ELSEVIER

Early Childhood Research Quarterly 19 (2004) 355–371

Early Childhood Research Quarterly

An observational study of delivered and received aggression, gender, and social-psychological adjustment in preschool: "This White Crayon Doesn't Work . . . "

Jamie M. Ostrov [a,*], Kathleen E. Woods [a], Elizabeth A. Jansen [a], Juan F. Casas [b], Nicki R. Crick [a]

[a] *University of Minnesota, Twin Cities Campus, Minneapolis, MN, USA*
[b] *University of Nebraska, Omaha, NE, USA*

Abstract

A semi-structured observational study investigated gender differences in delivered and received relational, physical, verbal, and nonverbal aggression in a young preschool sample ($N = 60$). Findings revealed that gender differences in subtypes of aggression may be apparent as early as 3 years of age. Specifically, girls were found to deliver and receive more relational aggression than males, whereas boys tended, although not significantly, to deliver and significantly received more physical aggression than females. Relational and physical subtypes of delivered and received aggression were differentially associated with preschoolers' social-psychological adjustment.

Keywords: Aggression; Observation; Gender; Preschool

1. Introduction

The study of gender linked peer-directed aggression and victimization has recently generated a plethora of findings that have important implications for researchers, clinicians, and educators who are concerned with accurately accounting for the developmental trajectories of both boys and girls (Crick, Werner et al., 1999; Zahn-Waxler, 1993). In defining the gender-linked hypothesis of aggression, Crick and her colleagues describe two subtypes of aggression. Physical aggression is defined as those behaviors that involve intent to hurt or to harm others through physical acts such as pushing and pinching as well as

* Corresponding author. Present address: Institute of Child Development, University of Minnesota, 51 East River Road, Minneapolis, MN 55455, USA. Tel.: +1-612-624-3347; fax: +1-612-624-6373.
E-mail address: ostr0077@tc.umn.edu (J.M. Ostrov).

0885-2006/$ – see front matter
doi:10.1016/j.ecresq.2004.04.009

verbal acts such as threatening physical force (Crick, Werner et al., 1999), and is typically perpetrated by boys (for a review see Coie & Dodge, 1998). Relational aggression is conceptualized as the intent to harm others by removing or threatening to damage a relationship or feelings of social acceptance and inclusion in social groups and is relatively more common among girls in early and middle childhood (for a review see Crick, Werner et al., 1999).

Researchers have also begun to evaluate a gender-balanced model of peer victimization. Specifically researchers studying preschoolers (Crick, Casas, & Ku, 1999), school-aged children (Crick et al., 2001; Schafer, Werner, & Crick, 2002), and adolescents (see Crick et al., 2001) note that hostile female–female interactions, typically consist of relational victimization, which has been operationalized as being the frequent target of relationally aggressive acts from peers, friends, or significant others (Crick et al., 2001). In contrast, physical victimization involves being the frequent target of physically aggressive behaviors from others and is more typical of hostile male interactions (Crick et al., 1999; Schwartz, Dodge, Pettit, & Bates, 1997). The fact that young girls often play in gender-segregated female groups (Maccoby, 1990), suggests that they may be at increased risk for experiencing relational victimization from their peers. Moreover, given that girls have been found to have an increased desire to achieve close interpersonal social bonds as well as an increased tendency to focus on relational features of interactions (Block, 1983; Crick & Grotpeter, 1995; Cross & Madsen, 1997), they may be at increased risk for experiencing negative consequences from relational victimization. In contrast, boys may be differentially vulnerable to physical acts that subvert their social dominance relationships given their increased propensity for attending to group structural changes and instrumental/dominance interactions (Bugental, 2000).

A gender-based approach to the study of aggression and victimization in early childhood is important in that it may significantly increase our understanding of the social development of young children and may elucidate specific factors that are relevant for deciphering maladaptive developmental pathways specific to each gender (Crick & Rose, 2000; Zahn-Waxler, 1993). Despite the possible scientific and practical benefits such studies would provide, few researchers have responded to existing calls for research in this area (Crick, Werner et al., 1999; Pellegrini, 1998) resulting in surprisingly little empirical work conducted with early childhood samples (for reviews see Archer, in press; Crick, Werner et al., 1999). Despite progress made in this field to date, there remain several limitations and the present study is designed to address some of these existing limitations.

Researchers utilizing teacher-and peer-report methods have generally found evidence of gender differences in relational and physical aggression in preschoolers in the United States (Bonica, Yershova, Arnold, Fisher, & Zeljo, 2003; Crick et al., 1997) and in early childhood studies conducted abroad (Russell, Hart, Robinson & Olsen, 2003; cf. Hart, Nelson, Robinson, Olsen, & McNeilly-Choque, 1998). Initial evidence from recent research has also documented gender differences in relational and physical victimization in preschool samples based on teacher reports (Crick et al., 1999; cf. Bonica et al., 2003). Although these findings are consistent with the gender-linked model, they are based on a rather small body of literature as the majority of studies of relational aggression and victimization have focused on school-age children and adolescents (for reviews see Crick, Werner et al., 1999; Crick et al., 2001). Moreover, in past studies the overlap between physical and relational aggression has been moderate to high (see Crick et al., 1997) and further research testing the orthogonal nature of these two constructs is needed during early childhood. One major limitation of the extant developmental literature is the lack of research focusing on young preschool children in empirical studies of relational aggression and relational victimization (cf. Crick et al., 1997, 1999; Hart et al., 1998; McNeilly-Choque, Hart, Robinson, Nelson, & Olsen, 1996). A

second major limitation of past research is that the study of childhood aggression and victimization subtypes has rarely utilized direct observational methods. Past research has instead relied almost exclusively on peer nominations, self-reports, teacher-report paradigms, semi-structured interviews, or on children's reactions to hypothetical social interactions (for reviews see Archer, in press; Crick, Werner et al., 1999; Crick et al., 2001).

Although findings are mixed, the majority of studies have demonstrated that girls deliver more relational aggression than boys, who are more likely to display more physical aggression than girls (Crick & Grotpeter, 1995; Rys & Bear, 1997; cf. Tomada & Schneider, 1997). These general developmental findings and gender differences however remain largely untested with observational methods for samples of young preschool children (see Crick, Werner et al., 1999). In addition, those few preschool studies that have been conducted have often yielded mixed findings regarding gender differences in relational aggression during early childhood, perhaps due to cultural differences in the samples investigated (Hart et al., 1998; but see Crick et al., 1997, 1999; McNeilly-Choque et al., 1996; Ostrov & Keating, 2004; Russell et al., 2003). Given these discrepant findings, verification of past results with observational techniques is essential.

The developmental study of aggression during early childhood has a rich history of utilizing observational methods for the study of physical and verbal aggression (for reviews see Coie & Dodge, 1998; Reid, Baldwin, Patterson, & Dishion, 1988). Observational studies during early childhood have utilized a diverse array of sampling techniques and methodologies including naturalistic and systematic free play observations in the classroom and on the playground (e.g., Arnold, Homrok, Ortiz, & Stowe, 1999; Fagot & Hagan, 1985; Laursen & Hartup, 1989; McNeilly-Choque et al., 1996), structured observations utilizing play group designs (e.g., Coie, Dodge, Terry, & Wright, 1991; Olson, 1992;), as well as home and structured laboratory assessments (e.g., Cummings, Iannotti, Zahn-Wazler, 1989).

Recently studies utilizing observational techniques with preschoolers have investigated both physical and relational aggression, offering some behavioral confirmation of past hypotheses and findings. In the first known observational attempt to study relational and overt aggression during early childhood (head start sample: $M = 58$ months, S.D. $= 3.70$; university sample: $M = 60$ months, S.D. $= 4.30$), McNeilly-Choque et al. (1996) reported weak to moderate correlations between teachers, peer reports and actual observed behavior on preschool playgrounds. Ostrov and Keating (2004) observed various aggression subtypes displayed and received by preschool children ($M = 64$ months; S.D. $= 6.77$) during naturalistic free play sessions and in a semi-structured coloring task. In general, these authors found that boys delivered and received more overt aggression (i.e., physical and verbal aggression) than girls, whereas girls delivered and received more relational aggression than boys. Taken together these studies offer the impetus for the present research, which is designed to replicate and extend these past findings with a younger sample, while addressing some fundamental unanswered research questions. Despite these extensive past and current efforts to observe aggressive (delivered and received) and antisocial behavior in young children, the field has only recently begun to develop observational systems to capture relational aggression for young boys and girls.

1.1. Observational assessment of gender differences for aggression subtypes

In order to rectify the two major limitations, the lack of observational studies of relational aggression and the paucity of research during early childhood, the present observational study was designed to test the gender-linked hypothesis of delivered and received aggression with the youngest observational sample

to date.[1] In the present study, we employed a substantially revised version of the coloring task paradigm developed by Ostrov and Keating (2004) to assess subtypes of aggression and prosocial behavior. The semi-structured coloring task was designed to be similar to those utilized in past developmental studies during early childhood (e.g., Camras, 1984; Charlesworth & Dzur, 1987). The coloring task consisted of a 9 min mild conflict provoking semi-structured task designed to investigate aggressive and prosocial tactics with same-sex peers by providing preschool triads with limited resources (i.e., only one functional crayon) in a coloring task. Although, 9 min is a brief observational period, based on past studies in which a 5–10 min time intervals were used to assess aggression, (Goldstein, Arnold, Rosenberg, Stowe, & Ortiz, 2001; Pepler, Craig, & Roberts, 1998) we were confident that sufficient levels of aggression would be displayed.

In the present study, we used triads (dyads were used by Ostrov & Keating, 2004) in order to increase the ecological validity of the observational task, based on evidence that preschoolers' aggressive acts often occur in groups of three or more children (Farver, 1996; Trawick-Smith, 1992). Triads were also utilized in order to remove potential group preference biases for each gender, given findings that suggest that male children prefer larger groups and female children prefer dyadic interactions (Benenson, 1993). We also restricted the triads to same-sex groups, given evidence that preschoolers' interactions are most likely to occur naturally in this constellation (Maccoby, 1990) thus increasing the ecological validity of the context. In addition, the triads consisted of only same-sex children because researchers have found distinct behavioral styles (i.e., girls used more verbal behaviors and boys used more physical behaviors) in preschool same-sex groups in a laboratory-based resource utilization study (Charlesworth & Dzur, 1987). To decrease children's reactivity we seated the experimenter behind a large divider during the experimental portions of the coloring task in contrast to the approach used by Ostrov and Keating (2004) in which the experimenter and camera were in clear view.

In the present study, four types of aggressive behaviors were assessed: relational aggression, physical aggression, verbal aggression (e.g., verbal insults and mean names), and nonverbal aggression (e.g., mean faces, intrusive pointing, and chin thrusts, which are hostile movements of the chin to signal threat to others, Keating & Heltman, 1994; etc.), all of which have been shown to be important indicators of hostile, mean behavior in past studies (see Coie & Dodge, 1998; Crick, Werner et al., 1999; Galen & Underwood, 1997). Additionally, delivered and received prosocial behavior was also examined to provide a relatively comprehensive and valence-balanced (i.e., positive and negative) assessment of children's social behavior.

In using this revised method, we hypothesized that physically aggressive tactics would be utilized more by boys, whereas, relationally aggressive strategies would be employed more frequently by girls. Similarly, we predicted that boys would be more likely than girls to be the recipients of physical aggression, whereas girls would be more likely to be the targets of relational aggression. Further, we hypothesized that, in keeping with past findings, verbal aggression would be observed as a frequent tactic used both by boys and girls (Ostrov & Keating, 2004). Finally, based on initial evidence that nonverbal aggression may play a particularly important role in school-aged girls' groups (Galen & Underwood, 1997), we predicted that nonverbal aggression would be more prevalent among the interactions of preschool girls, relative to those of boys.

[1] Past theorists have defined physical and relational peer victimization to be based on frequent or chronic receipt of these aggressive behaviors over time (Crick et al., 1999, 2001; Olweus, 1983; Schwartz et al., 1997). In the present study, to avoid confusion, we used the term *received aggressive behavior* to underscore that our semi-structured observations may not have sufficiently assessed the children's behavior to fully demonstrate victimization or the frequent receipt of aggression over time.

1.2. Delivered and received aggression subtypes and concurrent social-psychological adjustment

The second goal of this study was to examine the association between observed delivered and received aggression subtypes and children's social-psychological adjustment problems as reported by the focal children's teachers. In order to avoid shared method variance and to provide an independent assessment of the focal children's concurrent adjustment, we asked head teachers to complete several established instruments assessing social-psychological adjustment problems. To address this issue in a relatively thorough manner, we included a broader range of social-psychological adjustment indices (e.g., depressed affect, peer rejection, asocial behavior, prosocial behavior) than those utilized in previous observational studies of relational aggression (e.g., peer acceptance). Based on results from past studies in which peer and teacher assessments of aggression and victimization have been used, we hypothesized that all subtypes of observed aggression (delivered and received) would be associated with concurrent social-psychological adjustment problems for both boys and girls (e.g., Crick, 1996).

In order to address our various research goals we used teacher reports of social-psychological adjustment and a revised semi-structured observational paradigm (i.e., coloring task) in which 60 young preschool children were observed interacting with their peers.

2. Method

2.1. Participants

Participants included 60 children (31 boys and 29 girls) ranging in age from 44 to 66 months (M = 54.86 months; S.D. = 6.06) and their head teachers, selected from two preschool sites (five mixed aged classrooms, with 12–16 children per classroom) affiliated with a large public university located in a large Midwestern city. Children were from diverse socioeconomic backgrounds representing most spectrums of yearly income (US$ 5000 to >90,000), but families were primarily middle class. The participants represented diverse ethnic backgrounds with the sample comprised of children from African American (8.5%), Asian American (6.8%), European American (79.6%), Latino (3.4%) or other (1.7%) racial/ethnic backgrounds. The children participating from Site 1 already had parental consent to participate in research studies conducted at this site. Thus, we provided a copy of the consent form to parents, so that they could indicate if they did not want their child to participate in some or all of the study components. Parental consent rates for Sites 1 and 2 were 98% and 75%, respectively.

2.2. Coloring task procedures

Prior to any observational sessions, research assistants (male and female graduate students) were introduced to children and teachers and spent a few weeks building rapport during free play. Approximately 1 week before their scheduled session, children were individually asked to rate their preference for coloring on a 3-point response scale from 1 (not at all) to 3 (very much) in order to obtain a baseline indication of general interest in the coloring activity. Responses indicate that 95% of the children said that they liked to color "very much," further supporting the ecological validity of the task.

Once rapport was established, the 60 children were randomly selected into same-sex triads (gender precluded full random assignment). The children were invited with two other same-sex peers to join

the experimenters for a coloring session and verbal assent was obtained from each child prior to the session. In order to reflect children's natural social interactions within school environments and to support the ecological validity of the task, participants were paired with children only from their classroom, regardless of age variation among triad members.[2] For each session, there were a total of three trials, each lasting 3 min, with the triad receiving a different developmentally-appropriate picture (Winnie the Pooh, Elmo, & Big Bird)[3] to individually color in each trial. Picture order was counterbalanced across sessions. The passage of time was measured by a 3 min hourglass, which was set on the table in view of the children. A limited-resource situation was created by providing one attractive jumbo crayon (e.g., orange crayon for the Winnie the Pooh picture) and two functionally-useless white jumbo crayons, which were placed on the table, equidistant from each child prior to the start of each session. The specific placement of the attractive crayon, within the group of three crayons, was counterbalanced across each of the three trials, but the three crayons were still always placed together equidistant from all participants.

At the start of the session, children were randomly seated at a standard preschool table with three chairs, in a room near their classroom. During the session, the adult experimenter was seated behind a divider at some distance away from the children, such that he or she was partially hidden from view. The experimenter was able to monitor the session by observing from the sides of the divider. The experimenter began by turning on the video-camera and initiated a standard verbal protocol:

> "Hi, just to remind you my name is (experimenter states his or her first name), can you remind me what your names are? Okay, I want to see how kids like you color. I want to remember how you color so I am going to take some pictures of your coloring with a video-camera today (points to the visible camera). I am going to want to keep your pictures, so that I remember how each of you colors. I want you to try your best when you are coloring and keep coloring until I tell you to stop. You will be able to tell how much time you have left by looking at the sand in this hourglass. When the sand is all gone from the top and sits at the bottom like this (experimenter demonstrates) that means there is no more time left to color, and we will start a new picture. Today we have three pictures for you to color. I am very busy today and will be over there in that chair reading my book (points to location) while you are coloring, so you will not be able to ask me questions while you color, but you can talk to each other. Do you have questions before we get started? Is everyone ready? Okay, then let's get started with your first picture."

At the end of each 3 min trial, the experimenter indicated that time was up and provided each child with praise. The second and third pictures and corresponding crayons were then distributed in turn. Material rewards for research participation were strictly discouraged in the two preschools, thus their participation was acknowledged with verbal praise. In order to provide a smooth transition back to the child's classroom and to alleviate any distress children might have experienced from the task, we allowed children to color with a full range of attractive crayons with research assistants and their two classmates when the 9 min session was concluded.

[2] The age variation in the multi-age classrooms was limited to some degree because young 3-year-olds (i.e., less than 44 months) were in separate age specific classrooms and not included in the present study.

[3] The three pictures were digitally scanned and using adobe illustrator software, most dark images/coloring was removed from the pictures to ensure that the white crayon was functionally useless.

2.3. Coding of the videotapes

The coloring sessions were coded by trained male and female undergraduate observers, who were unfamiliar with the children and unaware of the study's hypotheses. Training consisted of coders watching videotapes of children interacting in a similar paradigm (Ostrov & Keating, 2004) and continued until an inter-observer reliability criterion of 0.80 (Intra-Class Correlation Coefficient) was achieved between the coders. When this criterion was reached, the coders were given the actual experimental videotapes to begin coding for the study. Coders had free access to the experimental tapes and could review the tapes as often as they needed to in order to make accurate observations. The coders first reviewed the tapes for each child in order to record the behaviors displayed by each focal child (i.e., aggression and prosocial behavior). The second wave of coding consisted of coders recording the behaviors received by each focal child (i.e., received aggression and prosocial behavior). Thus, each 9 min session was initially coded at least six times, including three displayed and three received reviews. Observers were trained to recognize rough-and-tumble play (Pellegrini, 1989, 2001), which was identified by playful, friendly, and positive interactions without the intention to hurt or harm. This allowed us to explicitly ensure that this type of play was not included in our physical aggression codes (Arsenio & Lover, 1997). In keeping with past coding systems (Ostrov & Keating, 2004), each separate and discrete behavior, based on a temporal break, was coded independently. Observers recorded each behavior in full detail on an observation form that contained a list with different prototypical exemplars for each behavioral category (based on Crick et al., 1997, 1999; see Ostrov & Keating, 2004). Behavioral counts were summed across the session to derive the delivered and received aggression subtype scores.

2.4. Psychometric properties of the coloring task

In the past, acceptable psychometric properties have been established using the coloring paradigm (Ostrov & Keating, 2004). For example, observations from the coloring task procedure were significantly associated with observations collected during naturalistic free play assessments (which were also significantly correlated with teacher's assessments of the specific behaviors). For instance, Ostrov and Keating (2004) reported significant correlations for physical aggression between the two contexts, $r = 0.64$, $P < 0.01$, and relational aggression between the two contexts was also significantly correlated $r = 0.48$, $P < 0.01$, demonstrating the external validity of this instrument. In the present study, inter-rater reliabilities were collected for 30% of the sessions, in which at least two observers independently coded all components of the same session. In order to assess inter-observer reliability, Intra-Class Correlation Coefficients (ICC) were computed between the two independent raters (McGraw & Wong, 1996) and are presented below.

2.4.1. Delivered aggression subtypes

Each focal child received individual scores for each of the displayed behavioral categories, which consisted of the sum of all behaviors displayed toward one's peers during the session. Behavior categories that were recorded include: *physical aggression* (e.g., hitting, pushing, pulling, punching, forcibly taking object, verbal threats to physically harm, etc., ICC = 0.95); *verbal aggression* (e.g., insults, mean names, and taunts not explicitly expressed at the relationship, etc., ICC = 0.65); *relational aggression* (e.g., excluding from the activity, spreading rumors or secrets, withdrawing or threatening to withdraw the relationship/friendship, maliciously telling lies, ignoring a peer, etc., ICC = 0.93); *nonverbal aggression* (e.g., mean faces, intrusive pointing, chin thrusts, etc., ICC = 0.60).

2.4.2. Received aggression subtypes

Each focal child was observed individually in order to assess the number of behaviors they received from their peers during the coloring session. The total number of aggressive behaviors each focal child received was summed across the session to generate a series of individual received aggression subtype scores (i.e., *received physical aggression* score consisted of the sum of all physical aggression received by the focal child during the session, ICC = 0.95). Individual scores were similarly generated for *received relational aggression* (ICC = 0.79), received verbal aggression (ICC = 0.41), and *received nonverbal aggression* (ICC = 0.51). Given the low levels of inter-rater reliability between raters for received verbal and nonverbal aggression these constructs were dropped from further analyses.

2.4.3. Other codes

Each focal child was observed for *displayed prosocial* behavior, which consisted of both traditionally-studied prosocial acts (e.g., helping, sharing, etc., ICC = 0.90) (Crick et al., 1997) as well as relational inclusion behaviors (Greener & Crick, 1999; e.g., includes other children in activity, etc.). *Received prosocial behavior* consisted of receiving the defined prosocial behaviors from peers (ICC = 0.89). Each child received a total score (summed across the session) for prosocial behaviors displayed toward peers and a total score for prosocial actions received from peers. During a separate wave of videotape observations, *reactivity* was measured by coding the total frequency of looks to the experimenter or camera, as well as the total number of comments directed to the experimenter. Averages were then computed for each child across the three measures to yield the reactivity index. The inter-rater reliability for the reactivity code was acceptable, ICC = 0.95. Results reveal that children were minimally affected by the presence of either the camera or the experimenter, as the average rate of reactivity was 10.80 reactions during the session, with the total duration of each reaction event not exceeding 2 s. This finding indicates that on average the focal children were reactive 4% or less of the time during the 9 min session. This reactivity primarily consisted of a comment directed to the experimenter concerning how the white crayon did not work. This level of reactivity is in keeping with past research that revealed that observed children were reactive to a video-camera during 2–5% of the filmed episodes (Atlas & Pepler, 1998).

2.4.4. Stability of aggression scores

To assess the stability of coloring task relational aggression scores, a sub-sample ($N = 19$) of the participants were included in an on-going longitudinal assessment of relational aggression during preschool. Using a past observational scheme (Ostrov & Keating, 2004) focal child observations (Fagot & Hagan, 1985; Pellegrini, 2001) were conducted during free play in the classroom and on the playground. Each child was individually observed for relational aggression, which was recorded during 10 min sessions on eight separate days. Frequencies were summed across sessions to yield reliable scores for each child. This sub-sample also completed peer ratings of relational aggression (i.e., “Does (name of classmate) ever say you can’t come to my birthday party, you can’t play?” adapted from Crick et al., 1997) by having each child individually sort their classmates pictures (neutral facial expressions) into one of three boxes depicting responses to “no,” “yes-a little,” or “yes-a lot”(for similar procedure see Hart et al., 2000). The coloring task was administered during year 1 and naturalistic observations and peer reports of relational aggression were collected during the following year (Fall and Spring). For relational aggression, coloring task observations correlated with naturalistic observations of relational aggression collected 1 year later during the spring, $r(19) = 0.53$, $P < 0.05$. In addition, for relational aggression, coloring task

observations of relational aggression were correlated with peer reports of relational aggression assessed 1 year later during the spring, $r(19) = 0.63$, $P < 0.01$.

2.5. Teacher assessments of preschooler's social behavior and adjustment

The head teacher for each child participating in the research was asked to complete two measures, assessing the social behavior and adjustment of participating preschoolers. Teachers were provided with the instruments as well as verbal and written directions and they had the opportunity to clarify any questions. Each head teacher was given an honorarium in the form of a US$ 25 gift certificate for their participation.

The Preschool Social Behavior Scale-Teacher Form (PSBS-TF; Crick et al., 1997), and one subscale (i.e., received prosocial behavior) from the Preschool Peer Victimization Measure-Teacher Form (PPVM-TF; Crick et al., 1999) were completed by the head teacher of each participating preschooler. These subscales have demonstrated acceptable psychometric properties (see Crick et al., 1997, 1999). The measure (with items rated on one to five point scales ranging from "never or almost never" to "always or almost always") assesses children's *depressed affect* (three items; e.g., "This child looks sad"); *prosocial behavior delivered to peers* (four items; e.g., "This child is helpful to peers", etc.) and *prosocial behavior received from peers* (three items; e.g., "This child gets help from peers when he/she needs it", etc.). Teachers were also asked to rate how *accepted* the focal child was by same- and opposite-sex peers. A new addition to the measure, using the same response scale as the above behavioral items, asked teachers to assess how *rejected ("disliked")* the focal child was by same- and opposite-sex peers. Scores for each subscale were summed. In the present study, the depressed affect subscale demonstrated acceptable internal consistency with Cronbach's $\alpha = 0.71$; as did the subscale for displayed prosocial behavior and received prosocial behavior with Cronbach's $\alpha = 0.90$ and 0.85, respectively. Cronbach's α for peer acceptance and rejection were 0.81 and 0.92, respectively. Additional subscales from this measure were collected for purposes of a different study.

The Child Behavior Scale (CBS; Ladd & Profilet, 1996) was also completed by participating teachers. The CBS is a psychometrically-sound measure of young children's social behavior and adjustment. The 35 item CBS is comprised of 6 subscales, consisting of *Aggressive with Peers* (seven items, e.g., physically aggressive items such as "fights, bullies, or kicks", etc.); *Prosocial with Peers* (seven items, e.g., "helps, kind, or cooperative", etc.); *Asocial with Peers* (six items, e.g., "prefers to play alone, or a solitary child", etc.); *Excluded by Peers* (seven items, e.g., "not chosen as playmate, or avoided", etc.); *Anxious-Fearful* (four items, e.g., "worried or afraid", etc.); and *Hyperactive-Distractible* (four items, e.g., "squirmy, fidgety, or inattentive", etc.). In the present study, the subscales on this instrument demonstrated high internal consistency: Cronbach's α were 0.84 for Hyperactive; 0.86 for Aggression; 0.91 for Prosocial; 0.94 for Asocial; 0.91 for Exclusion and 0.78 for Anxious-Fearful.

3. Results

First, a series of ANOVA analyses were conducted that tested the hypothesis that gender differences would emerge for delivered and received subtypes of aggression and prosocial behavior. Next, a series of regression analyses and partial correlations (controlling for age) were conducted that tested the hypothesis that subtypes of aggression would be associated with concurrent social-psychological adjustment problems.

3.1. Gender differences in peer-directed social behavior[4]

Since behaviors among the triad during the coloring task were not completely independent of one another, a violation of the assumptions of ANOVA, analyses were also conducted with triad or the group mean as the unit of analysis (Stevens, 2002). Analyses were in the direction of the predicted findings (e.g., a significant aggression type × gender interaction was revealed and female groups were more relationally aggressive than male groups) but due to diminished power all analyses were not significant (e.g., males were not significantly more physically aggressive). Given the similar nature of the results, findings are reported separately with focal child as the unit of analysis (for examples using this approach see Arnold et al., 1999; Cummings et al., 1989; Ostrov & Keating, 2004).

In keeping with our first goal, to investigate the extent to which boys and girls directed different types of social behavior toward their same-sex peers, we computed a five (behaviors delivered to peers: physical, relational, verbal, and nonverbal aggression and prosocial behavior) × 2 (focal child gender) ANOVA with repeated measures on the first variable. Raw frequencies for each type of directed behavior (e.g., physical, relational, etc.) comprised the dependent variable for these analyses. The ANOVA revealed a significant main effect for social behavior type, $F(4, 58) = 7.35$, $p < 0.001$. Specifically, Tukey post-hoc tests ($p < 0.05$) revealed that nonverbal aggression ($M = 3.68$; S.D. $= 4.03$) was significantly more frequent than physical aggression ($M = 2.03$; S.D. $= 3.46$), verbal aggression ($M = 1.77$; S.D. $= 2.08$), and relational aggression ($M = 1.10$; S.D. $= 1.58$), but not more frequent than prosocial behavior ($M = 2.32$; S.D. $= 2.54$).

The ANOVA also yielded a two-way interaction of behavior type and gender, $F(4, 58) = 2.67$, $p < 0.05$, which was further explored with simple effect analyses. Specifically, one-way ANOVAs by gender were conducted separately for each behavior type. In keeping with predictions, the simple effects analysis for physical aggression revealed a trend, although not statistically significant, toward boys ($M = 2.84$; S.D. $= 4.50$) being more physically aggressive than girls ($M = 1.17$; S.D. $= 1.44$), $F(1, 58) = 3.62$, $p < 0.06$. Additionally, simple effect analyses for relational aggression revealed that, as predicted, girls ($M = 1.72$; S.D. $= 1.94$) were significantly more relationally aggressive than boys ($M = 0.52$; S.D. $= 0.81$), $F(1, 58) = 10.10$, $p < 0.01$. Finally, the simple effect for prosocial behavior, revealed a trend, although not statistically significant, that suggested that boys ($M = 2.87$; S.D. $= 3.01$) displayed more prosocial behavior than girls ($M = 1.72$; S.D. $= 1.77$) during the coloring task, $F(1, 58) = 3.18$, $p < 0.08$. All other effects were nonsignificant.

3.2. Gender differences in received social behavior from peers

To investigate the extent to which boys and girls were the recipients of different subtypes of social behavior from their peers, we conducted a 3 (received behavior: physical and relational aggression, and prosocial behavior) × 2 (gender) ANOVA with repeated measures on the first variable. Raw frequencies for each type of received behavior (e.g., physical aggression, relational aggression, etc.) served as the dependent variables. Analyses yielded a two-way interaction of received behavior and gender, $F(2, 58) = 4.21$, $p < 0.01$. The interaction was further explored by a series of simple effect analyses, in which one-way ANOVAs by gender were conducted separately for each behavior type.

[4] ANCOVAs were run controlling for age in all analyses for goal 1, results were similar with or without the covariate and thus only the ANOVA and the unadjusted means are reported.

For received physical aggression the simple effect analysis revealed that, as predicted, boys ($M = 2.58$; S.D. $= 3.83$) received significantly more physical aggression than girls ($M = 0.97$; S.D. $= 1.24$) during the coloring task, $F(1, 58) = 4.69$, $p < 0.05$. The simple effect analysis for received relational aggression revealed that, as hypothesized, girls ($M = 2.51$; S.D. $= 4.05$) received more relational aggression than boys ($M = 0.55$; S.D. $= 0.93$) during the coloring task, $F(1, 58) = 6.95$, $p < 0.01$. All other effects were nonsignificant.

3.3. Delivered and received aggression and adjustment

We next conducted a series of analyses to evaluate the association between the various indices of adjustment and observed delivered and received aggression. Due to previously documented gender differences in aggression and victimization, these analyses were conducted separately for boys and girls (see Crick et al., 1997, 1999) in keeping with past analysis approaches (e.g., Crick, 1996). Further, age was statistically controlled. First, a series of multiple regression analyses were conducted in which each subtype of delivered and received aggression served as the dependent variable (e.g., relational aggression), age was entered at step 1 and the predictors were entered at step 2, which included all of the previously stated adjustment measures (e.g., peer rejection, exclusion, etc.). Next, for those analyses in which the omnibus F statistic was significant, the association between the adjustment variables and the dependent variable were explored with partial correlations, controlling for age, and separated by gender.

3.3.1. Omnibus regression analyses

For relational aggression, the regression analyses yielded a significant association between the adjustment predictors and delivered relational aggression for boys, $F(12, 18) = 2.98$, $p < 0.05$. In addition, the regression analyses revealed that the adjustment predictors tended, although not significantly, to be associated with delivered relational aggression for girls, $F(12, 15) = 2.14$, $p < 0.08$. For physical aggression, the regression analyses indicated a significant omnibus association between the adjustment variables and delivered physical aggression for boys, $F(12, 18) = 2.86$, $p < 0.05$. The omnibus analyses yielded a significant association between the adjustment predictors and delivered verbal aggression for girls, $F(12, 15) = 2.77$, $p < 0.05$. In keeping with predictions, the regression analyses revealed a significant association between the adjustment variables and received relational aggression for girls, $F(12, 15) = 2.91$, $p < 0.05$. The regression analyses revealed that the adjustment variables tended, although not significantly, to be associated with received physical aggression for girls, $F(12, 15) = 2.17$, $p < 0.08$. Despite the convention of not reporting marginal trends, due to our a priori predictions we further investigated the statistically marginal trends for delivered relational aggression and received physical aggression ($p < 0.08$) for girls, but they should be interpreted with caution. No other significant regression models were obtained.[5]

3.3.2. Delivered and received physical aggression by gender

Findings for aggression, revealed that observed physical aggression was related to teacher-rated peer rejection for boys, $r(27) = 0.37$, $p < 0.05$; and was negatively associated with teacher-rated prosocial behavior (PSBS-TF), $r(27) = -0.41$, $p < 0.05$.

[5] Due to the number of analyses run there is a possibility that Type I Errors were made.

Analyses of received physical aggression revealed that, for girls, observed received physical aggression was correlated with asocial behavior, $r(26) = 0.44$, $p < 0.05$.

3.3.3. Delivered and received relational aggression by gender

Analyses of aggression showed that, for boys, observed relational aggression was positively associated with teacher-rated exclusion by peers, $r(27) = 0.44$, $p < 0.01$; and negatively related to teacher-rated received prosocial behavior, $r(27) = -0.52$, $p < 0.01$. For girls, analyses revealed that observed relational aggression was negatively associated with teacher-rated prosocial behavior (PSBS-TF), $r(26) = -0.41$, $p < 0.05$.

Analyses of received aggression indicated that, for girls, observed received relational aggression tended, although not significantly, to be positively associated with teacher-rated peer rejection, $r(26) = 0.34$, $p < 0.06$, and teacher-rated aggression (as measured by the CBS), $r(26) = 0.64$, $p < 0.001$. Further, observed received relational aggression was negatively correlated with teacher-rated prosocial behavior (CBS), $r(26) = -0.36$, $p < 0.05$ for girls.

3.3.4. Verbal aggression

For girls, observed verbal aggression was positively associated with teacher-rated peer acceptance, $r(26) = 0.68$, $p < 0.001$; and was associated with teacher-rated prosocial behavior (CBS), $r(26) = 0.43$, $p < 0.05$. Also for girls, verbal aggression was negatively related to teacher-reported depressed affect, $r(26) = -0.58$, $p < 0.001$; asocial behavior, $r(26) = -0.58$, $p < 0.001$; and exclusion by peers, $r(26) = -0.51$, $p < 0.01$.

4. Discussion

Researchers have repeatedly recognized the limitations of teacher and peer informants and have acknowledged the need for observational confirmation of aggression and victimization subtypes of young children's behavior (Crick et al., 1999; Crick, Werner et al., 1999; Hart et al., 1998). The results of this study provide important observational evidence to support the gender-linked model of aggression and victimization in early childhood. Specifically, boys tended, although not significantly, to deliver more and received significantly more physical aggression than girls, whereas girls were found to deliver and receive significantly more relational aggression than boys. This is especially noteworthy given the relatively young age of the participants. That is, these findings in combination with past research (e.g., Bonica et al., 2003; Crick et al., 1997, 1999; McNeilly-Choque et al., 1996; Ostrov & Keating, 2004) provide evidence that gender-specific aggression trajectories may begin in early childhood (as young as 3 years of age), and that both girls and boys exhibit and experience significant levels of aggression during the preschool years. These results stand in sharp contrast to existing theories of the development of aggression which largely posit that, as a group, girls do not exhibit significant behavioral problems prior to adolescence (e.g., Keenan & Shaw, 1997; Moffitt & Caspi, 2001; Silverthorn & Frick, 1999). Moreover, these results provide further evidence that girls may be experiencing aggressive behavior problems in greater numbers and at younger ages than previously believed and, consequently, increased attention should be paid to girls' behavior problems *before* they reach the adolescent years.

Results of this research also provide important information regarding the range of relationally aggressive behaviors employed by young children. Past researchers have posited that, given the relatively limited

scope of preschoolers' cognitive and social skills, their use of relational aggression is relatively immature. Specifically, their relationally aggressive acts have been thought to be primarily direct in nature and unlikely to involve other children (Crick, Werner et al., 1999). In contrast to this view, a qualitative review of the relational aggression data reported here suggests that preschoolers in this research exhibited relatively sophisticated relationally aggressive strategies that involved observed gossip, secret telling, and rumor spreading. These behaviors were sometimes direct but occasionally were subtle/covert in nature. The use of the video camera and the ability to assess the children's behavior using multiple waves of assessment allowed our observers to reliably record these behaviors. An example of the use of such relationally aggressive behaviors can be seen in the following transcript (condensed) of the coloring task:

Girl 3 (right seat) grabs the red crayon from Girl 1 (left seat).
Girl 1 and Girl 2 (middle) attempt to color with the white crayons (they watch Girl 3).
Girl 1 looks at Girl3 (who keeps coloring).
Girl 1 looks at Girl 2, says: "I gotta tell you something" (Girl 1 gets up from her seat and leans in to tell Girl 2 a secret. During this secret spreading Girl 3 looks at Girl 1).
Girl 3 replies with "I heard that!" to Girl 1.
The 3 min picture, and session, ends with Girl 3 still in possession of the good crayon.

To our knowledge, this represents the first observational evidence that rather sophisticated relationally aggressive behaviors are present in children as young as 3–5 years of age, and these behaviors should be included in future studies of early childhood.

The current study also replicated recent findings suggesting that gender differences in the use of nonverbal aggression are not present during the preschool years (Ostrov & Keating, 2004). Since nonverbal aggression was found to be the most common form of aggressive behavior in the present study, future research with young children should continue to explore these behaviors. As predicted, children were relatively egalitarian in their display of verbal aggression (e.g., insults and mean names) as well. Further research is needed that examines whether the current findings regarding the lack of observed gender differences in delivered nonverbal and verbal aggression are specific to preschoolers or are also applicable to children of older ages.

The results of this study extend prior preschool studies (Crick et al., 1997, 1999) in which peer- and teacher-based assessments of relational and physical forms of aggression and victimization have been shown to be associated with social-psychological adjustment difficulties (e.g., peer rejection). In general, findings of this research indicated that, as predicted, observed delivered physical and relational aggression were both associated with maladjustment for the preschool participants. Specifically, for boys, it was found that delivered physical aggression was associated with both peer rejection and a lack of prosocial behavior, whereas delivered relational aggression was associated with exclusion by peers. For girls, delivered and received relational aggression were associated with a lack of prosocial behavior and received relational aggression tended to be associated with problematic peer relationships (e.g., peer rejection). In addition, for girls, receiving physical aggression was associated with asocial behavior. These findings indicate that boys and girls may be susceptible to the consequences of both physical and relational aggression during early childhood. Girls may be more relationally aggressive during preschool (Crick et al., 1997; Ostrov & Keating, 2004) but the present findings suggest that boys that are involved in these types of hostile interactions may also be at risk for future adjustment problems. Similarly, girls that receive physical aggression may also be at an increased risk for future social and behavioral problems (see Crick, 1997). Observed received physical and relational aggression both were related to adjustment problems, but for

girls only. It is unclear why significant findings were not obtained for boys. One possibility, however, is that peer victimization among young boys may typically occur in groups larger than triads, particularly given evidence that the context of boys' naturalistic play tends to be large peer groups (as opposed to girls' groups which tend to consist of two or three children; Benenson, 1993; Maccoby, 1990). If so, our coloring task design may have failed to identify those boys who were the recipients of aggression within the larger classroom setting. In general, many of the adjustment indices were based on the teachers' perceptions of how children behaved relative to their peers and in the larger class context. It is conceivable that the semi-structured setting did not adequately capture all those children who were experiencing behavioral and peer problems in the class. Future studies must continue to test these hypotheses in a variety of settings in order to rectify these limitations.

Despite the contributions of the present study, we acknowledge certain limitations that future research should attempt to rectify. The first was that our observational paradigm, although ecologically valid for this age group, was restricted to only 9 min. This time frame is consistent with past studies of aggression during early childhood (Arnold, 1997; Goldstein et al., 2001; Putallaz & Sheppard, 1990; Stowe, Arnold, & Ortiz, 1999), but we acknowledge that it is a relatively brief period of time. Moreover, our findings suggesting the predictive validity of the coloring task, indicates that the 9 min sessions were able to reliably capture children's naturally occurring behavior. It should be the goal of future research to attempt to capture a more detailed assessment of young children's social behavior (e.g., including multiple analogue situations spread across a number of days; observing play practices and aggression in the classroom and playground context). We believe that the coloring task procedure is a useful context for assessing multiple subtypes of aggressive and prosocial behaviors. Observational studies are often plagued by small sample sizes due to the cost and time intensive nature of this method (for discussion see Pellegrini, 2001; Reid et al., 1988), and the present study is no exception. Certainly, longitudinal research relying upon observational procedures and the investigation of various adjustment indices over time would greatly add to the current developmental literature.

4.1. Implications for practice

The present findings coupled with other recent studies (see Crick et al., 1997, 1999; Bonica et al., 2003; McNeilly-Choque et al., 1996; Ostrov & Keating, 2004; Russell et al., 2003; Sebanc, 2003) suggest that interventions for physical and relational aggression during early childhood are warranted. Recent intervention efforts with kindergarten children participating in a developmentally appropriate, classroom wide, and randomly assigned intervention study (Harrist & Bradley, 2003) suggests some possible directions for efforts during early childhood (e.g., rules against peer exclusion to change classroom climate reinforced by stories, discussion, role playing and monitoring). The present findings indicate that both the aggressor and the recipients may be in need of support with peer relationships. Parents, teachers and professionals working with families and children must become well versed in the identification of both physical and relational aggression/victimization problems and must be capable of assessing these behaviors in a timely but developmentally appropriate fashion. The present study provides one possible means by which these behaviors may be assessed in an efficient and meaningful manner among preschool peers. Future efforts should not only focus on one subtype of aggression or among one group of children, but rather should encompass physical, relational, verbal and nonverbal behaviors among both boys and girls given the present findings. In addition, a lack of prosocial behaviors appears to accompany many of these aggressive tendencies and efforts must be made to incorporate prosocial and collaborative learning

skills into early childhood curriculum and interventions. This is especially relevant given past research which suggests that those children who are high in aggression and low in prosocial behavior may be at greatest risk for behavioral problems (Crick, 1996). It is recommended that early childhood professionals place emphasis on both traditional criteria used to identify prosocial behavior (e.g., sharing and helping) as well as relational inclusion (i.e., including in groups, activities and play; Greener & Crick, 1999) in the development of prosocial lessons and interventions.

In conclusion, results of the present study demonstrate that gender differences for subtypes of aggression are present in rather young children, that relational aggression is stable over a relatively long period of time, and that the inclusion of subtypes of delivered and received aggressive behavior has utility for identifying those children who are at risk for concurrent behavioral and adjustment problems. Furthermore, this study adds to past research by providing observationally-based evidence that a sizable percentage of very young children will go unidentified for behavioral problems if we do not include relational forms of aggression and victimization, in addition to physical forms (see Crick, Werner et al., 1999; Hennington, Hughes, Cavell, & Thompson, 1998). It is clear that assessing various subtypes of aggression and victimization via observational methods allows researchers the ability to more accurately identify children who may be at risk for behavioral and social-psychological adjustment problems.

Acknowledgements

This research and preparation of this manuscript was supported by a NIMH Traineeship (MH-15755) to the Institute of Child Development and by an Eva O. Miller Fellowship in support of the first author, by John E. Anderson Research Funds to the project team, and from NSF (BCS-0126521) and NIMH (MH63684) grants to the fifth author. We wish to thank Brielle Wacker, Ivan Liceaga, Deanna Spanjers and Maran Wolston for their assistance with coding. We thank Craig H. Hart, Crystal Cullerton-Sen, and three anonymous reviewers for comments on an earlier version of this manuscript. Finally, we are grateful to the directors, teachers, parents and students of the participating preschools.

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