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Parent–Child Reciprocity? Parental Aggression and Oppositional Defiant Symptoms in Girls

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Parent–Child Reciprocity?

Parental Aggression and Oppositional Defiant Symptoms in Girls

Olivia J. Derella

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A Thesis

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RECIPROCAL RISKS FOR PARENTAL AGGRESSION AND ODD

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Master of Science Thesis

Parent–Child Reciprocity? Parental Aggression and Oppositional Defiant Symptoms in Girls

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Abstract

Objective. Evidence suggests that parents' verbal aggression, corporal punishment, and inter-partner conflict are linked to children's heightened conduct problems and oppositional defiant disorder (ODD). While children mutually influence parenting, strength of bidirectional relationships among these specific behaviors have been inconsistent across gender; further investigation is warranted to understand links between parental aggression and girls' ODD symptoms. The current study tests independent reciprocal effects between specific forms of parental aggression and girls' ODD dimensions of oppositionality, antagonism, and irritability.

Method. Annual data from the longitudinal Pittsburgh Girls Study were used to evaluate parental aggression and girls' ODD symptoms in a community sample ($N = 2,450$). From child ages 5-16, parents reported on girls' disruptive behaviors and their own aggression towards children and partners. Separate longitudinal generalized estimate equations examined parent and child behavior outcomes from predictors lagged by one timepoint. **Results.** After controlling for demographic factors, behavior stability, and other symptomology, corporal punishment predicted girls' increasing antagonism, parent-partner psychological aggression predicted both antagonism and irritability, and parent-child verbal aggression predicted increases across ODD dimensions. Girls' oppositionality and antagonism predicted increasing use of parent-child verbal aggression over time. **Conclusions.** Bidirectional associations emerged indicating that parents' use of verbal aggression towards daughters escalates reciprocally with girls' behavioral ODD symptoms, but not irritability, which only demonstrated an effect of parenting. These findings highlight the importance of examining specific aggressive parent behaviors and ODD dimensions to evaluate independent effects, and suggest that girls' ODD is most salient in transaction with parents' verbal aggression.

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Parent–Child Reciprocity? Parental Aggression and Oppositional Defiant Symptoms in Girls

Maladaptive parent-child interactions are a salient component of oppositional defiant disorder (ODD). This is supported by evidence that parenting behaviors contribute to the disorder's development (e.g., Harvey, Metcalfe, Herbert, & Fanton, 2011) and that effective treatments focus on changes in parenting behaviors (Eyberg, Nelson, & Boggs, 2008). Additionally, at the symptom level, evidence suggests that some behaviors are subject to reciprocal influence between parents and children (e.g., Burke, Pardini, & Loeber, 2008; Lavigne, Gouze, Hopkins, Bryant, & LeBailly, 2012). In the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* (American Psychiatric Association, 2013), ODD is included in the category of disruptive behavior disorders and is described as a pattern of angry/irritable mood, argumentative/defiant behavior, or vindictiveness persistent over at least six months. When compared to other clinic-referred youth without conduct problems, children with ODD demonstrate higher levels of psychiatric comorbidity, family dysfunction, and difficulties across social relationships (Greene et al., 2002). Though ODD influences development beyond adult-child relationships, the behaviors of children with ODD, including arguing, defying, blaming or annoying others, spitefulness, and temper outbursts, often explicitly challenge parents.

Among disruptive behavior disorders, ODD has been shown to particularly increase caregiver strain (Bussing, Gary, et al., 2003; Bussing, Zima, et al., 2003), which may contribute to increasingly maladaptive interaction patterns. Children's ODD symptoms are likely to emerge in tandem with inconsistent or timid discipline in line with Patterson's (1982) coercive model, and parenting children with ODD has also been characterized by lower involvement and poorer communication over time (Burke et al., 2008). These difficult dynamics within the parent-child

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dyad would suggest that ODD might be highly associated with more negative parenting practices, potentially including parental aggression. Research thus far has delved primarily into relationships between ODD and corporal punishment (e.g., Tung, Li, & Lee, 2012), with some focus on the role of inter-partner conflict (e.g., Burnette, 2013; Harvey et al., 2011). Less studied in the context of ODD, but perhaps equally important, is parents' use of verbally aggressive behaviors towards their children. These forms of parental aggression might function as risk factors for the development of ODD symptoms as well as outcomes of children's ODD-related behavior problems, warranting examination of both "parent effects" and "child effects" to better understand the relationships among these factors.

Corporal Punishment

When considering the most severe forms of physical parental aggression, researchers have found that physical abuse is often correlated with ODD symptoms. Maltreated preschoolers manifest anger and noncompliance at higher rates than nonmaltreated children (Ayoub et al., 2006), and ODD with comorbid attention-deficit/hyperactivity disorder (ADHD) is a common dual diagnosis for children in clinical settings who have experienced physical maltreatment (Ford et al., 2000). However, cross-sectional data such as these are limited in helping us understand the direction of parent-child effects. In addition, many children experience more mild parental aggression that, while not considered child maltreatment, may still be associated with problematic effects.

As highlighted across a number of meta-analyses and review articles (e.g., Benjet & Kazdin, 2003; Ferguson, 2013; Larzelere & Kuhn, 2005), corporal punishment, especially in its most mild forms, should not be conflated with child abuse. The feature distinguishing the two has traditionally been corporal punishment's goal of inflicting pain, but not injury, to reduce a

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child's undesired behavior (Lee, Altschul, & Gershoff, 2015). Still, definitional inconsistencies on the part of clinicians, researchers, and parents challenge conclusions regarding the effects of corporal punishment: interpretations of the term may range in severity, from mild spanking on a child's behind, to hitting with an object, to more severe physical punishment that might be perceived by some parents and clinicians as abusive (Benjet & Kazdin, 2003).

Regardless of the distinctions between corporal punishment and physical abuse, the American Academy of Pediatrics (1998) and the American Academy of Child & Adolescent Psychiatry (2012) have released policy statements recommending parents not spank or hit their children, citing evidence that corporal punishment is not more effective for long-term behavioral change than non-aggressive discipline and increases children's risk for aggression and poorer mental health (Gershoff, 2002). Even so, American parents continue to use corporal punishment at high rates in childhood. Parents responding to a 1995 Gallup telephone survey endorsed using corporal punishment in the past year at a peak rate of 94% for toddlers and over 50% for children aged 12 (Straus & Stewart, 1999). More recent research suggests lower rates for more narrowly defined spanking: in the 2000 National Survey of Early Childhood Health, 64% of parents of toddlers reported ever spanking their children, and 26% engaged in the behavior often. Parents who were often frustrated with their children's behavior and had lower wellbeing were at higher risk of frequently spanking (Regalado, Sareen, Inkelas, Wissow, & Halfon, 2004).

When considering corporal punishment as a broader spectrum of behaviors, both cross-sectional and longitudinal studies across recent years have consistently identified problematic outcomes for children's disruptive behaviors. Higher frequency spanking in the preschool years has been associated with increased child aggression at age five (Taylor, Manganello, Lee, & Rice, 2010) and more severe externalizing behaviors at age nine, especially for children who

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have experienced greater cumulative risk (MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel, 2014). Corporal punishment has also been linked to more conduct problems and ODD symptoms in middle childhood in both clinical (Frick, Christian, & Wootton, 1999) and community samples (Pederson & Fite, 2014; Tung et al., 2012).

The generalization of these findings should be considered with some caution due to definitional issues regarding corporal punishment, which may collapse mild spanking with more severe physical discipline. Critiques of Gershoff's (2002) meta-analysis have suggested that the long-term harms of spanking are inconclusive due to this conflation of severity levels, as well as overreliance on cross-sectional data (Ferguson, 2013; Larzelere & Kuhn, 2005). Some longitudinal studies suggest that in contrast to "harsh spanking," mild, infrequent spanking does not predict greater externalizing problems (Lansford, Wager, Bates, Pettit, & Dodge, 2012), and may improve immediate non-compliance (Gershoff, 2002; Larzelere & Kuhn, 2005), which would imply that clinicians need not discourage parents from using mild corporal punishment occasionally and with control. However, even when not directly predicting children's behavior problems, mild spanking is associated with later escalation to harsh spanking (Lansford, Wager, Bates, Pettit, et al., 2012), which may put children at increased risk over time. Additionally, in two separate longitudinal data sets, Lansford and colleagues (2011) demonstrated counter-evidence such that discipline severity did not moderate the relationship between corporal punishment and children's externalizing behaviors, with mild physical punishment still predicting negative outcomes.

Verbal Aggression

Distinct from corporal punishment, a large majority of parents engage in verbally aggressive tactics across childhood and adolescence (Straus & Field, 2003); these behaviors may

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have a disciplinary goal, but may also emerge out of frustration with children's misbehavior (Regalado et al., 2004). Verbally aggressive behaviors—at times labeled as negative verbalizations (Ferguson, 2013), verbal abuse (Evans, Simons, & Simons, 2012), or included in definitions of psychological aggression (e.g., Straus, Hamby, Finkelhor et al., 1998)—may include yelling, shouting, screaming, insulting, or making verbal threats. Some measures incorporate both spanking and verbal aggression into a single construct of “harsh punishment” (e.g., Hipwell et al., 2008), complicating conclusions that can be drawn about effects specific to parents' verbalizations. Research in this area is limited and has not focused specifically on relationships with ODD. The present evidence is mixed regarding whether parents' verbal aggression independently confers risk for children's problematic behaviors. Some studies support unique effects of verbal aggression: parents' insults and threats predict poorer child adjustment within both violent and non-violent homes (Moore & Pepler, 2006). Cross-sectional evidence implicates both maternal and paternal verbal aggression as unique predictors of externalizing problems when controlling for the effects of corporal punishment (McKee et al., 2007). In a longitudinal study of African American youth, verbal abuse at ages 10 to 12 predicted conduct disorder symptoms in adolescence across gender, independently of corporal punishment, which demonstrated a small effect only for boys (Evans et al., 2012).

On the other hand, some evidence suggests that this relationship depends on contextual factors. For example, children's exposure to other forms of aggression may amplify the potential harms of verbal aggression. Retrospective reports of childhood verbal abuse have been associated with greater anger and hostility in young adulthood, and the strongest effect was seen when young adults had also witnessed domestic violence while growing up (Teicher, Samson, Polcari, & McGreenery, 2006). Parent gender may also moderate these links, but findings are

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mixed. In contrast to the work of McKee and colleagues (2007), research conducted by LeRoy and colleagues (2014) found that paternal verbal aggression directly predicted behavior problems, while maternal verbal aggression only predicted externalizing symptoms if children also experienced severe physical aggression in the home. The lack of evidence specific to possible links between verbal aggression and children's development of ODD suggests a clear gap in need of investigation.

Family and Inter-Partner Conflict

Aspects of a maladaptive or aggressive family context beyond direct behavior towards children may also play a role in the development of children's externalizing and ODD symptoms. Deater-Deckard, Dodge, Bates, and Pettit (1998) found that higher externalizing problems were not only associated with harsher discipline, but also more parental conflict, among other risk factors such as exposure to violence. Parental hostility, family and marital conflict, and exposure to inter-partner violence in early childhood have also been associated with children's ODD (Burnette, 2013; Greene et al., 2002; Harvey et al., 2011; Lavigne, Gouze, Hopkins, & Bryant, 2016). However, these relationships may be weakened after controlling for the strong stability of ODD symptoms over time (Lavigne et al., 2016). Because ODD is associated with family dysfunction beyond the parent-child relationship (Greene et al., 2002), it is critical to investigate whether parental aggression in other forms, such as inter-partner conflict, independently contributes to changes in children's behavioral problems above and beyond aggression enacted towards the child. Establishing temporal precedence and controlling for outcome behavior at prior timepoints would also allow us to examine whether ODD symptoms contribute to parents' negative behaviors in romantic partnerships.

Child Effects: The Transactional Model

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Multiple forms of parental aggression are linked both cross-sectionally and longitudinally with children's behavioral dysfunction, but parent-directed effects do not fully capture the interactive nature of parent-child relationships. The transactional model of developmental psychopathology indicates that dysregulation and impairment may be shaped over time by children's reciprocal interactions with their environments (Cicchetti & Toth, 1997; Sameroff, 2009). Children's own disruptive behaviors and negative emotions in response to parents can exacerbate their risk for maladaptive relationships and long-term problematic outcomes. Researchers have called for greater focus on "the influential child" throughout development in order to better understand how children and caregivers elicit and respond to each other's behaviors in ways that increase risk or resilience over time (Davidov, Knafo-Noam, Serbin, & Moss, 2015). It is important to consider not only a parent's role in conferring risk for children's development of ODD symptoms, but also that the aversive qualities of children's defiance, anger and irritability symptoms may elicit greater parental aggression in these dyadic interactions.

There is evidence to suggest that children's characteristics impact parental aggression from very early ages: infants and toddlers with parent-reported difficult temperaments or greater fussiness are more likely to be spanked (Berlin et al., 2009; MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel, 2011). Bidirectional relationships have also been supported between maternal spanking and child aggression from ages one to three to five (Lee, Altschul, & Gershoff, 2013). Within a cross-sectional study, Lavigne and colleagues (2012) demonstrated that not only were family conflict and parental hostility directly predictive of greater ODD symptoms, but preschooler's ODD was also associated with greater parent hostility and depression. Bidirectional influences between caregivers and children continue to occur beyond early childhood (Gershoff, Lansford, Sexton, Davis-Kean, & Sameroff, 2012). Elementary-school-

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aged children with greater externalizing problems were found to experience more spanking and yelling in following years (Lansford, Wager, Bates, Dodge, & Pettit, 2012; Lansford, Wager, Bates, Pettit, et al., 2012). Among adolescents, physical punishment and teen misconduct predicted reciprocal increases over time (Wang & Kenny, 2014).

Despite perceptions that differences in corporal punishment normativity across cultural groups may protect against negative effects of parental aggression (e.g., Deater-Deckard, Dodge, Bates, & Pettit, 1996), evidence from several large scale longitudinal studies suggests that reciprocal effects between corporal punishment and children's externalizing behaviors are similarly problematic across diverse races, ethnicities, and cultures (Gershoff et al., 2012; Lansford et al., 2005, 2011; Wang & Kenny, 2014). Although family warmth is also often anticipated to buffer against the risks associated with corporal punishment, maladaptive reciprocal effects between parent and child problematic behaviors persist regardless of maternal warmth in early childhood and adolescence (Lee et al., 2013; Wang & Kenny, 2014).

Do Bidirectional Effects Differ by Gender?

Girls have historically received less attention in the field of disruptive behaviors, in part because of the gender gap favoring a larger prevalence among boys (Demmer, Hooley, Sheen, McGillivray, & Lum, 2017). When considering the role of parent-child interactions in the development of these problematic behaviors, it is critical to investigate whether the same dyadic processes are at play for girls as for boys. Parents, and especially fathers, tend to report greater rates of corporal punishment of sons than daughters (McKee et al., 2007), though Wang and Kenny (2014) have suggested that among adolescents, mothers demonstrate no difference in their rates of corporal punishment by child gender. Initial findings suggest that different mechanistic pathways may play a role in the effects of parental aggression on boys' versus girls'

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behavior problems. Among young Spanish children, corporal punishment has been implicated as a mechanism linking lower socioeconomic status to the risk of developing ODD, but only for girls (Granero, Louwaars, & Ezpeleta, 2015). A study of African American children suggested that for boys, both verbal abuse and corporal punishment indirectly predicted conduct problems in adolescence, largely through hostile attributions and reduced self-control. On the other hand, for girls, only verbal abuse demonstrated a mediated effect on conduct problems through mechanisms of increased anger and hostile attributions; corporal punishment was not predictive of later behavior (Evans et al., 2012).

Whether bidirectional parent-child effects are present for girls as well as boys is a question with limited exploration but intriguing contributions thus far. Certain mixed-gender samples indicate that girls' and boys' externalizing behaviors do not differ in their reciprocal contributions to parents' use of corporal punishment (Lansford et al., 2011; Wang & Kenny, 2014). In an all-female sample, reciprocal effects were found between harsh parenting and daughters' conduct problems (Hipwell et al., 2008). Though the female-only sample of Hipwell and colleagues (2008)—which is also the source for the data used in the present study—did not allow researchers to directly compare results between boys and girls, together these findings suggest that girls' disruptive behaviors are likely to play a role in eliciting more negative parenting. However, none of these studies specifically examined girls' ODD symptoms.

Despite this support for bidirectional effects across gender, a handful of studies have suggested that among children with behavioral problems including ODD, “parent effects” may be more consistently present for girls than boys, and boys may generate greater “child effects” on parenting. In samples of both American and Chinese children, harsh parenting impacted girls' externalizing and ODD symptoms to a greater degree than boys' symptoms (Burnette, 2013;

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Xing, Wang, Zhang, He, & Zhang, 2011); girls' behaviors did not contribute to escalations in corporal punishment, while boys' externalizing symptoms did (Xing et al., 2011). Within a clinical sample of boys, harsh punishment was not significantly related to the presence of ODD after accounting for the effects of comorbid conduct disorder (CD) and ADHD symptoms, demonstrating an absence of effect for boys' ODD symptoms specifically (Burke et al., 2008). Overall, these studies suggest that parental aggression may play an important role in the development of ODD for girls in particular, but evidence for reciprocal relationships from girls' behavior to parenting remains inconclusive. Additionally, ADHD and CD behaviors frequently co-occur with ODD (e.g., Maughan, Rowe, Messer, Goodman, & Meltzer, 2004), and thus it is critical to disentangle the independent effects associated with each symptom profile. Since, to our knowledge, no studies of these reciprocal effects in girls have examined ADHD, CD, and ODD simultaneously (e.g., Burnette, 2013; Granero et al., 2015; Hipwell et al., 2008), it is also unclear whether inconsistent findings across gender are related to whether or not comorbid symptoms are taken into account.

Development of ODD in Girls

Studies suggesting gender differences in the relationships between parental aggression and children's ODD are particularly important as they may contribute to elucidating the gender disparities in the rates of ODD. A recent meta-analysis indicates that boys and girls meet diagnostic criteria for ODD at a ratio of 1.59 to 1 (Demmer et al., 2017). In addition, the trajectories of ODD rates differ over development between boys, whose rates demonstrate stability over time, and girls, whose prevalence increases in a curvilinear fashion into adolescence and early adulthood (Leadbeater, Thompson, & Gruppuso, 2012). Enhanced

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understanding of the role of parenting in girls' development of ODD may help identify risk factors or relational mechanisms implicated in these gender-disparate trajectories.

ODD Dimensionality

Examining the multi-dimensional nature of ODD symptoms might also help bring clarity to current gaps in the literature examining reciprocal effects between parents' and girls' behaviors. ODD is distinct among externalizing behaviors for its robust risks for CD as well as depression and anxiety (e.g., Hipwell et al., 2011; Stringaris & Goodman, 2009a, 2009b). Recent research has identified that the structure of ODD helps explain this heterotypic continuity, with specific symptom dimensions predicting differential comorbidity both concurrently and long term (Burke, Hipwell, & Loeber, 2010; Hipwell et al., 2011; Stringaris & Goodman, 2009a, 2009b). Though symptoms may cluster and be labeled somewhat differently across samples, behavioral dimensions (also labeled "headstrong," "oppositional," or "antagonistic" behavior) consistently predict later CD, and an irritability dimension (also labeled "negative affect" or "emotionally dysregulated") predicts depression through young adulthood (Burke, 2012; Stringaris, Cohen, Pine, & Leibenluft, 2009). These symptom dimensions have demonstrated gender invariance, with ODD symptoms manifesting similarly for boys and girls (Lavigne, Bryant, Hopkins, & Gouze, 2015).

Despite advances over the last several years in identifying the structure of ODD, very few studies have empirically assessed associations between forms of parental aggression and specific ODD dimensions, and none have evaluated potential bidirectional effects. Research thus far has contributed some understanding to the interaction of parenting with irritability symptoms (i.e., "touchy," "angry," and "temper" or "spiteful"), indicating that harsh parenting may be associated with greater irritability for both girls and boys. However, irritability may play a different

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mechanistic role for boys, mediating the relationship between harsh parenting and boys' status as bully-victims (Whelan, Kretschmer, & Barker, 2014). In addition, differential treatment response to a caregiving intervention for oppositionality suggested that children with irritability might be especially sensitive to both positive and negative parenting behaviors (Scott & O'Connor, 2012).

Ford (2002) proposed a model in which parental physical aggression might heighten the risk for ODD via increased anger, hypervigilance, and difficulty self-regulating. Though Ford was specifically considering children who are victims of maltreatment, this model's emphasis on anger and emotional dysregulation may still have utility in understanding developmental processes towards ODD for children who experience lower levels of parental aggression. This type of pathway has been explored in a sample of African American children: for girls specifically, increased anger and frustration was the primary mechanism through which parents' verbal abuse predicted later conduct problems (Evans et al., 2012). This finding of problematic affective and behavioral outcomes, in combination with past research supporting reciprocal effects of children's externalizing behavior and parenting (e.g., Lansford et al., 2011), suggests that parental aggression would impact not only irritability, but the behavioral dimensions of ODD as well. However, models considering multiple dimensions of ODD have not been tested.

The Current Study

While evidence is growing that parental aggression is associated with detrimental effects on girls' ODD (Burnette, 2013; Granero et al., 2015), with limited support for specific links to irritability (Whelan et al., 2014), it remains unclear whether parenting exerts differential influence on the development of behavioral and irritability symptoms of ODD over time. In addition, because this disorder captures a group of children whose combination of externalizing and mood symptoms may be highly aversive to parents, it is important to consider whether

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oppositonality, antagonistic behaviors, and chronic irritability independently elicit different parenting behaviors and put children at greater risk of later parental aggression. The current analyses tested hypothesized reciprocal effects between children's ODD dimensions and parental aggressive behavior in a longitudinal community sample of girls in the Pittsburgh Girls Study. Specifically examined are parents' use of corporal punishment and verbal aggression towards their children and psychological aggression towards their partners. To evaluate the emergence of ODD symptoms into adolescence, data from ages five to 16 were evaluated. This study addresses gaps in the research by applying a transactional framework to the experience of parental aggression and girls' ODD symptoms, to assess whether these behaviors develop through bidirectional relationships between caregivers and daughters (Cicchetti & Toth, 1997; Davidov et al., 2015). By incorporating the multidimensional structure of ODD and investigating specific parenting behaviors, this study may help pinpoint risk factors in the trajectories of girls' ODD symptoms across development and suggest implications for comorbid dysfunction.

Method

Participants

At baseline, the Pittsburgh Girls Study (PGS) included a sample of 2,450 girls between the ages of five and eight across four age cohorts. Girls were recruited to participate in the study following enumeration of households in 90 neighborhoods in the city of Pittsburgh. Of the 23 lowest income neighborhoods, all households were enumerated, while 50% of households were accounted for of the 66 remaining neighborhoods. Of 3,118 girls identified as potential participants based on age during the enumeration process, 242 children were ineligible (e.g., due to developmental disability, non-English-speaking caregiver) or lost to contact. 2,875 children remained eligible to participate, and of these, 2,451 girls (85.3%) consented to study wave 1

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participation. One child had no completed measures and was dropped from study participation. Cohorts at baseline included 588 five-year-olds, 630 six-year-olds, 611 seven-year-olds, and 622 eight-year-olds.

Girls included at study wave 1 were predominantly African-American (52.4%) or Caucasian (40.8%), with 6.8% of the sample self-identifying as being of mixed or other race. Oversampling for low-income neighborhoods resulted in 40.9% of girls included from the lowest-income neighborhoods, and 59.1% of girls from remaining neighborhoods. In this sample, 25% of the households earned less than \$15,000 per year, below the 2001 US poverty threshold of \$17,960 per year. Most girls in the sample had a female primary caregiver (93%) who was also a biological parent (92%), and more than half (56-61%) of parents were living with a spouse or partner (for further detail, see Hipwell, Loeber, Stouthamer-Loeber et al., 2002). Data from PGS waves 1 through 12 were utilized for the current analyses to incorporate all age 16 data. Participant follow-up rates were above 91% from waves 2 through 7, and above 85% from waves 8 through 12 of the study.

Procedure

Data for the PGS were collected annually from participant girls, parents, and teachers from 2000 to the present. Teacher reports were not used in the present analyses. Prior to completing measures, parents gave written informed consent and girls gave verbal assent. Of parents of girls attending school, 99.2% also gave consent for teacher contact and inclusion. Age-related differences in measure applicability (e.g., five-year-olds being unable to complete self-report questionnaires) resulted in certain measures being completed by different reporters across years. To maintain consistency in respondent across waves for the current study, only parent-report data was evaluated from child ages five through 16. Trained interviewers

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administered measures to parents and girls separately over the course of a few hours using a laptop computer. Parents also completed paper questionnaires. All interviewees were compensated for their participation at each data collection point. Study procedures were approved by the University of Pittsburgh Institutional Review Board.

Measures

A parent-reported demographics questionnaire developed for use in the Pittsburgh Youth Study (Loeber et al., 1998) was administered to assess child race and ethnicity at baseline and financial status at each wave. For the current study, dichotomous variables were generated for race (0 = Caucasian child; 1 = child of a racial/ethnic minority group) and financial status (0 = not receiving public assistance; 1 = receiving). Neighborhood risk at baseline was assessed using the Your Neighborhood questionnaire, which asked caregivers to endorse whether specific risky or criminal activities (e.g., vandalism, burglaries, assaults) were problems in their neighborhood (Stouthamer-Loeber & Stallings, 2008). All other measures were administered annually, and only parent-reported data were used.

Parent-to-Child Aggression. A modified version of the *Conflict Tactics Scale – Parent/Child* (CTSPC; Straus et al., 1998) was used to assess parenting behaviors during conflict via parent report at child ages five to six, and via both parent and child report at child age seven and up. Ten items of the CTSPC were used to assess specific primary caregiver behaviors directed towards the child in response to perceived misbehavior, with prompts of “When your daughter did something she was not allowed to do, how often did you...” Items were scored on a three-point scale from “never” (1) to “often” (3) and were summed within subscales to yield construct scores for nonviolent discipline (4 items; e.g., using “time out,” taking away privileges), parent-to-child verbal aggression (5 items; swearing or cursing, threatening to spank

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or hit, threatening expulsion from the home, verbally berating, and shouting or screaming), and corporal punishment (1 item; spank or hit). Only the parent-child verbal aggression and corporal punishment items were used in the current analyses. A construct combining verbal aggression and corporal punishment has demonstrated, in data from this study, a Cronbach's alpha of .72 (Hipwell et al., 2008).

Parent-to-Partner Aggression. The *Revised Conflict Tactics Scale – Romantic Partner* (CTS; Straus, Hamby, Boney-McCoy, & Sugarman, 1996) is a widely used measure of inter-partner or relationship violence. In the PGS, a caregiver completed the CTS about her or his own romantic relationship. In the current study, a construct of parent-to-partner psychological aggression was created from the summed scores of six items assessing caregivers' self-reported aggressive behaviors towards their partners during arguments, including insulting or swearing at him/her, physically threatening him/her, stomping out of the room or house, and physical destruction or throwing of objects. Items were scored categorically by increasing frequency of the behavior over the past year, ranging from "never" (0) to "more than 20 times" (6; Straus et al., 1996). The CTS has demonstrated strong test-retest reliability over a two-month period (Vega & O'Leary, 2007), and among high-risk mothers, the psychological aggression subscale has shown good internal consistency ($\alpha = .77$; Newton, Connelly, & Landsverk, 2001).

Psychological Symptoms. Mental health symptoms were evaluated via parent report using the *Child Symptom Inventory-4* (CSI-4; age 5 to 12) and *Adolescent Symptom Inventory-4* (ASI-4; age 13 and up; Gadow & Sprafkin, 2002). The CSI-4/ASI-4 questionnaire addresses youth affective and behavioral symptoms according to DSM-IV diagnostic criteria. Parents responded to items regarding the frequency of specific symptoms on a four-point Likert severity scale: "Never" (0), "Sometimes" (1), "Often" (2), or "Very Often" (3). For the current analyses,

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CSI-4/ASI-4 symptom severity of ODD (8 items), ADHD (18 items), and CD (11 items) were examined. The CSI-4/ASI-4 has demonstrated high sensitivity in identifying children with disruptive behavior disorders and depression, as well as concurrent validity in distinguishing diagnosed children from a non-clinical control sample (Gadow & Sprafkin, 1994). Within this sample, studies have demonstrated moderate to good internal consistency of the CSI-4/ASI-4 across disorders: Hyperactivity/Impulsivity $\alpha = .86$ (Hipwell et al., 2008); CD $\alpha = .69$ (study wave 6) to $.80$ (study wave 10; Hipwell et al., 2011).

The dimensionality of ODD was further examined using symptom assignment to three dimensions consistent with prior exploratory factor analysis within the PGS sample (Boylan et al., 2016; Burke et al., 2010). While the DSM-5 accounts for three dimensions of ODD, symptom assignment differs across studies (e.g., Burke et al., 2014). For the current analyses, the factor structure of ODD best fitting this sample was selected (Figure 1), in which an Irritability dimension was comprised of the symptoms “touchy,” “angry,” and “spiteful.” This is consistent with symptom dimensions identified in a community sample of children (Lavigne et al., 2015) and among clinic-referred boys (Burke, 2012; Burke & Loeber, 2010). The symptoms “loses temper,” “argues,” and “defies” were assigned to a dimension of Oppositionality, while “annoys” and “blames others” were assigned to a dimension of Antagonism. Prior evaluation of internal consistency of ODD dimensions within the PGS sample suggests moderate to good reliability across timepoints, with Cronbach’s α for irritability ranging from $.71$ (age 5) to $.80$ (age 12), for oppositionality from $.64$ (age 5) to $.80$ (age 12), and for antagonism from $.56$ (age 5) to $.71$ (age 12; Boylan et al., 2016).

Data Analytic Plan

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The accelerated cohort design of the PGS resulted in a large proportion of missingness of outcome variables at age five (76%), six (51%), and seven (27.3%); increasing rates of attrition, though relatively low, largely account for missingness between 10 to 15% across ages 13 to 16. To examine separate predictions from parent to child behavior (Figure 2) and from child to parent behavior (Figure 3), population-averaged multivariate generalized estimating equations (GEE) models were conducted using STATA, Version 14 (StataCorp, 2015). This analytic strategy has the additional advantage of demonstrating robustness to unbalanced designs, in which some participants contribute more measurement occasions than others (Diggle et al., 1994), as is true in the present analyses.

Poisson models were determined to best represent the mean structure in all cases except in the prediction of parent-child verbal aggression, for which a Gaussian model was appropriate. GEE models account for clustered non-independent observations of individuals over time, and robust standard errors were specified in each model. To model longitudinal effects, time-varying predictor variables were lagged by one timepoint relative to the outcome variable, thus demonstrating the effect of prior year measurement (time $T - 1$) associated with the outcome (time T). Since autoregressive effects for each outcome were modeled by including the prior wave value of the outcome as a predictor, the remaining covariance structure was specified as independent. Examinations of diagnostic plots of residuals for each model suggested no concerns.

To adjust for intentional oversampling of lower-income neighborhoods in the PGS, all models included sampling weights of 0.67 for low-income neighborhoods and 1.23 for remaining neighborhoods. To avoid bias due to the large sample size and multiple comparisons, an alpha level of $p = .001$ was selected to identify significant effects. Coefficients are reported as

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incidence rate ratios (IRR), which estimate the proportion difference in the outcome score based on a one unit change in the predictor.

Inclusion of Covariates. Model covariates were selected based on evidence suggesting meaningful associations with both predictors and outcomes of interest. Age was included as a covariate for models predicting both parenting and child behavior. In addition, because these trajectories may not be linear, a quadratic effect of age was tested in all models; if the quadratic term was significant, it was included as a covariate in final models (see Tables 3, 4). To assess possible moderator effects of age on both parent and child outcomes, age was tested as an interaction term for all key predictor variables, but no significant findings emerged.

Studies suggest that demographic factors such as lower socioeconomic status independently predict increasing discipline severity (Lansford et al., 2009) and do not fully account for main effects of race on rates of harsh parenting (Hipwell et al., 2008). It is thus important to account for the possible differences in rates of parental aggression across racial and ethnic groups demonstrated in several large community samples (Coley, Kull, & Carrano, 2014; Gershoff et al., 2012; Hipwell et al., 2008; Lansford et al., 2009; Wang & Kenny, 2014). Thus, demographic variables included as covariates in all models were those (1) indicating baseline neighborhood risk, (2) whether participant families received public assistance in the prior year, and (3) whether parents identified minority race or ethnicity on the part of the child.

Comorbid symptomology other than ODD symptoms may also contribute to changes in parental aggression or ODD dimensions over time (e.g., Burke et al., 2008). The inclusion of lagged ADHD and CD symptoms as time-varying covariates in all models provided a more conservative estimate of the unique effects associated with each ODD dimension. Additionally, prior studies examining reciprocal effects of parent and child behaviors have not consistently

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accounted for the influence of behavior stability over time (Gershoff, 2002). The current analyses controlled for prior wave level of each outcome variable to evaluate relationships after accounting for autoregressive effects.

Results

Descriptive Statistics

Means and standard deviations of outcome variables across study ages are depicted in Table 1. Mean levels of ODD-antagonism, parent-partner psychological aggression, and corporal punishment declined across ages five to 16, while ODD-irritability, ODD-oppositionality, and parent-child verbal aggression demonstrated different patterns. Possible non-linear trends associated with age were subsequently tested for all outcome variables with a quadratic age term.

Bivariate correlations between dimensions of ODD and other variables largely strengthened across timepoints (Table 2). As would be expected, ODD dimensions were more strongly correlated with each other than with parenting behaviors. Parenting behaviors demonstrated less consistent bivariate correlational patterns, tending to peak in middle childhood to early adolescence, and declining again in strength by age 15. Nearly all autoregressive correlations strengthened over time, suggesting that girls' and parents' behaviors become increasingly stable as years go by. However, autoregressive correlations of corporal punishment weakened over time, suggesting that this particular behavior may become less stable over time.

Demographic Variable Effects

When all variables were included in the model, age was significantly positively related to each ODD dimension, and a quadratic age term was non-significant for oppositionality, suggesting that girls' oppositional behaviors increase in a linear fashion over time (Table 3). Quadratic age was significantly related to antagonism and irritability, both of which

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demonstrated a concave non-linear trajectory. Age was significantly negatively related to later corporal punishment and parent-partner psychological aggression, indicating that these parent behaviors decline as girls get older (Table 4). A quadratic age term was significantly related to parent-child verbal aggression, with a concave non-linear trajectory as age increases.

Neighborhood risk and receiving public assistance were not significantly related to ODD symptom dimensions (Table 3). Living in higher-risk neighborhoods at baseline was associated with significantly higher levels of parent-child verbal aggression (Table 4). Receiving public assistance was significantly associated with higher levels of both parent-partner and parent-child verbal aggression in the next year, but did not predict change in corporal punishment (Table 4). After controlling for demographic factors of neighborhood risk and receiving public assistance, girls of minority race/ethnicity experienced higher levels of corporal punishment and parent-child verbal aggression (Table 4). Caucasian girls displayed higher levels of oppositional behavior and irritability (Table 3); antagonistic behavior was unrelated to race.

Parent to Child Effects

Table 3 displays results of generalized estimating equations testing effects of parental aggression (time $T - 1$) on later child symptomology (time T). All ODD dimensions at prior timepoints demonstrated significant autoregressive effects, and these dimensions also predicted each other. Girls' ADHD, but not CD, severity at the prior wave significantly predicted higher symptom severity across ODD dimensions. Controlling for children's symptoms at prior timepoints, corporal punishment independently predicted significant increases in girls' antagonism but was not significantly related to irritability and oppositionality. Verbal aggression directed towards girls significantly predicted all three ODD dimensions, and psychological

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aggression towards partners predicted increases in girls' antagonism and irritability, but not oppositionality.

Child to Parent Effects

Table 4 displays results of GEE models testing effects of child symptomology (time T – 1) on later parental aggression (time T), controlling for significant autoregressive effects of corporal punishment, parent-child verbal aggression, and parent-partner psychological aggression, respectively. Parents were found to engage in increasing levels of corporal punishment and verbal aggression towards their daughters if the girls had higher levels of ADHD. CD severity was not significantly related to parental aggression. Girls' ODD dimensions did not significantly predict parents' use of corporal punishment or parent-partner psychological aggression. Both oppositional (i.e., argues, defies, temper) and antagonistic behaviors (i.e., blames, annoys) significantly contributed to parents' increasing verbal aggression toward girls. Girls' irritability symptoms (i.e., angry, touchy, spiteful) did not predict any domains of parental aggression.

Discussion

The current study sought to identify whether bidirectional relationships between parents' and children's behaviors contribute to the development of aggressive parenting and ODD symptoms in girls. By testing associations of ODD dimensions with specific forms of parental aggression across a large developmental span, this study has expanded upon the limited literature thus far exploring how ODD in girls is both impacted by and reciprocally influences parenting. Evaluating parenting behaviors separately and including verbal and psychological aggression in addition to corporal punishment, strengthens conclusions that can be drawn regarding unique associations with different forms of parental aggression. Additionally, to isolate effects

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associated with ODD independent of other externalizing behavior problems, the analyses incorporated girls' comorbid ADHD and CD symptomology and accounted for significant stability of the outcomes of interest, offering a conservative estimate of the effects of ODD on outcomes.

Parent Effects

While corporal punishment has in other studies predicted greater externalizing behaviors, aggression, and overall ODD symptoms (e.g., MacKenzie et al., 2014; Pederson & Fite, 2014), the current study demonstrated associations differing in strength across ODD dimensions.

Corporal punishment significantly predicted later increases in antagonism, while associations with irritability and oppositionality were nonsignificant. These results indicate that despite prior research supporting immediate compliance following spanking (Gershoff, 2002; Larzelere & Kuhn, 2005), oppositional behavior does not improve over time with greater use of corporal punishment, and antagonistic behaviors may worsen. In contrast to corporal punishment, parent-to-child verbal aggression consistently predicted increases in girls' symptoms across irritability, antagonistic behaviors, and oppositional behaviors. Parents who engaged more frequently in behaviors such as shouting, name-calling, or berating in response to girls' misbehavior reported more severe ODD symptoms over time, even after controlling for prior levels of girls' behavior problems.

Furthermore, parent-partner psychological aggression was also associated with worsening antagonism and irritability on the part of girls over time, even though these parenting behaviors were not specifically targeted at daughters. These effects were also independent of other parental aggression directed towards children. The current study did not examine the presence of the caregiver's partner in the home environment; future studies exploring associations with inter-

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partner conflict should identify whether direct exposure to parent-partner aggression is needed to put children at risk for increasing ODD symptoms. In addition, it is unclear from the current findings through what pathway inter-partner conflict contributes to children's behavior problems. Though not tested in the current study, inter-partner conflict in this form might operate through several mechanisms to play an indirect role in the development of ODD. Psychological aggression towards partners might be associated with increased parental stress, or it might contribute to a family climate of hostility and poor problem solving, of which inter-partner conflict could be one manifestation.

Overall, these three domains of aggressive parent behaviors appear to play distinct roles in the increasing severity of girls' ODD symptoms. These findings are consistent with a large body of research suggesting not only that aggressive disciplinary tactics are ineffective ways to modify undesired behavior, but may also predict girls' increasingly problematic behavior. Though parent-to-child verbal aggression has received less specific focus than corporal punishment, its contributions to children's ODD symptoms across behavioral and affective dimensions suggest that parents' engagement in verbal aggression might function as an important risk factor for children's maladaptive trajectories. The current study's lack of significant prediction from corporal punishment to all ODD dimensions is somewhat inconsistent with robust prior findings regarding escalation of children's externalizing behaviors, but few of these studies specifically examined ODD while also controlling for comorbid ADHD and CD symptoms.

When considering the contribution of parenting behaviors to child trajectories, this study underscores the importance of examining the different dimensions of ODD. Since irritability has been linked to outcomes of depression and anxiety (e.g., Burke, Hipwell, & Loeber, 2010), these

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trajectories may be more likely to arise from processes related to verbal aggression towards the child, or psychological aggression between a parent and partner, than as an outcome from corporal punishment. In contrast, though evidence is scant regarding outcomes specific to antagonistic behaviors of ODD, we might hypothesize that children who experience corporal punishment and subsequently engage in more blaming or deliberately annoying others could follow a trajectory towards greater social problems with peers and teachers, as well as parents.

Child Effects

This study also supports the transactional nature of parent-child relationships. Results suggest that parent-child verbal aggression and the behavioral symptom dimensions of oppositionality and antagonism escalate reciprocally over time. Higher levels of girls' ADHD symptoms also significantly predicted increasing verbal aggression. As girls' ODD and ADHD behaviors become more frequent or severe, parents may experience greater strain and frustration and increasingly respond to misbehavior with ineffective tactics such as verbal aggression. However, because parent stress was not explicitly tested in the current study, this mechanism remains hypothetical and should be tested in future studies.

Contrary to hypothesized bidirectional effects, girls' ODD symptoms did not predict use of corporal punishment after accounting for the significant contribution of ADHD symptoms over time. Given that ODD and ADHD are highly comorbid, researchers must recognize that specific symptom clusters may contribute in different ways to escalated risk for aggressive parenting. These findings deepen prior studies of reciprocal effects between parenting and girls' externalizing problems, emphasizing that the specific form of behavior matters when examining the possible negative impacts of both girls' disruptive behavior symptoms and parental aggression. On the other hand, girls' behavior problems across ODD, ADHD, and CD did not

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significantly predict change in parent-partner psychological aggression, suggesting that the effects of girls' externalizing behaviors on parenting may not carry over to parents' aggression within romantic relationships. These results contrast with other studies suggesting that ADHD, especially with ODD and CD symptoms, is associated with elevated rates of parents' divorce or relationship dissolution (Bussing, Zima, et al., 2003; Wymbs, Pelham, Molina, et al., 2008); it will be important for future research to investigate why these discrepant results might exist.

Limitations

Limitations are inherent in single-respondent questionnaire based research. Parents reporting on both their own and their children's behaviors may inflate relationships between variables. Additionally, retrospective reports, perhaps especially when they evaluate behaviors across the past year, may be inaccurate for a number of reasons (e.g., Benjet & Kazdin, 2004). Parents may not accurately remember the frequency of their own or their children's behaviors. Social desirability biases may also lead parents to under-report their own problematic disciplinary tactics, which may have contributed to non-significant findings regarding corporal punishment in contrast to earlier studies. While parents may also under-report or over-report their children's disruptive behaviors, prior research indicates that the prevalence rate of high severity ODD within the Pittsburgh Girls Study—six to eight percent across ages five to 12—is comparable to other community samples (Boylan et al., 2016), suggesting minimal impact of parent response bias for children's symptoms.

Still, within this community sample, lower rates of ODD and aggressive parenting may be present than would be found in a clinical sample, possibly attenuating findings regarding the relationships among variables. The relationship between parenting behaviors and parent-reported symptoms may also be context-dependent (e.g., Lavigne, Dahl, Gouze, et al., 2015), and we cannot determine from the current study whether these parenting factors are associated with

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children's ODD behaviors in other contexts such as school. Though the weighted analyses of this female-only urban sample were representative of girls living in the city of Pittsburgh at the time of data collection, these findings may not generalize to girls living in different socioeconomic or cultural contexts or to boys.

While children and parents likely exert mutual influence in their relationships from birth, the current study began longitudinal data collection of all variables at baseline ages of five to eight. Both ODD symptoms and maladaptive family processes may emerge during the preschool years (Harvey et al., 2011). This limits our ability to describe early manifestations of the relationships involved in this study, and to identify earlier indicators of risk in infancy, toddlerhood, and preschool age. Additionally, the modeling strategy used in this study did not simultaneously test both directions of effect between parents and girls, which limits conclusions regarding concurrent relational transactions from year to year. As with all questionnaire-based studies, despite conservative longitudinal testing controlling for prior wave levels of behaviors, the research design prevents conclusions regarding causality between parent and child behaviors.

Also complicating the integration of these results with prior research is measurement inconsistency and lack of specificity. The current study is limited in its ability to disentangle the complex mixed findings regarding negative effects on children associated with mild, occasional spanking (e.g., Ferguson, 2013; Lansford et al., 2012a). Unfortunately, the current study was unable to determine severity level, amount of control, or disciplinary context of spanking or hitting in its single-item measurement of corporal punishment. It is thus uncertain whether parents who endorsed this item were engaging only in mild controlled spanking or also in more severe physical punishment. We are unable to address whether the severity level of corporal

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punishment captured within the item “spank or hit” would moderate the significant prediction from corporal punishment to ODD antagonism in this sample.

Future Directions

The current sample consisted predominantly of mothers reporting on their own and their daughters’ behaviors, and moderation by parent gender was not examined. However, research has implicated parent gender as a meaningful factor influencing the relationships among parenting, parent psychopathology, and children’s disruptive behaviors (e.g., Harvey et al., 2011; LeRoy et al., 2014). Thus, future studies might oversample for equal proportions of mothers and fathers to examine differential bidirectional influences among maternal and paternal behaviors and ODD development. The current findings should also be replicated in a mixed-gender or boys-only sample to enhance understanding of whether parental aggression contributes to the development of ODD dimensions in both boys and girls, and whether boys’ ODD symptoms play a different role in eliciting negative parent behaviors.

Though the incorporation of gene by environment interactions has been limited in longitudinal research of ODD and parenting, one study has implicated a strong heritability component for the stability of both ODD symptoms and parent-child conflict, with reciprocal effects impacted by both environmental and genetic components (Burt, McGue, Krueger, & Iacono, 2005). Another study has suggested that the relationship between ODD and self-blame for inter-parent conflict may be moderated by a child’s 5HTTLPR genotype (Martel, Nikolas, Jernigan, Friderici, & Nigg, 2012). Prospective research designs should make efforts to include genetic sampling to further explore this intriguing line of inquiry suggesting differential sensitivity to negative parenting.

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The current findings highlight parent-child verbal aggression as a possible contributing factor to the exacerbation of girls' ODD symptoms across dimensions, as well as risks for increasing antagonistic behaviors in particular with parents' use of corporal punishment. Given the meaningful associations of ODD dimensions with social dysfunction and prediction to later conduct disorder and depression, it may be fruitful to further explore whether an interaction between ODD symptoms and parental aggression would predict heightened risk for these trajectories as well. These findings also indicate important treatment targets for family-based interventions for ODD in girls. Two-pronged interventions that target both parents' and girls' behaviors may be most effective to prevent reciprocal escalations of negative interactions over time.

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Table 1. *Descriptive statistics of outcome variables and covariate symptoms over time.*

Age		5	6	7	8	9	10	11	12	13	14	15	16
ODD-Irritability	M	1.80	1.73	1.67	1.72	1.64	1.66	1.73	1.75	1.73	1.74	1.78	1.70
	SD	1.26	1.32	1.38	1.42	1.47	1.53	1.54	1.54	1.56	1.60	1.67	1.59
ODD-Oppositionality	M	2.51	2.27	2.20	2.09	2.02	1.98	2.01	2.09	2.17	2.21	2.26	2.18
	SD	1.63	1.53	1.60	1.58	1.62	1.63	1.67	1.71	1.77	1.80	1.83	1.82
ODD-Antagonism	M	1.79	1.67	1.59	1.58	1.49	1.43	1.47	1.38	1.34	1.26	1.25	1.16
	SD	1.07	1.05	1.08	1.09	1.10	1.15	1.18	1.12	1.19	1.18	1.19	1.19
Parent-Partner Psychological Aggression	M	8.83	8.77	8.60	8.46	7.81	7.35	7.17	7.04	7.08	6.40	6.18	6.13
	SD	7.13	6.78	7.05	6.87	6.77	6.40	6.46	6.45	6.42	6.28	6.21	6.32
Parent-Child Verbal Aggression	M	7.55	7.65	7.72	7.74	7.73	7.67	7.76	7.75	7.66	7.64	7.59	7.45
	SD	1.40	1.43	1.53	1.60	1.66	1.66	1.75	1.82	1.84	1.88	1.92	1.90
Parent-Child Corporal Punishment	M	1.60	1.61	1.56	1.51	1.46	1.40	1.37	1.32	1.29	1.24	1.21	1.16
	SD	0.51	0.51	0.52	0.51	0.51	0.50	0.49	0.48	0.46	0.43	0.42	0.38

Note. Score range was as follows: *ODD-Irritability* 0 – 9; *ODD-Oppositionality* 0 – 9; *ODD-Antagonism* 0 – 6; *Parent-Partner Psychological Aggression* 0 - 36; *Parent-Child Verbal Aggression* 5 – 15; *Corporal Punishment* 1 – 3.

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Table 2. *Bivariate and autoregressive correlations of outcome variables over time.*

Age	5	6	7	8	9	10	11	12	13	14	15	16
<i>IRR/IRR</i>	1	.432**	.508**	.551**	.554**	.557**	.575**	.572**	.575**	.576**	.611**	.610**
<i>OPP/OPP</i>	1	.557**	.630**	.645**	.650**	.650**	.670**	.658**	.670**	.669**	.679**	.687**
<i>ANT/ANT</i>	1	.422**	.504**	.558**	.532**	.559**	.605**	.575**	.593**	.556**	.564**	.593**
<i>IRR/OPP</i>	.569**	.534**	.538**	.576**	.586**	.602**	.650**	.677**	.674**	.709**	.724**	.724**
<i>IRR/ANT</i>	.499**	.478**	.552**	.584**	.600**	.634**	.674**	.682**	.683**	.707**	.712**	.725**
<i>OPP/ANT</i>	.456**	.392**	.501**	.427**	.511**	.566**	.558**	.599**	.616**	.643**	.673**	.678**
<i>PPA/PPA</i>	1	.601**	.669**	.674**	.695**	.699**	.692**	.680**	.707**	.686**	.670**	.691**
<i>CVA/CVA</i>	1	.576**	.617**	.639**	.675**	.655**	.693**	.697**	.682**	.677**	.697**	.700**
<i>CP/CP</i>	1	.541**	.515**	.572**	.522**	.552**	.552**	.562**	.530**	.518**	.458**	.444**
<i>PPA/CVA</i>	.281**	.330**	.366**	.379**	.370**	.371**	.405**	.358**	.393**	.351**	.348**	.369**
<i>PPA/CP</i>	.072	.162**	.178**	.208**	.202**	.212**	.181**	.150**	.194**	.166**	.221**	.170**
<i>CP/CVA</i>	.432**	.474**	.478**	.470**	.500**	.479**	.485**	.474**	.512**	.495**	.470**	.462**
<i>IRR/PPA</i>	.100*	.203**	.228**	.183**	.245**	.254**	.215**	.241**	.287**	.253**	.238**	.248**
<i>OPP/PPA</i>	0.055	.098**	.119**	.124**	.188**	.185**	.177**	.233**	.225**	.222**	.223**	.260**
<i>ANT/PPA</i>	0.088	.229**	.251**	.238**	.250**	.266**	.249**	.277**	.283**	.234**	.238**	.260**
<i>IRR/CVA</i>	.216**	.178**	.193**	.229**	.286**	.307**	.282**	.324**	.352**	.342**	.354**	.334**
<i>OPP/CVA</i>	.166**	.106**	.182**	.221**	.261**	.289**	.271**	.310**	.353**	.349**	.383**	.355**
<i>ANT/CVA</i>	.228**	.252**	.267**	.283**	.319**	.346**	.351**	.357**	.378**	.359**	.385**	.377**
<i>IRR/CP</i>	.115**	.098**	.128**	.142**	.178**	.188**	.148**	.204**	.206**	.147**	.150**	.162**
<i>OPP/CP</i>	.106*	.062*	.100**	.085**	.139**	.123**	.115**	.139**	.174**	.152**	.159**	.139**
<i>ANT/CP</i>	.125**	.133**	.178**	.176**	.213**	.220**	.191**	.240**	.233**	.191**	.193**	.198**

Note. *IRR* = ODD-Irritability; *OPP* = ODD-Oppositionality; *ANT* = ODD-Antagonism; *PPA* = Parent-Partner Psychological Aggression; *CVA* = Parent-Child Verbal Aggression; *CP* = Corporal Punishment.

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Table 3. *GEE Models of Parental Aggressive Behaviors (Time T – 1) on Child Symptoms (Time T).*

	IRR	Robust Std. Err.	z	p > z	[95% Conf. Interval]	
<u>ODD-Oppositionality</u>						
Age	1.007	0.002	3.79	<0.001*	1.003	1.010
Race	0.788	0.014	-13.58	<0.001*	0.761	0.816
Neighborhood Risk	1.002	0.001	2.02	0.043	1.000	1.004
Public Assistance ^{T-1}	0.980	0.015	-1.35	0.177	0.952	1.009
ADHD Severity ^{T-1}	1.006	0.001	5.74	<0.001*	1.004	1.007
CD Severity ^{T-1}	0.990	0.004	-2.67	0.007	0.984	0.997
ODD-Antagonism ^{T-1}	1.026	0.008	3.49	<0.001*	1.011	1.041
ODD-Oppositionality ^{T-1}	1.212	0.006	36.83	<0.001*	1.200	1.225
ODD-Irritability ^{T-1}	1.038	0.005	7.08	<0.001*	1.028	1.049
Corporal Punishment ^{T-1}	1.032	0.013	2.5	0.013	1.007	1.059
P-P Psych Aggression ^{T-1}	1.002	0.001	2.37	0.018	1.000	1.004
P-C Verbal Aggression ^{T-1}	1.031	0.004	7.75	<0.001*	1.023	1.040
constant	0.800	0.034	-5.25	<0.001*	0.737	0.870
<u>ODD-Antagonism</u>						
Age	1.057	0.016	3.58	<0.001*	1.025	1.090
Age ²	0.997	0.001	-4.78	<0.001*	0.995	0.998
Race	0.963	0.018	-2.02	0.043	0.928	0.999
Neighborhood Risk	1.002	0.001	1.95	0.051	1.000	1.004
Public Assistance ^{T-1}	1.010	0.015	0.64	0.525	0.980	1.039
ADHD Severity ^{T-1}	1.009	0.001	8.25	<0.001*	1.007	1.012
CD Severity ^{T-1}	0.995	0.004	-1.11	0.267	0.988	1.003
ODD-Antagonism ^{T-1}	1.269	0.011	27.23	<0.001*	1.247	1.291
ODD-Oppositionality ^{T-1}	1.029	0.006	5.17	<0.001*	1.018	1.040
ODD-Irritability ^{T-1}	1.042	0.006	7.07	<0.001*	1.030	1.054
Corporal Punishment ^{T-1}	1.068	0.015	4.62	<0.001*	1.039	1.098
P-P Psych Aggression ^{T-1}	1.005	0.001	4.86	<0.001*	1.003	1.007
P-C Verbal Aggression ^{T-1}	1.033	0.005	6.84	<0.001*	1.023	1.043
constant	0.383	0.034	-10.67	<0.001	0.321	0.457
<u>ODD-Irritability</u>						
Age	1.108	0.019	5.80	<0.001*	1.070	1.146
Age ²	0.996	0.001	-5.32	<0.001*	0.994	0.997
Race	0.924	0.019	-3.93	<0.001*	0.888	0.961
Neighborhood Risk	1.002	0.001	2.09	0.037	1.000	1.005
Public Assistance ^{T-1}	1.012	0.017	0.71	0.476	0.979	1.047
ADHD Severity ^{T-1}	1.006	0.001	4.88	<0.001*	1.004	1.009
CD Severity ^{T-1}	0.989	0.004	-2.41	0.016	0.981	0.998
ODD-Antagonism ^{T-1}	1.056	0.009	6.18	<0.001*	1.038	1.075
ODD-Oppositionality ^{T-1}	1.057	0.006	9.52	<0.001*	1.045	1.069
ODD-Irritability ^{T-1}	1.208	0.009	25.27	<0.001*	1.191	1.226
Corporal Punishment ^{T-1}	1.055	0.017	3.36	0.001	1.023	1.089
P-P Psych Aggression ^{T-1}	1.005	0.001	4.67	<0.001*	1.003	1.008
P-C Verbal Aggression ^{T-1}	1.024	0.005	4.66	<0.001*	1.014	1.035
constant	0.329	0.035	-10.51	<0.001	0.268	0.405

Note: * p < .001. IRR = incidence rate ratio. T – 1 specifies a lagged variable with measurement at prior timepoint. ADHD Severity, CD Severity, and ODD dimensions = total symptom severity scores. Race (Majority = 0, Minority = 1). Public Assistance (Not Receiving = 0, Receiving = 1).

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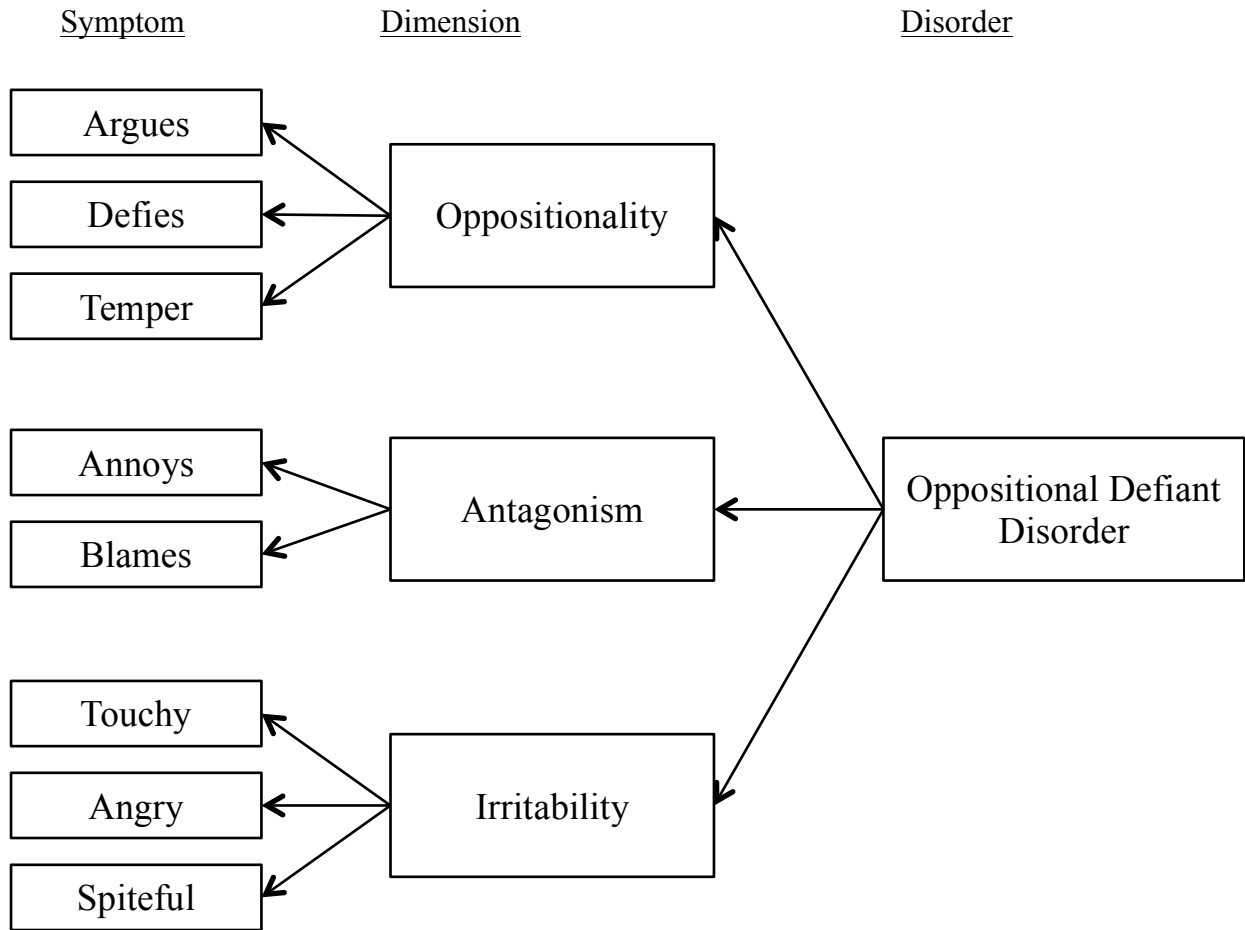
Table 4. *GEE Models of Child Symptoms (Time T – 1) on Parental Aggressive Behaviors (Time T).*

	IRR	Robust Std. Err.	z	p > z	[95% Conf. Interval]	
<u>Corporal Punishment</u>						
Age	0.986	0.001	-19.36	<0.001*	0.984	0.987
Race	1.085	0.007	13.29	<0.001*	1.072	1.099
Neighborhood Risk	1.001	0.000	2.83	0.005	1.000	1.002
Public Assistance ^{T-1}	1.003	0.005	0.67	0.503	0.994	1.013
ADHD Severity ^{T-1}	1.002	0.000	5.48	<0.001*	1.001	1.003
CD Severity ^{T-1}	1.004	0.002	2.40	0.016	1.001	1.007
Corporal Punishment ^{T-1}	1.394	0.009	49.42	<0.001*	1.376	1.412
ODD-Antagonism ^{T-1}	1.006	0.003	2.20	0.028	1.001	1.011
ODD-Oppositionality ^{T-1}	1.006	0.002	2.98	0.003	1.002	1.010
ODD-Irritability ^{T-1}	1.000	0.002	-0.18	0.860	0.995	1.004
constant	0.860	0.014	-9.22	<0.001	0.833	0.888
<u>Parent-Partner Psychological Aggression</u>						
Age	0.989	0.002	-5.20	<0.001*	0.985	0.993
Race	1.028	0.021	1.39	0.166	0.989	1.069
Neighborhood Risk	1.004	0.001	3.43	0.001	1.002	1.006
Public Assistance ^{T-1}	1.087	0.018	4.94	<0.001*	1.052	1.124
ADHD Severity ^{T-1}	1.002	0.001	1.86	0.063	1.000	1.005
CD Severity ^{T-1}	0.985	0.004	-3.29	0.001	0.977	0.994
P-P Psych Aggression ^{T-1}	1.074	0.001	53.83	<0.001*	1.071	1.076
ODD-Antagonism ^{T-1}	1.026	0.009	2.85	0.004	1.008	1.043
ODD-Oppositionality ^{T-1}	1.013	0.006	2.09	0.036	1.001	1.025
ODD-Irritability ^{T-1}	1.011	0.007	1.49	0.137	0.997	1.025
constant	3.322	0.140	28.44	<0.001	3.058	3.609
	exp(B)	Robust Std. Err.	z	p > z	[95% Conf. Interval]	
<u>Parent-Child Verbal Aggression</u>						
Age	1.188	0.024	8.68	<0.001*	1.143	1.235
Age ²	0.992	0.001	-8.92	<0.001*	0.991	0.994
Race	1.262	0.032	9.21	<0.001*	1.201	1.326
Neighborhood Risk	1.005	0.002	5.03	<0.001*	1.002	1.009
Public Assistance ^{T-1}	1.120	0.025	3.50	<0.001*	1.071	1.170
ADHD Severity ^{T-1}	1.014	0.002	8.05	<0.001*	1.011	1.017
CD Severity ^{T-1}	1.005	0.007	0.65	0.513	0.991	1.019
P-C Verbal Aggression ^{T-1}	1.884	0.017	70.84	<0.001*	1.851	1.917
ODD-Antagonism ^{T-1}	1.046	0.012	3.76	<0.001*	1.022	1.070
ODD-Oppositionality ^{T-1}	1.042	0.009	4.62	<0.001*	1.024	1.061
ODD-Irritability ^{T-1}	0.998	0.010	-0.22	0.825	0.979	1.017
constant	3.501	0.420	10.45	<0.001	2.768	4.428

Note: * p < .001. IRR = incidence rate ratio. exp(B) = exponentiated beta. T – 1 specifies a lagged variable with measurement at prior timepoint. ADHD Severity, CD Severity, and ODD dimensions = total symptom severity scores. Race (Majority = 0, Minority = 1). Public Assistance (Not Receiving = 0, Receiving = 1).

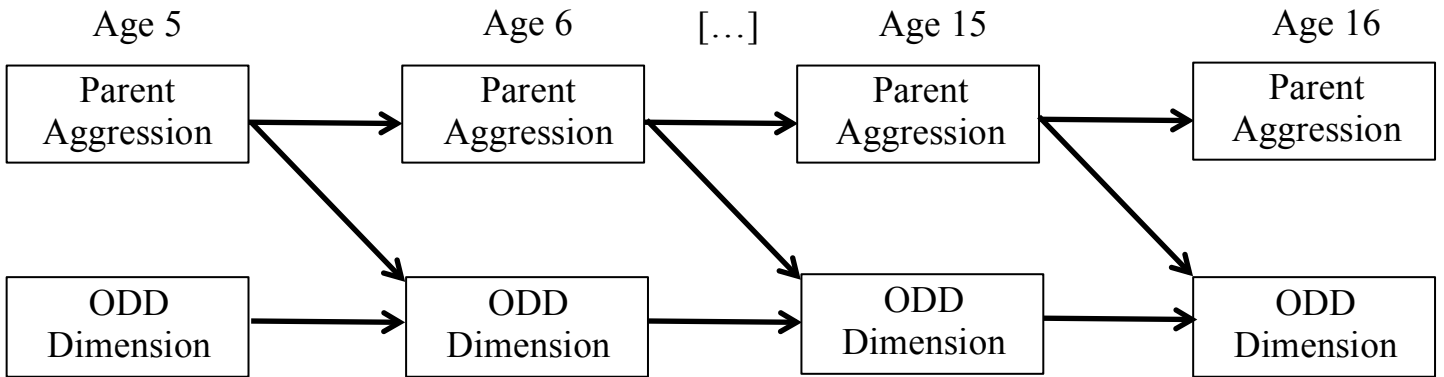
RECIPROCAL RISKS FOR PARENTAL AGGRESSION AND ODD

Figure 1. PGS oppositional defiant disorder dimensional structure.



RECIPROCAL RISKS FOR PARENTAL AGGRESSION AND ODD

Figure 2. Hypothesized “parent effects” on ODD dimensions over time.



RECIPROCAL RISKS FOR PARENTAL AGGRESSION AND ODD

Figure 3. Hypothesized “child effects” on parental aggressive behaviors over time.

