest correlations were between the TRF and the Relational Aggression and Physical Aggression subscales of the CCC.

With respect to the relationships between the CCC and GPA, (a) the entire CCC was moderately correlated with GPA, (b) the Learning Orientation subscale was moderately associated with GPA, (c) the Social Involvement subscale had a low correlation with GPA, and (d) the Relational Aggression and Physical Aggression subscales had mostly low correlations with GPA. As predicted, the Learning Orientation subscale had the strongest correlation with GPA.

Treatment sensitivity. The measure's sensitivity to treatment effects was also tested. As indicated in Table 5, the test-retest correlations for members of the treatment group were lower relative to those for members of the comparison group. These findings suggest the measure may be sensitive to intervention effects. Notably, the Social Involvement subscale seemed to be the most sensitive to treatment.

DISCUSSION AND APPLICATIONS FOR SOCIAL WORK PRACTICE

A constant challenge in intervention research is developing reliable and valid procedures that are sensitive to the effects of treatment (Fawcett et al., 1994). Based on the SHP and other instruments, the CCC was designed to measure keystone individual and peer risk and protective factors for childhood aggression. These factors were conceptualized as proximal child-level outcomes in programs for children with conduct problems. These outcomes include skills and attributes related to classroom success, attachment to prosocial peers, and reliance on aggression to solve social problems—all highly related to conduct problems in childhood. Factor analysis revealed that the CCC measured dimensions of children's behavior that correspond, conceptually, to these domains, but that the adequacy of measurement varied across dimensions.

Learning Orientation, consisting of 12 items and accounting for more than half of the variation in pretest and posttest scores, emerged as the first factor. Shown in Table 3, Learning Orientation items describe a range of student behaviors and attributes that are likely to influence classroom success. Building on both the strengths and risk perspectives, items reflect both protective factors (e.g., stays on task, eager to learn) and risk factors (e.g., easily distracted, shows poor effort). The composition and structure of the Learning Orientation factor in this analysis were consistent with earlier analyses of the SHP and the TOCA-R (Fast Track Project, 1997). Thus, the findings tend to support both prior research and theory.

Relational Aggression, consisting of nine items and accounting for almost 20% of the variation in pretest and posttest scores, emerged as the second factor. It is not surprising that the majority of items that loaded on Relational Aggression originated from the SEQ (Crick & Grotpeter, 1996). Shown in Table 3, these items describe behaviors intended to be harmful (e.g., lies to make peers dislike a student, and excludes other kids from the peer group) but not involving use of force. In addition, four other items load on Relational Aggression. These include “yells,” “stubborn,” “teases others,” and “can give suggestions without being bossy.” Originating from the SHP, these items describe behaviors that are aversive but that often do not involve the intent to harm physically. Together, these results suggest that the nine items measure a single relational aggression construct.

When gender differences were examined, Relational Aggression emerged as the first factor among girls. Although interpretations must be conditioned on the small sample size, the findings highlight both the importance of gender and the potential contribution of the relational aggression construct in extending knowledge about aggressive behavior. The structure of aggression appears to differ for boys and girls, and if confirmed in future studies, this finding may have important implications for the design of preventive interventions.

The third factor, Social Involvement, consisted of six items and accounted for 13% of the variation in pretest and posttest scores. The item “expresses needs appropriately” appears to lack validity as a measure of a child’s social involvement with peers. This item had fairly high loadings on Relational Aggression using pretest scores (.34) and posttest scores (.36, Table 3).

The final factor to emerge in this analysis, Physical Aggression, consisted of three items and accounted for less than 5% of the variation in pretest and posttest scores. Clearly, there is a need to examine the wording of these items and to assess the need for additional items that describe the intentional use of physical force to harm a person. For example, the item “fights” might be reworded as “physically fights,” and “breaks things” might be changed to “breaks things on purpose.” Adding items such as “uses a weapon,” “hits others on purpose,” “threatens others,” and “physically harms self” would reflect a wider range of behaviors that are conceptually consistent with definitions of physical aggression.

Reliability

The results of the reliability analyses indicate the CCC is reliable with a small measurement error. The measure has high internal consistency, above

acceptable standards (Table 4). The SEM also falls within the acceptable range. Furthermore, the CCC appears to maintain its internal consistency and low degree of measurement error for both boys and girls.

The test-retest findings involving the untreated comparison group suggest the measure is stable and the coefficient ($r = .86$) is considerably higher than that reported for the TRF in other research ($r = .68$ over 4 months) (Achenbach & Edelbrock, 1986). When examining the subscales, the Learning Orientation and Relational Aggression subscales were more stable. It is not surprising that Learning Orientation had the highest stability, perhaps due to teachers' familiarity with the subscale's content—which may minimize measurement error—or to the stability of some of the subscale items. Cognitive ability is recognized as being quite stable (Nunnally & Bernstein, 1994). Similarly, Relational Aggression was stable. The 3 1/2 month test-retest correlation ($r = .84$) was particularly high when compared with a 1-month correlation of .82 acquired using a peer nomination measure of relational aggression (Crick, 1996). The Physical Aggression subscale was also stable and is similar to published reports of the TRF Aggressive subscale ($r = .68$ over 4 months) (Achenbach & Edelbrock, 1986) and with the Aggressive with Peers Subscale of the Child Behavior Scale ($r_s = .69$ and $.71$ over 4 months with two cohorts) (Ladd & Profilet, 1996). Thus, the CCC and subscales appear to have acceptable internal consistency and seem stable (over at least a 14-week period).

Validity

It was also important to examine how the CCC and its subscales related to external constructs and criteria. The findings support the measure's construct, convergent, and concurrent validity. As hypothesized, there was a relatively high correlation between Learning Orientation and GPA and lower correlations between Learning Orientation and the other subscales. At the subscale level, Relational Aggression and Physical Aggression were highly correlated with aggression as measured by the TRF. As predicted, Learning Orientation and Social Involvement had weaker correlations with the TRF, reflecting the differences in item content between those subscales and the TRF. Future studies should examine the convergent validity of these two subscales by using measures that approximate their content. In addition, further studies should include different methods of measurement (e.g., direct observations, children's self-reports) to assess method variance. Including different methods reduces systematic measurement errors related to the method used.

Sensitivity to Treatment

The preliminary findings suggest the measure may be sensitive to treatment effects. The intervention group test-retest scores, although quite stable, show less stability than the comparison group. In particular, the Social Involvement subscale appeared to have the most sensitivity. Making Choices includes the therapeutic use of role play, and the children may have improved more than the other children by virtue of the group interaction and structured exercises. Further studies using experimental designs where predictions could be made about the direction of change are needed to extend knowledge concerning the sensitivity of the CCC to treatment effects.

Limitations

The CCC should be used in view of both its strengths and limitations. In the absence of a probability sample, the findings cannot be generalized. Also, in view of the lack of multiple samples and norms, social workers should interpret CCC scores carefully. Learning Orientation, Relational Aggression, Social Involvement, and Physical Aggression have cultural and contextual elements that are not measured by the CCC. That is, scores viewed as worrisome or problematic in one context may be considered as normative in another. As with all practice-related assessment, the use of a single instrument or source of information is rarely adequate. Scores from the CCC must be interpreted in the context of culture, language, religion, and other factors.

Conclusion: Applications for Social Work Practice

The identification of keystone risk and protective factors is critical in the design of prevention and treatment programs (Fraser, 1996). For social workers who work with children at risk of disruptive behavior disorders (e.g. conduct disorder), the systematic assessment of risk factors holds the potential to identify youths who might benefit from selective preventive programs. In addition, the CCC builds on a strengths-based orientation by identifying protective factors. An instrument with a clear factor structure, the CCC consists of subscales that can be used to guide planning but also to identify areas for specialized assessment. For example, low scores on Learning Orientation might indicate a need for further assessment of learning problems, classroom academic habits, or level of parental involvement in activities such as homework. Specialized assessment in each subscale area can yield information to guide development of individualized intervention plans.

In conclusion, the CCC represents one of a growing number of conceptually meaningful and psychometrically sound practice measures that employ a risk and protective framework (see, e.g., Richman & Bowen, 1997; Pollard & Catalano, 1997). Although scores must be interpreted in the context of environmental conditions, culture, language, and religion, our initial findings suggest that the CCC has good factor structure and acceptable reliability and validity.

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