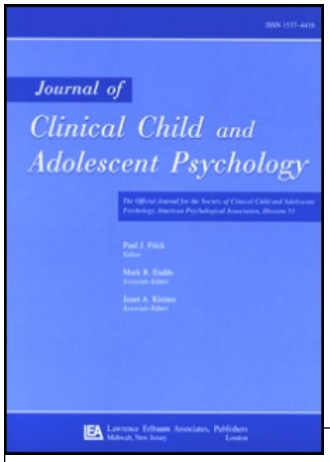

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Relational Aggression, Physical Aggression and Deception During Early Childhood: A Multimethod, Multi-informant Short-Term Longitudinal Study

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Relational Aggression, Physical Aggression and Deception During Early Childhood: A Multimethod, Multi-informant Short-Term Longitudinal Study

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A short-term longitudinal study examined relational and physical aggression and deceptive behavior among 120 preschool-aged children ($M = 44.36$ months old, $SD = 11.07$). Multiple informants and methods (i.e., observational, teacher reports) were used. Evidence for discriminant validity of the observations of aggression subtypes was found. For example, observations of relational aggression were more highly associated with teacher reports of relational aggression than teacher reports of physical aggression. Observed relational aggression was significantly associated with concurrent and prospective increases in deceptive behavior, even after controlling for gender and observed physical aggression. In addition, observed relational aggression was a unique significant predictor of concurrent deception, above and beyond teacher reports of aggression subtypes, which provides important support for the utility of the observational methods.

Aggression is so germane to childhood disorders that it is frequently a hallmark symptom for diagnosis (e.g., conduct disorder, oppositional defiant disorder) and often a comorbid symptom (e.g., attention deficit hyperactivity disorder; American Psychiatric Association, 2000) that complicates both differential diagnosis and treatment. Further, high rates of aggression are associated with a host of negative social-psychological adjustment outcomes, including peer rejection (see Coie, Dodge, & Kupersmidt, 1990), poor communication skill development (e.g., Dumas, Blechman, & Prinz, 1994), drug use (e.g., Chassin, Pitts, DeLucia, & Todd, 1999), and suicidal ideation (e.g., Achenbach, Howell, McConaughy, & Stanger, 1995). Beyond being indicative of dysfunction, aggression also serves an important role in the development of emotion regulation in social interaction (Eisenberg & Fabes, 1998) and is normative during most of early childhood (Dodge, Coie, & Lynam, 2006; NICHD Early Childhood Care Research Network [ECCRN], 2004). Given the role of aggression as both a normative feature of early childhood and an important risk factor for negative outcomes, understanding the onset, course, and associated sequelae are important topics of study for developmental psychopathology.

Portions of this study were presented at the 2007 biennial meeting of the Society for Research in Child Development, Boston; 2006 world meeting of the International Society for Research on Aggression, Minneapolis, MN; 2005 meeting of the International Society for Research on Impulsivity, Washington, DC; and the 8th National Head Start Research Conference, Washington, DC. The contribution of the entire Early Childhood PLAY Project staff is greatly appreciated. Special recognition is given to Jamie L. Guzzo for her contributions and assistance with the coordination of this project. We thank the families, teachers, and directors of participating schools.

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FORMS OF AGGRESSION

The focus of past aggression research has primarily been on physical aggression (i.e., hitting, pushing, kicking, forcefully taking objects), or the intent to hurt another individual using physical force or the threat of physical harm (Dodge et al., 2006). However, another form of aggression, relational aggression (i.e., inflicting harm

through damage, threat, or control of relationships such as friendships; Crick & Grotpeter, 1995), is increasingly being studied. Relational aggression can include behaviors ranging from more direct, overt tactics such as placing one's hands on a chair so a child cannot sit at the table or telling another child "You can't be my friend," to more covert, indirect acts such as spreading rumors, gossiping about a peer, or withdrawing one's attention from a peer by giving the "silent treatment."

Two additional conceptually related but distinct forms of aggression include social aggression and indirect aggression. Social aggression is defined as behaviors directed at damaging another's self-esteem or social status and includes nonverbal acts and verbal insults not part of the relational aggression construct (Galen & Underwood, 1997). To date, no known studies of social aggression have been conducted during early childhood with children younger than 5 years old, though important lab-based observational studies of social aggression have been conducted in middle childhood (Underwood, Scott, Galperin, Bjornstad, & Sexton, 2004). Indirect aggression includes behaviors in which the identity of the perpetrator may not be known (Lagerspetz, Bjorkqvist, & Peltonen, 1988). During early childhood, there have been several studies and wide use of assessment techniques of relational aggression and comparatively fewer of indirect aggression (e.g., Vaillancourt, Brendgen, Boivin, & Tremblay, 2003). We believe it is important to use the specific terminology that was originally adopted by researchers when developing their measures and constructs. In the study presented here we use past observational and teacher report methods of relational aggression for investigating new empirical questions in early childhood.

Development of Aggression and Gender

Physical aggression is apparent in early childhood and declines through the course of early development (for reviews, see Keenan & Shaw, 1997; Tremblay, 2000). Further, it appears that many typically developing children show relatively higher levels of physical aggression between the ages of 2 and 5 (Crick, Ostrov, Burr, et al., 2006; NICHD ECCRN, 2004; Tremblay, 2000). Relationally aggressive behavior is also apparent during early childhood and continues into middle childhood and adolescence (Crick, Ostrov, & Kawabata, 2007). However, the manifestations of relationally aggressive behavior may change across development. Behaviors such as gossip and rumor spreading, for example, which are often covert and indirect later in development, may be overt and direct during early childhood (Ostrov, Woods, Jansen, Casas, & Crick, 2004). That is, during early childhood, even when malicious secrets are spread they have been observed to be direct and in full view of the victim (see Ostrov et al., 2004), which makes the use of observational procedures more feasible during early childhood than perhaps at other developmental periods. In addition, it also appears that, despite some mixed findings (e.g., Hart, Nelson, Robinson, Olsen, & McNeilly-Choque, 1998; Johnson & Foster, 2005; Stauffacher & DeHart, 2005), during early childhood there may be gender differences in the manifestation of relational aggression with peers, such that girls may be generally more relationally aggressive than boys and they may direct more relationally aggressive behaviors to their female than to male peers (Bonica, Arnold, Fisher, Zeljo, & Yershova, 2003; Crick, Casas, & Mosher, 1997; Crick, Ostrov, Burr, et al., 2006; Hawley, 2003; Nelson, Robinson, & Hart, 2005; Ostrov & Keating, 2004; Ostrov et al., 2004; Russell, Hart, Robinson, & Olsen, 2003; Sebanc, 2003). The findings are also not completely clear in later developmental periods (e.g., David & Kistner, 2000; Loudin, Loukas, & Robinson, 2003; Tomada & Schneider, 1997). The gender differences that are found may be because of the importance and focus girls place on social interaction and relationships (Benenson, 1993; Cross & Madsen, 1997; Rose & Rudolph, 2006).

The longitudinal research that has been conducted on both relational and physical aggression is limited. However, studies that have investigated the course of relational and physical aggression have yielded varied results. For example, Murray-Close, Ostrov, and Crick (2007) found that relational aggression increased for girls during middle childhood. However, other researchers have found decreases in both relational and physical aggression from first to fifth grade, with girls reporting a greater decrease in physical aggression over time than boys (Park et al., 2005). Conversely, Cillessen and Mayeux (2004) found that between the ages of 10 and 14 years physical aggression was more stable than relational aggression and that girls demonstrated higher stability for both forms of aggression than did boys. The relation between aggressive behavior and the social–psychological adjustment has also been investigated with several longitudinal studies. Crick, Ostrov, and Werner (2006) found that the combination of both relational and physical aggression in the third grade was the strongest predictor of future social–psychological adjustment problems in the fourth grade, as well as increases in such problems from the third to the fourth grade. Further, Murray-Close et al. (2007) found that internalizing problems and relational aggression were dynamically associated and that they tended to co-occur in predictable ways across three time points in middle childhood. Thus, the study of both relational and physical aggression may aid in the understanding of developmental trajectories of both adaptive and nonadaptive adjustment trajectories.

Only one known study has examined the longitudinal outcomes of physical and relational aggression in the early childhood period in a longitudinal investigation (Crick, Ostrov, Burr, et al., 2006). These researchers investigated the development of relational aggression during early childhood over the course of 18 months. This study documented moderate levels of stability for relational and physical aggression. Moreover, this study revealed evidence that the association between aggression subtypes and adjustment was moderated by gender. That is, relational aggression was predictive of future peer rejection for girls, whereas physical aggression was predictive of future peer rejection for boys. This study provides important evidence that early childhood may be particularly crucial for the development and maintenance of aggressive behaviors that may be predictive of social–psychological adjustment problems.

DEVELOPMENT OF DECEPTION AND ITS ASSOCIATION WITH AGGRESSION

During early childhood, children are in the initial stages of developing the social-cognitive capacity of how others think about desires, emotions, and beliefs (i.e., theory of mind). Of importance, theorists have made the distinction between deceptive capacity and behavior (Hala, Chandler, & Fritz, 1991). Specifically, children who are able to understand or use deceptive behaviors may or may not have the ability to fully comprehend others' perspectives. Deception is defined as intentional communications designed to mislead others and depends on the knowledge of the beliefs of both the liar/deceiver and the target of the deception (Wilson, Smith, & Ross, 2003, p. 22). Past research has documented that by 48 months children have a rudimentary ability to distinguish between lies and the truth (Bussey, 1999), and children as young as 36 months are capable of using nonverbal behaviors to deceive others (Lewis, Stanger, & Sullivan, 1989). To date, the literature does not address possible mechanisms by which this increase in deceptive behaviors may occur.

The theoretical link between aggression subtypes and deception has been frequently posited. Psychologists have theorized the role that deception or lying behavior may play in the course of delinquent, antisocial behavior and physical aggression (Lahey et al., 1999; Loeber & Dishion, 1983). The role that perspective-taking abilities play in the development of aggression remains an open question, with some arguing that these social-cognitive capacities are the foundation for aggressive actions (Sutton, Smith, & Swettenham, 1999; cf. Crick & Dodge, 1999). Braginsky (1970) theorized that children that are high on both prosocial and coercive control, which often includes physically aggressive tactics, also have sophisticated deceptive behaviors. Deception is also believed to be associated with a number of relationally aggressive tactics from spreading malicious rumors and lies to secret spreading, which may be comprised of false statements (Ostrov, 2006).

Despite the apparent overlap in these constructs no known prospective studies have explored the link between relational aggression and deception, and thus our study is exploratory in nature. Ostrov (2006) called for future longitudinal research to explore the direction of effect between aggression subtypes and deception. Does deception support the display of relationally aggressive behaviors or do children that learn covert relationally aggressive tactics like spreading malicious rumors or lies in turn acquire more skill at deceiving others? Few researchers have examined if aggressive behavior may contribute to changes in deceptive behaviors (Stouthamer-Loeber, 1986). Conceptually, we posit that engaging in either physical or relational aggression may promote the use of deception to avoid detection, retaliation, or punishment. For example, over time, use of relationally aggressive strategies, which include spreading malicious lies, may increase children's deceptive capacity and lead to the display of cheating and lying in nonaggressive contexts as well. Deception was selected for study rather than other important and potentially related social-cognitive factors (e.g., hostile attribution biases; Crick & Dodge, 1994) because of the relative lack of information concerning the association between deception and aggression in young children.

The focus on early childhood is because social interactions in early childhood plays a pivotal role in developing early social skills (McClelland & Morrison, 2003) and predicting later school success (for a review, see Rimm-Kaufman & Pianta, 2000). Indeed, early childhood is defined by a series of developing interactions between children and their social environment that have substantial impact on children's ability to handle the increasing demands that characterize social adjustment throughout primary school (Burchinal, Roberts, Zeisel, Hennon, & Hooper, 2006). Understanding the development of behavioral problems, such as aggression, during early childhood has been argued to be critical to later intervention attempts (Buhs & Ladd, 2001; Herrod, 2007). However, surprisingly little is known about the unique factors that influence the development of relationally and physically aggressive behaviors during early childhood (for a review, see Crick et al., 2007). Further elucidation of associated social-cognitive factors that are uniquely associated with either form of aggression will be particularly informative for later research on intervention.

MULTI-INFORMANT, MULTIMETHOD APPROACH

Without question, the use of multiple-informant, multisetting, and multimethod assessment represents the "gold standard" in developmental assessment (e.g., Johnston & Murray, 2003; Mash & Terdal, 1997). Obtaining information from multiple sources and methods likely yields a more accurate representation of children's behavior, thus facilitating screening, prevention, and intervention efforts (Doctoroff & Arnold, 2004). Aggression researchers use an extensive array of methods and informants, including teacher, peer, and self-report, as well as structured and semistructured interviews (e.g., Dodge et al., 2006). Research on relational aggression has relied heavily on teacher report and peer nominations (e.g., Crick & Bigbee, 1998; Crick, Casas, & Ku, 1999; Crick et al., 1997; Crick & Grotpeter, 1995; Rys & Bear, 1997), which, although practical and efficient, are limited (see McEvoy, Estrem, Rodriguez, & Olson, 2003). However, recently introduced observational methods (e.g., McEvoy et al., 2003; McNeilly-Choque, Hart, Robinson, Nelson, & Olsen, 1996; Ostrov & Keating, 2004) used to investigate school-based subtypes of aggressive behavior in youth may provide a more objective behavioral assessment of children's social behavior (Leff & Latkin, 2005). Although evidence exists documenting the favorable psychometric properties of the observation scheme developed by Ostrov and colleagues (Crick, Ostrov, Burr, et al., 2006; Ostrov & Keating, 2004), there is only limited evidence for the discriminant validity of the method and no research to date exists evaluating the predictive validity of observations over and beyond other methods (e.g., teacher reports) when studying relational aggression. Similar work has shown that classroom observations have incremental predictive ability above teacher report for other externalizing behaviors in young children (e.g., Doctoroff & Arnold, 2004; Shaw et al., 1998). Knowledge of incremental validity in child assessment, including observational methodologies, is needed to evaluate and compare the costs and benefits of various assessment methods in predicting desired outcomes.

HYPOTHESES

Our study had three main objectives. The first key objective was to replicate and extend the validity of recently introduced measures of aggression subtypes and deception. The second main goal was to test the unique associations between observed physical and relational aggression and teacher reported deception behaviors. Given the theoretical and empirical link between aggression subtypes and deception behaviors we anticipated unique concurrent and prospective associations between both physical and relational aggression forms and deception behaviors. Further, given past evidence of gender moderation (e.g., Zimmer-Gembeck, Geiger, & Crick, 2005), we explored if gender would moderate these associations between aggression subtypes and deception behaviors. Alternatively, it is conceivable that deception predicts changes in aggressive behaviors, and thus we explored this possible pattern of effects as well. The third central study objective was to test the utility of observational methods of aggression subtypes above and beyond the use of teacher reports of aggression in predicting concurrent and prospective deceptive behavior. We hypothesized that observations of aggression subtypes would uniquely predict concurrent and prospective deceptive behavior, above and beyond teacher report methods. To test the three novel study questions we conducted a multimethod and multi-informant (i.e., observational and teacher report), short-term longitudinal study with a large group of children in early childhood centers.

METHOD

Participants

One hundred twenty children (69 girls) participated in the study and were an average of 44.36 months old ($SD = 11.07$) at the start of the ongoing longitudinal project (e.g., Ostrov, 2006). Children were recruited from four nationally accredited and university-affiliated schools in a large city in the Northeast. Children represented diverse ethnic backgrounds: 12.9% were African American, 12.9% were Asian, 59.8% were Caucasian, 2.3% were Hispanic/Latino, 4.5% were Indian, 1.5% were Native American, 6.1% were from other ethnic backgrounds or unknown. The average parental consent rate across the study was approximately 68%. Attrition was small (12%; 6 boys and 10 girls) and was because of families that moved out of the area or country. For a subset of children ($n = 47$), parents completed a demographic questionnaire (all parents for the second cohort were invited to complete a demographic questionnaire and 63% returned the forms), which indicated that most parents were married (87.2%) and several (32.6%) spoke a second language in their home. The mean family income was between $55,000 and $100,000 (ranging from less than $15,000 to more than $100,000). The mean parental education level was a 4-year degree (ranging from some high school to a graduate or professional degree). These statistics were consistent with available school-based demographic information.

According to the child's primary teacher, children attended the child care center for an average of 28.01 hr/week ($SD = 13.81$). Approximately 32% of teachers had a bachelor's degree, and 37% had a master's degree. At Time 1 data collection, primary classroom teachers reported having been employed at their school for an average of 77.12 months ($SD = 61.53$, range = 6–216 months). They reported having known the focal child for an average of 12.47 months ($SD = 11.92$, range = 2–48 months; for additional details see Ostrov, 2006, which used only one time point and a subsample to address different empirical questions).

Measures

Observations of aggression. Observations using focal child sampling with continuous recording of children's relational and physical aggression were conducted during free-play using an adaptation of procedures developed by Ostrov and colleagues (Crick, Ostrov, Burr, et al., 2006; Ostrov & Keating, 2004) and reviewed by Leff and Latkin (2005). Each child was observed for 10 min per assessment by a trained observer over an 8-week period. At the two time points, each child was observed eight times for a total of 160 min of observation per child. During training, 20 observers (i.e., 16 advanced undergraduate students and 4 graduate students/professional staff; 18 female) spent considerable time in each participating classroom and on the playground to facilitate children's acclimation to their presence and reduce reactivity (Pellegrini, 2004). Extensive training included but was not limited to readings, discussion of clips from past television programs, completion of multiple-choice and matching examinations as well as a coding exam using videotapes from past studies, and live practice observations with an experienced observer.[1] Observers always conducted observations within earshot of the focal child in order to hear and see the full peer interactions. When in the presence of the children, observers used a "minimally responsive manner" (Pellegrini, 2004) and were specifically trained in controlling their nonverbal behavior (i.e., facial expressions, posture, and eye contact) to further diminish possible reactivity. Reactivity (i.e., frequency of looks, comments, and questions to the observer by the focal child) was low over the course of the study (Atlas & Pepler, 1998; $M = 0.42$, $SD = 0.42$ times per 10-min session at Time 1; $M = 0.25$, $SD = 0.29$ times per 10-min session at Time 2). The order of children observed was determined randomly within each day of observation, with the following caveats: The number of observations stayed similar for all children, and no child was observed more than once per day.

During each 10-min assessment interval, observers recorded the focal child's engagement in the following behaviors: physical aggression (e.g., hitting, shoving, taking objects) and relational aggression (e.g., verbally or nonverbally excluding from an activity, using friendship withdrawal as a threat; giving the "silent treatment," covering ears to signal ignoring, malicious secret or gossip spreading). Observers included a full description of what occurred and the gender of all children involved. Each separate independent behavior that was observed during the 10-min interval was recorded based on temporal breaks in the interactions during the observation. Both provoked and unprovoked behaviors were recorded. Behaviors were summed to yield total scores.

Further, assessments of reliability were conducted throughout the study to avoid observer drift problems. As in prior research, the manner in which the observations were collected was not amenable to kappa coefficients as observers did not specifically record intervals when the aggressive behaviors of interest were absent. The use of intraclass correlation coefficients (ICCs) has been suggested in similar situations (see McGraw & Wong, 1996) and used in the past (e.g., Crick, Ostrov, Burr, et al., 2006; NICHD ECCRN, 2004). Evidence for favorable interrater reliability of this observational measure (i.e., ICCs > .70) has been demonstrated (Crick, Ostrov, Burr, et al., 2006; Ostrov & Keating, 2004). Interrater reliability was assessed for 15% of observations, spread across the 8-week observation period. In our study, at both time points, reliability was acceptable for observations of relational aggression (ICCs = .72–.86) and physical aggression (ICCs = .78–.95). This observational method has demonstrated acceptable validity in the past with moderate correlations (i.e., .42–.50 for relational aggression and .47–.62 for physical aggression) between teachers and observers (Crick, Ostrov, Burr, et al., 2006; Ostrov & Keating, 2004).

Teacher reports of aggression. The Preschool Social Behavior Scale–Teacher Form (PSBS–TF) was used to assess teacher perceptions of children's physical and relational aggression (Crick et al., 1997). This instrument consists of 16 items, 6 of which assess relational aggression (e.g., "This child tells a peer they won't be invited to their birthday party unless s/he does what the child wants"), 6 of which assess physical aggression (e.g., "This child kicks or hits others"), and 4 of which assess prosocial behavior (e.g., "This child is helpful to peers"). The prosocial items were included in this instrument for ethical and methodological reasons (i.e., to avoid negative response biases) and served as positively toned filler items. Teachers rated the degree to which

[1] A detailed coding manual is available for research purposes from the first author.

children exhibited relational and physical aggression directed at their peers using a 5-point rating scale from 1 (*never or almost never true*) to 5 (*always or almost always true*). Evidence supports the favorable psychometric properties of the PSBS–TF (e.g., Bonica et al., 2003; Crick et al., 1997; Crick, Ostrov, Burr, et al., 2006; Johnson & Foster, 2005). Similarly, in our investigation, assessments of teacher reported physical and relational aggression were reliable (i.e., Cronbach's αs = .87–.93 across the study). To further support the validity of this measure, research assistants (RA) completed the PSBS–TF after all observations for the time period were completed. RA-reported relational aggression was reliable at Times 1 and 2 (Cronbach's αs > .93) and RA-reported physical aggression was also reliable at Times 1 and 2 (Cronbach's αs > .90). Correlations between teacher and RA reports were significant for relational aggression at Time 1 ($r = .32$, $p < .001$) and Time 2 ($r = .48$, $p < .001$). Correlations between teacher and RA reports were significant for physical aggression at Time 1 ($r = .32$, $p = .001$) and Time 2 ($r = .21$, $p = .042$).

Teacher reports of deception. The Children's False Statement–Teacher Form (CFS–TF; Ostrov, 2006), a measure of deception, lying, and false statements was completed by head teachers. Adapted from Wilson et al.'s (2003) reliable home-based observation system of deception and false statements in early childhood, seven items were generated for a teacher report instrument (e.g., "This child deceives others to get what s/he wants"; "I have noticed this child falsely accuses others of inappropriate behavior"). Teachers responded on a 1 (*never or almost never true*) to 5 (*always or almost always true*) rating scale, indicating the degree to which each of the statements applied to the focal child. Three positively toned filler items were included to avoid negative response bias (e.g., "This child is fair and honest when playing with others"). The seven-item measure had appropriate internal consistency (Cronbach's $\alpha = .95$ at Times 1 and 2). Past research has supported the factor structure of this measure and the concurrent validity of the scale (Ostrov, 2006). In our study, we extended the concurrent validity of the measure by having an RA familiar with the focal child complete the CFS–TF after all observations had been completed. The RAs were the same individuals that completed the observations for this study so they had several months of exposure to the children via training and observational data collection sessions. Given the overlap in informants, they are only used for validity purposes. The Cronbach's alphas for the RA report of the CFS–TF was acceptable (.96 and .97 for Times 1 and 2, respectively). Providing additional evidence for the validity of the deception measure, RA reports of deception significantly corresponded with teacher reports of deception at Time 1 ($r = .37$, $p < .001$) and Time 2 ($r = .24$, $p = .05$).

Procedure

Our study was approved by the local Institutional Review Board, and parents provided written consent prior to participation. Children's primary teachers also provided written consent prior to completing packets. Observations were begun during the fall and were initiated approximately 2 months after the children began attending school for that year, which allowed time for the children to get to know one another. Approximately 4 months after the conclusion of Time 1, observations were initiated for Time 2. At each time point, teacher packets were distributed when approximately half of the observation sessions were completed. Teachers received an honorarium ($25 gift certificate) after completing teacher report packets at each time point. All families and staff received newsletters summarizing the major findings of the study.

RESULTS

The study had three main objectives. The first objective was to examine the intercorrelations between physical and relational aggression as well as the stability and bivariate associations of all key study variables. In keeping with the first goal, Fisher *r* to *Z* correlations were conducted to examine the discriminant validity of observed relational and physical aggression. The second main goal was to test the concurrent and prospective unique associations between observed physical and relational aggression and teacher reported deception behaviors. In addition, the alternative direction of effect was explored in models that tested if deception predicted changes in physical or relational aggression, respectively. The third main study objective was to test the predictive validity of observational methods of aggression subtypes above and beyond the use of teacher reports of aggression in predicting concurrent and prospective deceptive behavior.

Preliminary Analyses

Descriptive statistics were conducted for all key study variables (see Table 1). The means for observational data show the average frequency of behavior across the sessions and thus were relatively low base-rate events, which is similar to past studies using these methods (e.g., Crick et al., 2006). Unfortunately, national norms and ranges for clinical significance are not presently available for comparison purposes. Of importance, assessments of

TABLE 1
Bivariate Correlations and Descriptive Statistics With Total Sample

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. Ragg Obs T1	—									
2. Ragg Obs T2	.41***	—								
3. Pagg Obs T1	.15	.06	—							
4. Pagg Obs T2	.15	.19	.46***	—						
5. Ragg TR T1	.28**	.09	.14	.13	—					
6. Ragg TR T2	.47***	.41***	.11	.11	.65***	—				
7. Pagg TR T1	.10	− .01	.36***	.39***	.48***	.41***	—			
8. Pagg TR T2	.28**	− .07	.33***	.37***	.39***	.60***	.74***	—		
9. Deception TR T1	.24**	.09	.26**	.26**	.74***	.47***	.58***	.47***	—	
10. Deception TR T2	.35***	.10	.24*	.27**	.48***	.72***	.46***	.66***	.55***	—
M	1.02	1.60	2.40	2.02	9.59	10.65	9.56	9.67	10.96	11.29
SD	1.50	2.42	2.49	2.44	4.88	5.43	4.27	4.79	5.90	5.34
Range	0–7	0–14	0–13	0–11	6–28	6–25	6–22	6–26	7–30	7–28

Note: *Ragg = relational aggression; Pagg = physical aggression; Obs = observations; TR = teacher report; T1 = Time 1; T2 = Time 2.*
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

skew were less than 3 (1.14 to 2.67) and kurtosis values were less than 8, suggesting that nonnormality of the data was not a concern (Kline, 2005).

Validity, Intercorrelations, and Stability

Replicating past validity findings, observations and teacher reports of relational aggression significantly corresponded at Times 1 and 2 (see Table 1). In addition, observations and teacher reports of physical aggression significantly corresponded at both time points. The association between observed physical and relational aggression was found to be low and nonsignificant at both time points. Stability correlations were moderate and significant for observed relational aggression and physical aggression. Teacher reports of relational and physical aggression were highly stable. To extend the validity findings and test the discriminant validity of the observations, we used Fisher Z statistics to compare correlations between observations and teacher reports of aggression. Specifically, observations of relational aggression at Time 1 were more highly correlated with teacher reported relational aggression at Time 1 than with teacher reported physical aggression at Time 1 ($Z = 1.96$, $p < .05$). Observed physical aggression at Time 1 was more highly correlated with teacher reports of physical aggression at Time 1 than with teacher reports of relational aggression at Time 1 ($Z = 2.45$, $p < .01$). At Time 2, observations of relational aggression were more highly correlated with Time 2 teacher reports of relational aggression than with concurrent teacher reports of physical aggression ($Z = 4.20$, $p < .01$). At Time 2, observations of physical aggression were more highly correlated with Time 2 teacher reports of physical aggression than with concurrent teacher reports of physical aggression ($Z = 3.10$, $p < .01$). Prospective analyses were also run as a more conservative test of these associations. Observed relational aggression at Time 1 was more highly associated with future teacher reported relational aggression than with future teacher reported physical aggression ($Z = 2.38$, $p < .01$). Finally, observed physical aggression at Time 1 was more highly associated with future teacher reported physical aggression than with future teacher reported relational aggression ($Z = 2.61$, $p < .01$).

Bivariate associations indicated that observed relational aggression at Time 1 was associated with concurrent and future deception behaviors. Observed physical aggression at Time 1 was also associated with concurrent and future deception. Teacher reports of aggression subtypes were also significantly associated with teacher reports of deception (see Table 1).

Aggression Subtypes and Concurrent and Future Deception

To test the second main objective, a series of hierarchical regression models were conducted (see Table 2). In the first model, we tested if observed physical and relational aggression at Time 1 uniquely predicted concurrent deception, controlling for the influence of the other aggression type and focal child gender. At Step 1, focal child gender, observed physical and observed relational aggression at Time 1 was entered. At Step 2, the interactions between focal child gender and physical and relational aggression were entered, respectively. Results of these analyses revealed that both relational and physical aggression were uniquely associated with concurrent deception behaviors (see Table 2). Model 2 was similar to the first model, except that initial deception behaviors were also entered into the model and the outcome variable was deception at Time 2. This analysis revealed that both observed relational aggression at Time 1 and observed physical aggression

TABLE 2
Regression Models Testing Unique Associations Between Observed Physical and Relational Aggression and Concurrent and Prospective Deception Behaviors

Outcome, Step, Predictors	β	$F,\Delta F$	R^2	ΔR^2
Model 1: Deception T1				
1) Gender	–.04	(3, 104) = 4.34, $p = .006$	.11	—
Pagg Obs Time 1	.22*			
Ragg Obs Time 1	.21**			
Model 2: Deception T2				
1) Deception Time 1	.46***	(4, 79) = 12.20, $p < .001$	.38	—
Gender	.07			
Pagg Obs Time 1	.20*			
Ragg Obs Time 1	.19*			
Model 3: Relational Aggression Obs T2				
1) Gender	.16	(3, 92) = 6.19, $p < .001$	.17	
Pagg Obs Time 1	.01			
Ragg Obs Time 1	.39***			
2) Deception Time 1	–.01	(1, 88) = .011, $p = .92$		.00
Model 4: Physical Aggression Obs T2				
1) Gender	–.25	(3, 92) = 8.34, $p < .001$	.22	
Pagg Obs Time 1	.32***			
Ragg Obs Time 1	.09			
2) Deception Time 1	.15	(1, 88) = 2.22, $p = .14$		.02
Model 5: Deception T1				
1) Gender	–.02	(3, 94) = 72.47, $p < .001$	.70	
Pagg TR Time 1	.43***			
Ragg TR Time 1	.53***			
2) Pagg Obs Time 1	.10	(2, 92) = 5.10, $p = .008$		.03
Ragg Obs Time 1	.14**			
Model 6: Deception T2				
1) Deception Time 1	.62***	(4, 73) = 16.78, $p < .001$	.49	
Gender	.09			
Pagg TR Time 1	.16			
Ragg TR Time 1	–.03			
2) Pagg Obs Time 1	.14	(2, 67) = 1.44, $p = .25$		.02
Ragg Obs Time 1	.06			

Note: *Ragg = relational aggression; Pagg = physical aggression; Obs = observations; TR = teacher report.*
*$p < .05$. **$p < .01$. ***$p < .001$.

at Time 1 predicted an increase in deception behaviors, controlling for gender and the other aggressive behavior at Time 1. The models did not demonstrate any evidence for moderation by gender and thus are removed for ease of communication.[2] To test the alternative direction of effects, two additional prospective models were conducted.[3] Deception was not associated with increases in either physical (Model 3) or relational aggression (Model 4). In sum, observed relational aggression and observed physical aggression both uniquely predicted concurrent and future increases in deception behavior across the study.

Utility of Observations of Aggression and Concurrent and Future Deception

To test the third main objective of the study a series of regression models were conducted (see Table 2). These models were designed to test the utility of observations of aggression above and beyond the role of teacher reports of aggression in the prediction of concurrent and prospective deception behavior. Model 5 was designed to test the concurrent associations between aggression and deception. Thus, at Step 1, focal child gender, teacher-reported relational and physical

[2]The models were run controlling for age and the findings were identical, and thus, for ease of communication, the more parsimonious model is shown.

[3]Consistent with findings reported in Model 1, deception ($\beta = .22$, $p < .001$) was significantly associated with concurrent observed physical aggression, above and beyond observed relational aggression and gender, $\Delta F(1, 104) = 5.14$, $p < .025$, $\Delta R^2 = .04$ ($R^2 = .12$). Also consistent with Model 1, deception ($\beta = .22$, $p = .03$) was significantly associated with concurrent observed relational aggression, above and beyond observed physical aggression and gender, $\Delta F(1, 104) = 4.86$, $p = .03$, $\Delta R^2 = .04$ ($R^2 = .07$).

aggression was entered. At Step 2, observed physical and relational aggression was entered. At Step 3, the interaction between focal child gender and observed relational and observed physical aggression was entered. None of the interactions with gender were significant and thus are not presented for ease of communication. Model 5 revealed that only observed relational aggression was a unique significant predictor of concurrent deception, when controlling for gender, teacher reports of physical and relational aggression and observed physical aggression. That is, observations of relational aggression predicted variance in concurrent deception above and beyond the role of teacher reports of aggression. The sixth model extended Model 5 by testing if observed aggression would predict increases in deception behavior across time points. None of the observed aggression variables predicted changes in deception across the study after teacher reports of aggression were entered as covariates (see Table 2).[4] In sum, observational reports of relational aggression appear to uniquely predict variance in concurrent deception behavior above and beyond the variance accounted for by observed physical aggression and teacher reports of physical and relational aggression. Observed relational aggression did not predict increases in deception behavior over time, when controlling for teacher reports of aggression subtypes. None of the models demonstrated evidence for moderation by gender.

DISCUSSION

This research was designed to examine three main objectives related to the association between aggression subtypes and deceptive behavior using a multi-informant, multimethod short-term longitudinal study. In keeping with our first key objective, we replicated and extended the validity of observational methods of aggression subtypes and teacher reports of deception. As predicted, teacher ratings and observational assessment of aggression were correlated at levels similar to previous studies. In addition, the results indicated adequate discriminant validity for both relational and physical aggression using the observational measure. This finding further highlights the utility of this particular observational coding scheme for both concurrent and prospective designs assessing physical and relational forms of aggression. With regard to the deception measure, the moderate concurrent and prospective correlations between teacher and RA report provided evidence for the validity of the recently introduced deception measure. Although further research is clearly needed on the psychometric properties of the CFS–TF, this study provides evidence that it is a useful assessment tool for the construct.

Second, we examined concurrent and prospective unique associations between observed physical and relational aggression and deceptive behaviors across two time points. Predictions for this second goal of the project were supported. Specifically, both observed relational and physical aggression were significantly associated with concurrent and future increases in deceptive behavior as anticipated. In exploring the alternative direction of effect, we did not find evidence that deception was associated with increases in either physical or relational aggression. Future work is clearly needed to replicate these effects, but the preliminary evidence suggests that both subtypes of aggressive behavior predict changes in deception behavior and deception behavior does not predict changes in aggressive subtypes.

To address our third goal, we examined the association of the observational assessments and teacher reports of deception after controlling for the variability accounted for by teacher reports of the same aggression constructs. Although all of our predictions were not substantiated, our findings do suggest the utility of observational aggression assessments in predicting current as well as future child deception. Specifically, initial observed relational aggression was associated with concurrent deceptive behavior, even after accounting for gender, teacher reports of aggression, and observed physical aggression. Although these findings did not hold for prospective analyses testing changes in deception, they do serve to provide preliminary evidence of the utility of using observational assessment in addition to teacher assessments of relational aggression. It is important to note that our follow-up analyses indicated that teacher reports showed unique associations with deception controlling for observations, but given shared method variance concerns we call for replication of these effects with an independent assessment of deception (e.g., a laboratory task of deception, see Keating & Heltman, 1994).

Limitations and Future Directions

There are several limitations to this study that may reduce the generalizability of the findings and may have

[4]The study was designed to test if observations of aggression predicted concurrent and future deception when controlling for teacher reports of aggression. The unique predictive utility of teacher reports were not central given the shared method variance concerns with teacher reports of both aggression and deception. However, as a follow-up, two regression models were conducted to test if teacher reports of aggression predicted deception above and beyond observational reports. It is not surprising that teacher-reported physical ($\beta = .40$, $p < .001$) and relational ($\beta = .49$, $p < .001$) aggression both uniquely predicted concurrent deception above and beyond observations, $\Delta F(2, 92) = 83.35$, $p < .001$, $\Delta R^2 = .49$. Teacher reports of physical ($\beta = .16$, $p = .23$) and relational ($\beta = .01$, $p = .97$) aggression did not predict increases in deception when accounting for observations of aggression and gender, $\Delta F(2, 67) = .73$, $p = .49$, $\Delta R^2 = .01$.

attenuated some of the effect sizes. To begin, one limitation of our exploratory research is the short-term nature of this project's longitudinal design. To understand the long-term developmental changes in the rates and assessment of social behaviors, such as aggression and deception, longer term longitudinal designs are suggested. Longer term studies may also serve to elucidate any changes in the nature of relations between aggressive and deceptive behaviors across development. As this study serves to further highlight the relations between relational and physical aggression and deception behaviors, future research may also be able to shed light on the unique mechanisms through which these social behaviors are related.

In addition, the children who served as participants in this study were only from accredited and university-affiliated schools and were primarily of a middle-class background. As socioeconomic status has already been indicated as an important factor in the development of relational aggression (Bonica et al., 2003; McNeilly-Choque et al., 1996), future studies should strive to include children from a greater spectrum of demographic backgrounds and educational settings (e.g., private and publicly funded, accredited and nonaccredited). Examining issues such as the impact of school quality and the variability of aggression and deception behaviors across school contexts are important to the field's understanding of how these factors may moderate the development of these specific social behaviors. The majority of children who participated in this study were also typically developing. Therefore, future research should replicate our findings with a sample of atypically developing children, such as children with speech and language impairment (see Ostrov & Godleski, 2007). In addition, future research should consider important developmental tasks and atypical versus typical development in assessing aggressive behavior.

Future research needs to further demonstrate the reliability and validity of the CFS–TF measure of deception. Comparison with already-available assessments of deception, such as Wilson and colleagues' (2003) observational measure of deception and false statements, on which the present teacher-report measure was based, might be a good start. Moreover, experimental procedures designed to elicit deception (Keating & Heltman, 1994) would help researchers progress toward this goal.

Implications for Research, Policy, and Practice

Although the link between aggressive behaviors and deception has been long hypothesized, our findings suggest an important role of aggressive behaviors in the development of deception. Further, these results suggest that both physical and relational forms of aggression may serve a unique role in this development. Although the need for inclusion of both relational and physical forms of aggression into analyses has been well discussed (Crick & Zahn-Waxler, 2003), this study provides further evidence to this point. Given the research on the negative trajectories associated with deceptive (e.g., Lahey et al., 1999; Loeber & Dishion, 1983; Stouthamer-Loeber, 1986), as well as aggressive behaviors (e.g., Achenbach et al., 1995), the importance of understanding how these relations develop is significant. If the developmental links between aggression and deception are better understood, there exists the potential to enable clinicians to reduce negative developmental trajectories by targeted intervention of relational and physical aggression. Careful understanding of this relation has tremendous cost and feasibility implications for informing the integration of existing treatment protocols as well as the selection of these protocols by providers.

The findings in this study support the need for future large prospective studies on the development of relational and physical aggression and deception. Given the nature of aggressive and deceptive behaviors, research on the role of theory of mind, social information processing (Crick & Dodge, 1994), and social cognition may be important in the understanding of the underlying mechanisms of such behaviors. Investigations into the mediating and moderating factors in the development and maintenance of deceptive and aggressive behaviors may further facilitate the development of intervention approaches by providing insight into the pathways to later adjustment problems and psychopathology.

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