Attempts to understand the aggressive child have a long history in clinical treatment research. Earlier investigations to explain aggressive and delinquent behaviors in youths utilized psychoanalytic theory that postulated underdeveloped internalized controls such as a deficient ego or conscience in antisocial youngsters (Redl & Wineman, 1957). Characterizing the broad domain of aggressive behavior in psychiatrically referred children and adolescents is important because (a) maladaptive aggressive behavior can be common in such youths (Connor, 2002; Connor, Melloni, & Harrison, 1998); (b) different types of aggression may have different correlates, important for identifying targets for future treatment, prevention, and research efforts (Vitiello & Stoff, 1997); (c) in clinical settings highly aggressive youths are frequently diagnosed as having conduct disorder (CD), and CD is generally not robustly treatment responsive (Werry, 1997); and (d) dissimilar aggression types may differentially respond to specific therapeutic interventions (Connor, 2002; Vitiello & Stoff, 1997).

One aggression type is called reactive aggression (Dodge & Coie, 1987). Reactive aggression has its theoretical roots in the frustration–aggression model (Berkowitz, 1989), which states that reactive aggression is an angry, defensive response to threat, frustration, or provocation. Another type of aggression is proactive aggression, which has its theoretical roots in social learning theory (Bandura, 1977). Proactive aggression is a deliberate, coercive behavior that is controlled by external reinforcements and is used as a means of obtaining a desired goal.

Aggression is a set of behaviors that may be a symptom or part of a syndrome such as CD, attention deficit hyperactivity disorder (ADHD), depression, bipolar disorder, posttraumatic stress disorder (PTSD), and/or psychotic disorders. CD is the prototypic psychiatric disorder clinicians often use to diagnose youths with
excessive, maladaptive aggression and is one of the most common psychiatric diagnoses found in youths referred for mental health treatment (American Psychiatric Association, 1994). Preclinical research has not established the existence of CD-like behaviors in animal models of aggressive behavior or that behaviors similar to CD exist in nature (outside of humans). Thus, CD may be an artificial category that obscures more meaningful types of aggression.

In contrast, the distinction between reactive and proactive aggression is firmly founded in ethology (Moyer, 1976). In animals, reactive aggression is characterized by frenzied defensive behavior with great autonomic nervous system arousal. Proactive aggression is identified as patient, quiet, predatory stalking behavior with minimal arousal (Eichelman, 1992).

Clinical researchers have begun to investigate proactive aggression and reactive aggression in children. Studies have established a reliable and valid method of measurement for these two aggression types (Dodge & Coie, 1987), with adequate construct validity (Poulin & Boivin, 2000; even when comorbid ADHD, CD, and oppositional defiant disorder [ODD] are controlled for; Waschbusch, Willoughby, & Pelham, 1998), as assessed by teachers in community school classrooms, in play groups, and in adjudicated adolescents (Coie, Dodge, Terry, & Wright, 1991; Smithmyer, Hubbard, & Simons, 2000). Proactive aggression and reactive aggression have been shown to predict different social-information processing mechanisms (Crick & Dodge, 1996), different outcomes in violence potential and conduct problems (Brendgen, Vitaro, Tremblay, & Lavoie, 2001; Vitaro, Gendreau, Tremblay, & Olligny, 1998), and different developmental histories and concurrent adjustment (Dodge, Lochman, Harnish, Bates, & Pettit, 1997).

Because aggressive behaviors are so common in psychiatrically referred children and because the majority of research investigating proactive aggression and reactive aggression has been conducted in nonreferred community samples of elementary school children, we chose to conduct a descriptive study assessing these aggression types in a clinical convenience sample of psychiatrically referred children. Our aims include (a) measuring the prevalence of reactive and proactive aggression in referred youths and (b) identifying correlates of reactive aggression and proactive aggression in referred youths. On the basis of previous research with nonreferred samples, we hypothesized that demographic, family, historical, and attributional variables would differentially correlate with clinically referred reactive and proactive aggressive youths.

Method

Subjects

Subjects were ascertained from unsolicited consecutive referrals to a residential treatment center (RTC; inpatients, n = 253) and a pediatric psychopharmacology clinic serving a tertiary hospital and medical school (outpatients, n = 70). Subjects were unselected for any psychiatric diagnosis, subject characteristic, or treatment. The RTC serves seriously emotionally disturbed children generally referred from their respective school systems, juvenile justice systems, or state protective services agencies. The psychopharmacology clinic serves as a major regional referral site for primary care clinicians, pediatric subspecialty clinicians, and mental health clinicians. All subjects and legal guardians gave consent. The institutional review boards of both the RTC and the medical school approved this study.

Procedures

Children were systematically assessed at evaluation. A board-certified or board-eligible child psychiatrist clinically evaluated all children. Parents, legal guardians, and/or staff workers (who worked closely with inpatient children) were interviewed about the child. Low verbal IQ, the frequent presence of language-based learning disabilities, and the frequent absence of parent/guardians familiar with inpatient children precluded the use of structured diagnostic interviewing. Clinical diagnoses were assigned according to Diagnostic and Statistical Manual of Mental Disorders (fourth edition; American Psychiatric Association, 1994) criteria. Rating scales were completed by parents at the time of evaluation for outpatients and completed by clinical staff within 4 months of admission to RTC. We assessed historical variables by interviewing patients and parent/guardians and by record review. This method of assessment has been used in previously published research (Connor, Ozbayrak, Harrison, & Melloni, 1998; Connor, Ozbayrak, Kusiak, Caponi, & Melloni, 1997).

Assessments

Demographic variables included age, gender, and verbal IQ. Historical variables assessed included the presence of physical or sexual abuse, age at first abuse, perpetrator type (adult vs. child), parental alcohol/substance abuse, parental violence, and parental arrest. Treatment variables included clinical psychiatric diagnosis (disruptive behavioral disorders [ADHD, ODD, CD], affective disorders [depression, bipolar disorder, anxiety disorders, including PTSD], and psychotic disorders), neurological disorders, asthma, and medication use at evaluation.

Interrater reliability for a board-eligible and a board-certified child psychiatrist on 40 subjects (12%) for this study was as follows: primary psychiatric diagnosis (K = .75), affective disorders (K = .87), disruptive behavior disorders (K = .92), psychotic disorders (K = .53), neurological diagnosis (K = .73), parental history of alcohol/substance...
abuse (K = 1.00), parental history of violence (K = 1.00), parental arrest history (K = 1.00), history of physical abuse (K = .85), history of sexual abuse (K = .93), and number of medications at evaluation (intraclass correlation coefficient = .97). Agreement was good to excellent for self-reported drug use (K = .73) and self-reported alcohol use (K = .76). The mean kappa was .84 on diagnostic, historical, and chart review variables for this data set. All raters were blind to study aims and hypotheses.

Proactive and reactive aggression were assessed with the Proactive/Reactive Rating Scale (Dodge & Coie, 1987). This rating scale consists of three items assessing reactive aggression and three items assessing proactive aggression. An example of a reactive aggression item is, “When this child has been teased or threatened, he or she gets angry easily and strikes back.” An example of a proactive aggression statement is, “This child uses physical force in order to dominate other kids.” The statements are written so that the respondent may use a 5-point scale, ranging from 1 (never) to 5 (almost always), to indicate how frequently the statement applied to an individual child. Children scoring an average of 3 or higher on either set of proactive/reactive statements were considered to demonstrate that type of aggression. The Proactive/Reactive Aggression Scale demonstrates adequate reliability and validity in children (Coie et al., 1991; Dodge & Coie, 1987).

To assess overall aggression intensity and severity in the sample, we used the Overt Aggression Scale, modified to assess the frequency and severity of aggression over the month previous to rating (MOAS; Sorgi, Ratey, Knoedler, Marsdert, & Reichmann, 1991; Yudofsky, Silver, Jackson, Endicott, & Williams, 1986), yielding a total score. This scale has adequate reliability and validity and is a standard aggression rating scale used in clinical aggression research with children (Malone, Delaney, Luebbert, Cater, & Campbell, 2000). These scales were completed by parents for outpatients and staff for inpatients.

Children were asked to self-report substance and alcohol abuse. Youth self-reports of substance use may be valid in highly structured psychiatric treatment settings where honest reporting is encouraged, and they demonstrate good discriminative validity from other diagnoses (Crowley, Mikulich, Ehlers, Whitmore, & MacDonald, 2001; Weiss et al., 1998).

We assessed child self-report hostile attributions with the child version of the Buss Durkee Hostility Inventory (Buss, Durkee, & Baer, 1956). This self-report true/false scale yields an expressed hostility factor (scores range from 0 to 7), an experienced hostility factor (scores range from 0 to 6), and a total rating (scores range from 0 to 13). For children with a reading level of less than the third grade the questions were read aloud by the parent/staff worker completing the scale. The child version of the Hostility Inventory has been previously used in research with children and possesses adequate reliability and validity (Treiber et al., 1989).

Child hyperactive/impulsive behavior was assessed by classroom teachers using the 10-item Conners Teacher Questionnaire (CTQ; Conners & Barkley, 1985; scores range from 0 to 30).

### Statistical Analysis

Independent variables were correlated with dependent measures assessing proactive and reactive aggression group status by use of the Pearson product–moment correlation coefficient (r) for the entire sample of 323 subjects. To ascertain unique correlates of proactive or reactive aggression, we used stepwise regression. On the basis of results of correlational analysis and previous research, we entered variables into a stepwise regression model with proactive aggression or reactive aggression as the dependent variable. Missing data resulted in an evaluable sample size of 313 for regression analyses. Significance was set at p < .05 for all tests.

### Results

#### Subject Characteristics

Subject characteristics are presented in Table 1. Although these clinical subjects were unsolicited and unselected for any psychiatric disorder or characteristic, they were highly aggressive. Children

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subject Characteristics (N = 323)</strong></td>
</tr>
<tr>
<td><strong>Characteristic</strong></td>
</tr>
<tr>
<td>Inpatient</td>
</tr>
<tr>
<td>Outpatient</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
<tr>
<td>Caucasian</td>
</tr>
<tr>
<td>African American</td>
</tr>
<tr>
<td>Hispanic</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Diagnosis</td>
</tr>
<tr>
<td>Psychotic</td>
</tr>
<tr>
<td>Affective</td>
</tr>
<tr>
<td>Disruptive behavioral</td>
</tr>
<tr>
<td>Alcohol use disorders</td>
</tr>
<tr>
<td>SUD</td>
</tr>
<tr>
<td>Psychiatric comorbidity</td>
</tr>
<tr>
<td>CNS neurological</td>
</tr>
<tr>
<td>Asthma</td>
</tr>
<tr>
<td>History</td>
</tr>
<tr>
<td>Physical abuse</td>
</tr>
<tr>
<td>Sexual abuse</td>
</tr>
<tr>
<td>Adult perpetrator</td>
</tr>
<tr>
<td>Age at first abuse</td>
</tr>
<tr>
<td>≤5 years</td>
</tr>
<tr>
<td>&gt;5 years</td>
</tr>
<tr>
<td>Family history</td>
</tr>
<tr>
<td>Parent alcohol/SUD</td>
</tr>
<tr>
<td>Parent violence</td>
</tr>
<tr>
<td>Parent arrest</td>
</tr>
</tbody>
</table>

*Note.* Mean age was 12.7 ± 2.9 (range = 5 to 18 years). Mean verbal IQ was 92.8 ± 14.3 (range = 63 to 145). SUD = substance use disorder; CNS = central nervous system.
who engaged in physical assault in the 1 month preceding evaluation numbered 177 (55%). Children scoring 10 or higher on the MOAS (at least a moderate level of aggression frequency and severity in the month prior to rating) numbered 221 (68%). Children identified as demonstrating reactive aggression comprised 20% ($n = 65$) of the sample, and children identified as demonstrating proactive aggression comprised 59% ($n = 189$) of the sample. Children demonstrated high expressed hostility ($M = 4.4 \pm 1.7$), experienced hostility ($M = 3.5 \pm 1.3$), and total hostility ($M = 7.9 \pm 2.4$) scores. Children demonstrated high rates of impulsive/hyperactive behavior (mean CTQ = 12.8 ± 8.1). Inpatients had higher proactive aggression scores, $F(1, 318) = 4.21, p = .04$, than outpatients. However, no differences were found between inpatients and outpatients on MOAS severity and frequency, $F(1, 318) = 0.172, p = .68$, or reactive aggression, $F(1, 318) = 1.08, p = .30$.

**Aggression Measure Correlations**

Correlations among independent variables, proactive aggression, and reactive aggression for the entire sample are reported in Table 2. Proactive aggression is correlated with reactive aggression. Aggression frequency and severity, as measured by the MOAS, correlate with both proactive and reactive aggression, indicating that these aggression types are measuring frequent and severe aggression in this sample.

**Clinical Correlates**

**Demographics.** Age inversely correlates with reactive aggression but not proactive aggression. Verbal IQ inversely correlates with both reactive and proactive aggression.

**Diagnosis.** Disruptive behavioral disorders (CD, ODD, ADHD) correlate with both reactive and proactive aggression. Psychiatric comorbidity is directly correlated with both reactive and proactive aggression status. Neurological diagnoses are inversely correlated with aggression status, as is asthma.

**Substance use disorders.** Self-reported alcohol and substance abuse and a family history of alcohol or substance abuse correlate with proactive but not reactive aggression.

**Family history.** Parental history of violence or arrest correlates with both proactive and reactive aggression status.

**Abuse.** A history of physical abuse, but not sexual abuse, correlates with both aggression subtypes. Being abused by an adult perpetrator, as opposed to a child/peer, highly correlates with both reactive and proactive aggression.

**Hostile attributions.** Child self-reported hostile attributions correlate with both types of aggression. However, attributing danger to the environment (experienced hostility) only correlates with reactive aggression.

**Behavior.** Child behavioral hyperactivity/impulsivity correlates with both aggression types.

**Regression Analysis**

Stepwise regression analysis explained 28.7% of the variance in reactive aggression and 28.2% of the variance in proactive aggression in our sample (Table 3). Hyperactive/impulsive behavior, self-reported expressed hostility, and a diagnosis of a disruptive behavior...
disorder were correlated with both reactive and proactive aggression. Abuse variables, including sexual abuse by an adult perpetrator, were uniquely associated with reactive aggression. The total number of psychiatric diagnoses correlated with reactive aggression. A history of family violence and the presence of a substance abuse disorder were uniquely correlated with proactive aggression.

Discussion

In a large, unsolicited, and clinically referred sample of children, aggression was highly prevalent. Proactive and reactive aggression types could be identified, with 20% meeting our criteria for reactive aggression and 59% meeting our criteria for proactive aggression. A far higher percentage of children were identified in our clinical sample as proactive or reactive aggressors than in community samples. For example, Dodge and Coie (1987) evaluated 339 boys assessed in elementary school and classified 9% as proactive aggressors and 14% as reactive aggressors. In another sample of 1,028 elementary school students, 6% of children were classified as reactive aggressors, and 9% were classified as proactive aggressors (Salmivalli & Nieminen, 2002). A higher percentage of both proactive and reactive aggressors found in our sample may be due, in part, to methodological differences in identifying proactive and reactive aggressors across studies. Differences in study sample characteristics may also account for our increased aggression rates, including the clinical status of subjects, inclusion of both genders, a wide age range in the sample, high rates of children meeting criteria for a psychiatric diagnosis, a high prevalence of pathology in families of sample children, and/or a high rate of traumatic developmental stress in children included in our sample.

Our hypothesis was partially supported in that correlates partly differed between proactive and reactive aggression. Our results are consistent with previous research, finding some intercorrelations between proactive and reactive aggression but also supporting their independence in nonreferred samples of children (Brown, Atkins, Osborne, & Milnamow, 1996). Our results extend these findings to a sample of psychiatrically referred youths.

Children who were younger in age were significantly more reactive than proactive in their aggression. Our results are consistent with previous research, finding some intercorrelations between proactive and reactive aggression but also supporting their independence in nonreferred samples of children (Brown, Atkins, Osborne, & Milnamow, 1996). Our results extend these findings to a sample of psychiatrically referred youths.

Verbal IQ was inversely correlated with both proactive and reactive aggression. Our results are consistent with previous studies that find that children who cannot use language to mediate conflict (either because of young age or low verbal IQ) may often act out...
aggressively (Moffitt & Lynam, 1994), and our study identifies this relationship in both reactive and proactive aggression.

Although many studies document a relationship between substance use disorders, conduct problems, and aggression in youth (Wilens & Biederman, 1993), no studies to date have reported a specific association between substance use disorders and proactive aggression in psychiatrically referred samples. In our sample, self-reported alcohol and substance use disorders specifically correlate with proactive aggression and not reactive aggression. The same is true for a family history of alcohol or substance abuse that correlates with child proactive, but not reactive, aggression. Our findings support the importance of subtyping aggression to facilitate a better understanding of the relationship among CD, aggression, and substance use disorders in youth.

The number of psychiatric diagnoses (comorbidity) correlated with both reactive and proactive aggression in our study. Our results suggest an association between psychiatric illness and aggression in referred children. Our results are in agreement with recent research supporting an association between psychiatric diagnoses and risk of aggression (Arseneault, Moffitt, Caspi, Taylor, & Silva, 2000). Having asthma or an active central nervous system neurological disorder seems to protect against this relationship in our sample, at least as far as reactive aggression is concerned.

Regression analysis revealed the importance of hyperactive/impulsive behavior and a disruptive behavior disorder diagnosis for both types of aggression. This is consistent with previous research finding proactive aggression to be predictive of delinquency and disruptive behaviors (Vitaro et al., 1998). Our results suggest that in clinically referred children, reactive aggression may also be associated with disruptive behavioral disorders.

The attribution of self-reported expressed hostility was associated with both proactive and reactive aggression in our sample. Previous research in nonreferred community samples has reported that reactive aggression, but not proactive aggression, is associated with hostile attributions (Crick & Dodge, 1996). Because a large percentage of children in our sample experienced maladaptive and violent experiences in their development, they may be more hostile than nonreferred samples and more ready to see positive outcomes from aggression. Our results support a relationship between hostility and proactive aggression as well as reactive aggression in clinical samples.

In the regression analysis, abuse variables were found to be associated with reactive aggression, consistent with an emerging body of literature identifying relationships among early developmental traumatic stress, fear conditioning, and aggression in children (De Bellis, Baum, et al., 1999; De Bellis, Keshavan, et al., 1999). For example, traumatic events may disrupt homeostasis in multiple areas of the brain that are recruited to respond to threat. Use-dependent internalization of elements of the traumatic experience can result in fear-related neurodevelopmental adaptations that may result in relatively persistent neurophysiologic changes affecting emotional, behavioral, and cognitive functioning (Perry & Pollard, 1998; Perry, Pollard, Blakely, Baker, & Vigilante, 1995). These changes may increase vulnerability to aggressive responding, especially reactive types of aggression, in some traumatized children. Family violence was correlated with proactive aggression, consistent with previous research identifying learned behavior as important in the development of early onset aggression (Moffitt, 1993). Controlling for other variables, regression analysis confirmed the specific association between substance use disorders and proactive aggression.

Limitations

Limitations of our research must be considered. Our methodology was cross-sectional in design, so causality cannot be inferred from the results. The majority of subjects were seriously emotionally disturbed, with a history of multiple psychiatric treatment failures. The sample was heterogeneous in composition. Thus, results may not generalize to community samples or referred children with more mild psychiatric difficulties. The broad age range of our sample may have obscured more age-specific developmental correlates of proactive and reactive aggression. A lack of structured diagnostic interviewing precluded a more precise assessment of the relationship between specific psychiatric diagnoses and aggression subtype. However, our sample size was large, and aggression was highly prevalent in our subjects, providing an adequate population with which to investigate proactive and reactive aggression.

Research Implications

The results of our study suggest several avenues for further research. First, given limitations in our ability to utilize structured diagnostic interviewing in our sample, future research might further investigate relationships between proactive/reactive aggression and diagnosis using gold-standard, structured diagnostic instruments. Second, our results show that more reactive aggression occurs in the younger children. This result raises a question about whether aggression
types evolve as children grow older and how this might occur. Finally, additional research is needed to more fully explore additional contextual and historical variables and their possible associations with proactive/reactive aggression. For example, history of placement in RTC children could be valuable to examine the possibility of proactive aggression as a survival strategy used by youths to influence where they are placed in the mental health system.

Clinical Implications

Our results support recent attempts to characterize aggression beyond the psychiatric diagnosis of CD in referred children (Connor, 2002; Vitiello & Stoff, 1997). Proactive and reactive aggression can be identified in a heterogeneous sample of seriously emotionally disturbed children and adolescents, and regression analysis identifies some similar but also some differing correlates. However, the .60 correlation between proactive and reactive aggression means that clinicians should be wary of identifying subgroups with the use of only one assessment measure. Instead, it is recommended that clinicians utilize several sources of information to classify children as reactive or proactive aggressors.

Clinicians should be aware of the associations among hyperactive/impulsive behavior, hostility, disruptive behavior diagnoses, and both reactive and proactive aggression. These domains may provide specific targets for evidence-based treatment interventions directed at highly aggressive youth, such as psychopharmacology for hyperactive/impulsive behaviors or cognitive–behavioral therapy for hostile attributions. Early developmental trauma correlates with reactive aggression and maladaptive parenting, and parental substance use disorders correlate with proactive aggression. These domains can be a focus for primary and secondary prevention efforts aimed at reducing trauma and/or enhancing adaptive parenting in the lives of children, possibly reducing aggression in at-risk youths. Finally, the specific association between substance use disorders and proactive aggression suggests that further research into the relationship between aggression and substance use disorders focus on a proactive aggression subtype.

References


