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# First-Time Juvenile Arrestees' ODD Symptoms: The Role of Parent-School Interaction and Race

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First-Time Juvenile Arrestees' ODD Symptoms: The Role of Parent-School Interaction and Race

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B.A., The College of William and Mary, 2014

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**APPROVAL PAGE**

Master of Science Thesis

First-Time Juvenile Arrestees' ODD Symptoms: The Role of Parent-School Interaction and Race

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## ABSTRACT

**Objective.** Disruptive behaviors are bidirectionally associated with low-quality parent-school interactions (Hoover-Dempsey & Sandler, 1995). However, Non-White children are more likely to be identified by teachers as behaviorally disruptive (Epstein et al., 2005), more likely to have low-quality parent-school interactions (Serpell & Mashburn, 2012), and more likely to be engaged in the justice system (Hockenberry & Puzanchera, 2013). Considering that non-White parents may interact with schools and teachers differently than White parents (Mariñez-Lona & Quintana, 2009), it is unclear to what extent race might influence the predictive relationship between aspects of parent-school interactions and disruptive behavior problems. Thus, this study will examine how race moderates the reciprocal effects of parent-school interactions on Oppositional Defiant Disorder (ODD) over time. **Method.** As part of a study on parent help-seeking behaviors, data was collected annually for three years from 75 parents recruited at their child's first contact with the juvenile court. Regression models assessed the reciprocal relationship between four aspects of parent-school interactions (Engagement, Relationship, Correspondence, and Endorsement) on ODD symptoms over time. Tests of moderation assessed differences in the strength of these relationships between non-White and White children. **Results.** After controlling for demographic variables and autoregressive effects, both Engagement and Correspondence predicted increasing ODD symptoms. Race significantly moderated the predictive relationship for Engagement and Relationship on ODD symptoms, as well as ODD symptoms on Relationship. **Conclusions:** This study provides some evidence that parent-school interactions are associated with future behavioral symptoms, and that these relationships differ by race. These results call for greater attention to how schools are engaging with non-White families, particularly those that have come into contact with the justice system.

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### First-Time Juvenile Arrestees' ODD Symptoms: The Role of Parent-School Interaction and Race

Within the juvenile justice system, approximately 46.5% of youth meet criteria for a disruptive behavior disorder (Shufelt & Coccozza, 2006; Teplin, Abram, McClelland, Dulcan, & Mericle, 2002). These disorders have been associated with greater impairment in familial, social, and academic functioning than any other mental health condition (Romano, Tremblay, Vitaro, Zoccolillo, & Pagani, 2001), including at sub-threshold levels (Angold, Costello, & Erkanli, 1999). Thus, both researchers and policy makers alike have turned their attention towards investigating factors that could play a role in ameliorating these children's symptomology. Among this large and varied literature of potential factors, one element to emerge is parent-school interactions. Interactions between parents and schools can have direct effects on the severity and trajectory of children's disruptive behavior problems over time (Serpell & Mashburn, 2012; M. Wang, Hill, & Hofkens, 2014). Evidence for this has provided the basis for legislative efforts that mandate school promotion of parent-school interaction (No Child Left Behind Act, 2001), underlining the importance of this cross-system collaboration.

#### **Defining Parent-School Interactions**

Prior studies have varied in their operationalization of parent-school interactions, limiting researchers' ability to make direct comparisons across the literature and draw conclusions without specific examination of the components involved (Fan & Chen, 2001; Minke, Sheridan, Kim, Ryoo, & Koziol, 2014; M. Wang & Sheikh-Khalil, 2014). For the purposes of this study, we will be defining parent-school interactions as including both behavioral and relational components. The behavioral components include both the parents' engagement in the child's learning process (e.g. attending parent-teacher conferences, reading to their child; for a review

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see Pomerantz & Moorman, 2010) as well as correspondence between parents and teachers (e.g. phone calls, letters; Catsambis, 1998). The relational components include both the parents' appraisal and endorsement of the school environment (Leadbeater, Sukhawathanakul, Thompson, & Holfeld, 2015), as well as the interpersonal affect between parents and teachers (e.g. mutual respect, trust, affection; Sheridan et al., 2012; Waanders, Mendez, & Downer, 2007). Though these components are associated with one another (Izzo et al., 1999), they have been found to be empirically distinct (Kohl, Lengua, & McMahon, 2000; Waanders et al., 2007; Wong & Hughes, 2006) and differentially predictive (Kohl et al., 2000; Manz, Fantuzzo, & Power, 2004; McWayne, Hampton, Fantuzzo, Cohen, & Sekino, 2004; Webster-Stratton, Jamila Reid, & Stoolmiller, 2008). Thus, specification and examination of each of its components allows for greater understanding of the impact of parent-school interactions on behavior problems.

Prior studies have found that high-quality parent-school interactions can directly affect the trajectories of youths who are displaying the persistent emotional and behavioral dysregulation that may increase the likelihood of engagement with the juvenile justice system. High-quality parent-school relationships are generally thought to occur when teachers and parents feel mutually respected, trusted, and supported, and are thus more likely to engage in positive, productive conversation and communication (Downer & Myers, 2010). In this manner, teachers and parents are able to support one another (BeLue, Halgunseth, Abiero, & Bediako, 2015) and engage in cross-system problem solving and plan implementation that supports the development of positive, generalized social skills effects across contexts (Downer & Myers, 2010; Powell, Son, File, & San Juan, 2010; Sheridan et al., 2012). In addition, when parents engage with teachers in this way, it models for children the importance of learning and enhances

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children's engagement with school, thus increasing a child's long-term opportunities for socioemotional development within the school context (Grolnick & Slowiaczek, 1994; Hughes & Kwok, 2007). In this manner, high-quality parent-school interactions can lead to more adaptive functioning for children with disruptive behavior problems, including the exhibition of fewer disruptive behaviors and less conflict with adults (El Nokali, Bachman, & Votruba-Drzal, 2010; Gwernan-Jones et al., 2015; McCormick, Cappella, O'Connor, & McClowry, 2013; Serpell & Mashburn, 2012; Sheridan et al., 2012).

### **Typical Parent-School Interactions for Children with Behavior Problems: A Cycle**

Unfortunately, youths with the types of persistent behavioral problems that might lead to their involvement with the juvenile justice system are much more likely to have caregivers who experience low-quality parent-school interactions (Gwernan-Jones et al., 2015). In part, this lowered likelihood of high-quality parent-school engagement may be due to the general, normative decline in parent-school engagement that occurs when children age into their middle school and high school years (Hill & Tyson, 2009; Stevenson & Baker, 1987; C. Wang, La Salle, Do, Wu, & Sullivan, 2018) – the same age where, unfortunately, youth are more likely to develop mental health disorders and more likely to become involved with the juvenile justice system (Center for Behavioral Health Statistics and Quality, 2015; Hill & Tyson, 2009). However, for children with these significant behavioral problems, the effect of those behavioral problems on parents and schools is an important factor in explaining why having high-quality parent-school interactions is the exception to the norm (Gwernan-Jones et al., 2015).

Multiple factors have been identified as potentially explaining the effect of interacting with a child with significant behavior problems on parents and school personnel. For parents, having a child with behavior problems can contribute to their experiencing a lowered sense of

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competence and a greater sensitivity to perceived judgement from others, both of which may in turn affect parents' ability to engage in effective strategies such as seeking treatment for their child (Carter, Briggs-Gowan, & Davis, 2004; Jones, Putt, Rabinovitch, Hubbard, & Snipes, 2017). In addition, for both parents and school personnel, one of the primary effects of childhood behavioral problems is stress. Interacting with a child with significant behavioral problems leads to a degree of stress that is detrimental to parents' and teachers' ability to effectively interact and collaborate with both with the child and one another (BeLue et al., 2015; Jones et al., 2017; Wiener, Biondic, Grimbos, & Herbert, 2016). When Gwernan-Jones et al. (2015) conducted a systematic review of qualitative studies that examined the school-related experiences of parents of children with behavior problems, they found that parents reported often feeling criticized, judged, and silenced by teachers, so that parent-teacher conflict became the norm.

Communication was often at the crux of this conflict, with parent perceiving that interactions solely occurred in response to child misbehavior and that teachers were not collaborative but rather pedantic in their discussions of remediation. The resulting inequitable power relationship left parents feeling devalued, stigmatized, and powerless, thereby leading to escalations in parents' resistance to active problem-solving and perception that the school is primarily at fault for the problem (Gwernan-Jones et al., 2015).

The resulting tension between parents and schools of children with behavior problems serve to explain why low-quality parent-school interactions have been associated with worsening behavior problems over time (Hoover-Dempsey & Sandler, 1995). When parents perceive that they are being judged by others, they are less likely to engage with schools and teachers (Nzinga-Johnson, Baker, & Aupperlee, 2009) and less likely to seek services for their children (McKay & Bannon Jr, 2004; Nock & Kazdin, 2001). Furthermore, when parents perceive that their child's

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teacher does not seem to value their input or opinion, they may be less likely to communicate their concern, as they feel “it won’t do any good anyway” (Pianta & Walsh, 1996, p.67).

Relatedly, if parents do not perceive the teacher and school as being beneficial for their child and his or her socioemotional development, they may be less likely to encourage their child to use a coping strategy such as asking the teacher for help (Powell et al., 2010). All of this may lead to a greater risk of a child’s behavior problems persisting over time, thus suggesting a potentially pivotal role for parents and schools in ameliorating the symptoms of children involved in juvenile justice, particularly in the context of parent perception. Yet, to date, few studies have examined parent-school interactions in middle- and high-school aged youths, and none have specifically examined these interactions in the years following a youth’s initial contact with the juvenile justice system.

### **The Role of Race**

A complete understanding of the reciprocal effects of parent-school interactions and juvenile arrestees’ behavioral problems requires specific exploration of race’s role within this process. Race has been found to play a significant role in parent-school interactions. Although racial, ethnic, and linguistic diversity is increasing in American public schools, there is still a substantial disparity between the demographics of public school teachers and their pupils (Davis & Bauman, 2013); about 82% of public school teachers in the United States identify as White (Aud et al., 2012), compared to only 49% of public school students identifying as White (NCES, 2019). The prevalence of teachers and other school personnel who identify both racially and culturally as White has made it so that all parents’ interactions with schools are typically appraised within the context of White families’ culture (Maríñez-Lora & Quintana, 2009; Villenas & Deyhle, 1999). For example, teachers have reported frustration with non-White

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parents' lack of engagement, often concluding that non-White parents do not value their child's education (McDermott & Rothenberg, 2000; Trotman, 2001). However, there are several potential explanations for this perceived lack of engagement that are unrelated to any apathy towards the child's education. Non-White parents may be using more home-based approaches to support their child's education (McCormick et al., 2013; M. Wang & Sheikh-Khalil, 2014), may not know the best way to get involved with schools (C. Wang et al., 2018), or may be perceiving bias and judgement from teachers and distancing themselves as a coping strategy (McDermott & Rothenberg, 2000; Salle, Meyers, Varjas, & Roach, 2015; Trotman, 2001). Regardless of the exact mechanism behind these behaviors, evidence suggests racial mismatch between parents and teachers/school personnel may affect their appraisal of one another and their ability to interact effectively (Maríñez-Lora & Quintana, 2009).

Given race's role in parent-school interactions, it is important to consider how race might affect the reciprocally predictive relationship between parent-school interactions and behavior problems. When examining the effects of behavior problems on parent-school interactions, there is evidence of race having an interactive effect. The various aspects of parent-school interactions (e.g. communication, involvement) may differ in their ability to predict Non-White children's outcomes (Hong & Ho, 2005). For example, C. Wang et al. (2018) found that parent engagement with schools was significantly more beneficial to the behavioral outcomes of White children compared to the outcomes of children from Asian, Black, and Latino backgrounds. There is evidence that when children exhibit behavior problems, non-White children are significantly more likely to have low-quality parent-school interactions than White children (Serpell & Mashburn, 2012). These findings suggest that race may differentially affect trajectories such that

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parent-school interactions benefit White children with behavior problems but may have no benefit or even be detrimental for non-White children.

When considered alongside findings that negative parent-teacher interactions are predictive of decreased family involvement with both school and mental health services (McKay & Bannon Jr, 2004; Pianta & Walsh, 1996; Powell et al., 2010), Non-White children appear to be significantly at risk. Children of racial and ethnic minorities are less likely to receive mental health treatment than White children (Ghandour, Kogan, Blumberg, Jones, & Perrin, 2012), and those unmet mental health needs have been found to correlate with disciplinary action in the juvenile justice system (Brady, Winston, & Gockley, 2014; Vincent, Grisso, Terry, & Banks, 2008). Therefore, race must be taken into account when examining the relationship between parent-school interactions and juvenile arrestees' behavior problems, as it may have an interactive effect on the predictive relationship between parent-school interactions and behavior problems. However, to date few studies have examined the effects of race on these interactions. Furthermore, prior investigations have been constrained by the limits of measurement tools, either using exclusively teacher-reported measures (Serpell & Mashburn, 2012) or child-reported measures (Hong & Ho, 2005; C. Wang et al., 2018). Specifically using parent-reported measures to explore the interaction between race, parent-school interactions, and behavior problems may provide some key additional insights.

### **Specific Examination of ODD within Juvenile Justice Samples**

Of the over-70% of youths within the juvenile justice population that meet criteria for a mental health disorder, Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) have been identified as two of the most prevalent diagnoses (Burke, Mulvey, & Schubert, 2015; Skowrya & Coccozza, 2006). ODD is defined by a recurrent pattern of angry/irritable mood,

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argumentative/defiant behavior, or vindictiveness persistent over at least six months, while CD encapsulates a pattern of rule-violating behaviors, including aggression towards others, destruction of property, deceit, theft over the past year (DSM-5; APA, 2013). Even in the general population, these disorders are among the most common reasons for mental health referrals (Ghandour et al., 2019), and still rates for these disorders have been found to be even higher within the juvenile justice setting population (Burke et al., 2015). Accordingly, a great deal of literature has examined potential correlates and outcomes. However, of note, there has been some suggestion that the extant literature on mental health in juvenile justice settings has provided greater attention to CD at the expense of ODD (Aebi et al., 2016), calling for increased attention to ODD specifically.

Due in part to many studies varying in the degree to which they parse apart ODD and CD (e.g. Ghandour et al., 2019; Wasserman et al., 2004), prevalence rates of ODD among juvenile arrestees have been found to vary across studies (2.8% to 43.2%; Burke, Mulvey, & Schubert, 2015; Colins, Vermeiren, Schuyten, & Broekaert, 2009; Plattner et al., 2007; Teplin et al., 2002; Wasserman, Ko, & McReynolds, 2004). Nonetheless, there is evidence that ODD is both prevalent in and predictive of youth who engage in criminal activities, even when controlling for ADHD and callous-unemotional traits (Aebi et al., 2016; Pardini & Fite, 2010). The onset of ODD is typically in childhood, distinguishing itself from normative disruptive behaviors as early as preschool (Keenan & Wakschlag, 2004) and remaining stable and persistent throughout development (Harvey, Youngwirth, Thakar, & Errazuriz, 2009; Lavigne, Bryant, Hopkins, & Gouze, 2015).

Considering evidence that service-seeking behaviors are higher for ODD compared to CD (Cornelius, Pringle, Jernigan, Kirisci, & Clark, 2001), and that juvenile arrestees with ODD

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are less likely to recidivate than those with CD (Boduszek, Belsher, Dhingra, & Ioannou, 2014), there appear to be protective factors that differentially affect ODD and warrant further and specific examination. Thus, it may be a particularly useful and novel approach to examine parent-school interactions as they relate to ODD. In prior literature, ODD has been found to lead to parents experiencing greater stress and poorer interpersonal relationships (Li et al., 2018). However, ODD has never been examined specifically as a predictor of parent-school interactions. Much of the extant literature on the associations between behavior problems and parent-school interactions have been conducted using more general or normatively-defined terms (e.g. problem behaviors, conduct problems, externalizing behaviors), and though this enables examination of behavioral problems in general, it limits our ability to understand the distinct effects of the different types of behavior problems. Similarly, though parent-child (Burke, Pardini, & Loeber, 2008) and teacher-child interactions (Tsai & Cheney, 2012) have been shown to be predictive of ODD symptoms, the predictive abilities of parent-school interactions to future ODD symptoms have not yet been examined. Thus, examination of the reciprocal effects of parent-school interactions with ODD symptoms provides opportunity to expand on the current literature and provide useful new insight.

It should be highlighted that, in our examination of ODD, we will be focusing on symptoms and not diagnoses. This approach was chosen in order to be able to detect changes over a wider range of variability over time, rather than a discrete dichotomous diagnosis. Furthermore, specific examination of symptom counts is supported by a significant amount of literature that finds that the majority of youths involved in the juvenile justice system have unmet mental health needs, and thus may have never received a formal diagnosis despite meeting criteria (Cornelius et al., 2001). Non-White youths in the juvenile justice system are particularly

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less likely to receive referrals or treatment for their behavior problems compared to their White counterparts (Hoeve, McReynolds, & Wasserman, 2014; Rawal, Romansky, Jenuwine, & Lyons, 2004). Thus, in order to appropriately capture and draw conclusions about these youths' behavioral problems, it is important that ODD be examined via its symptoms as opposed to a child's diagnostic history.

Furthermore, examining the reciprocal effects of parent-school interactions with ODD symptoms specifically may provide an opportunity to expand on prior literature about the associations between behavior problems and parent-school interactions by providing greater specificity. Furthermore, focus on ODD symptomology will expand on juvenile justice literature by providing specific focus and attention to ODD symptoms, and have the potential to suggest areas of possible intervention for families of youths with these emotional and behavioral difficulties.

### **The Current Study**

Though previous studies provide important information in regard to the importance of high-quality parent-school interactions, the impact a child with problem behaviors has on parents' perception of parent-school interactions, and the disproportionate role of race in both predictive relationships, the literature still has some key limitations. To date, the vast majority of studies on parent-school interactions have defined their terms ambiguously (Fan & Chen, 2001; Serpell & Mashburn, 2012), used cross-sectional methods that limit understanding of directionality, and examined parent-school interactions with community-based, non-clinical samples, referring to "problem behaviors" rather than specific diagnoses. This limits the interpretation of the extent to which these findings apply to children with more specific diagnoses and levels of impairment, thus obstructing the ability to fully understand the

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trajectories these factors will have over time. Furthermore, these constructs have not been examined in temporal proximity to a youth's first contact with the juvenile justice system – a potentially pivotal time in the lives of these high-risk youth.

Thus, the purpose of this study is to use parent-reported measures to analyze the directionality of the relationship between different aspects of parent-school interactions and ODD symptoms over time in the context of justice system involvement, with specific examination of how race moderates the hypothesized effects. This study addresses gaps in the literature by providing specific examination of ODD's reciprocal relationship with specific aspects of parent-school interactions in the context of initial juvenile justice exposure. Furthermore, by specifically investigating the role of race in moderating these predictive relationships, this study may provide some elaboration on how the relationship between specific aspects of parent-school interactions and ODD symptoms are differentially affected by a family's race. In pursuit of these aims, I hypothesized that, after controlling for demographic variables and autoregressive effects, parent-school correspondence would be predictive of increases in ODD symptoms, while all other aspects would be predictive of decreases. In the reverse direction, I predicted that greater ODD symptoms would be predictive of all four aspects of parent-school interactions worsening over time. Finally, I hypothesized that race would significantly moderate all interactions.

### **Method**

#### **Participants**

As part of a study on parent help-seeking behaviors (Burke et al., 2015), seventy-five parent-child dyads that had never previously been engaged with the juvenile justice system nor with specialized mental health services were recruited from an urban juvenile justice court

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setting. The sample consisted primarily of African American (73.3%) and Caucasian (16.0%) children. Most of the children were male (64%). The children's ages ranged from 10.9 to 15.1 years old, with a mean age of 13.62 ( $SD = 1.06$ ). There were no children younger than 10 in this sample, as the state of Pennsylvania's criminal age of responsibility is 10 years of age. In terms of annual household income, 26.2% of the sample reported making \$9,999 or less, 66.2% reported earning between \$10,000 and \$49,999, and 7.70% reported earning over \$50,000. An independent samples t-test was conducted to compare annual income in the sample's White and non-White families. No significant difference was found in the scores for White families ( $M=4.91$ ,  $SD =2.59$ ) and non-White families ( $M=5.81$ ,  $SD=2.91$ );  $t(74) =0.96$ ,  $p=0.34$ . Retention for this sample was 87.7% in year 2 and 66.7% in year 3.

### **Procedure**

These parent-child dyads were recruited in two different ways. The majority of this sample was recruited directly from the waiting room of a juvenile court. As parents checked in, they were informed of the study. Those that expressed interest were directed to discuss further details with a present member of the study personnel. A brief screening was then conducted in a separate, private room alongside the waiting room. Eligible participants were scheduled for a study interview. In addition to this recruitment strategy, advertisements were placed on city buses. These ads expressed that the study was enrolling parents of children who were engaged in juvenile justice services for the first time and provided a telephone number that participants could call in order to learn more information from study staff and be screened for eligibility. In order to be eligible, children had to be between the ages of 10 and 15, with no prior interaction with the juvenile justice system, no history of a diagnosis or services for intellectual disability, no mental health service-seeking within the past year, and no physical or developmental

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limitations that interfered with daily living and would require special assistant to manage. Both the researchers and the written consent materials emphasized that participation in this study would have no bearing on the course or outcome of any legal proceedings.

Trained research interviewers used a laptop computer to administer the interviews. Most interviews were conducted in family homes, though office interviews and alternative locations were occasionally utilized per a family's request. All interview locations provided a secure and private administration of the interview protocol. One year after their initial assessment, participants were contacted to complete additional measures. They were contacted again for the same purpose a year after that. All participants were compensated for their participation. The Institutional Review Board of the University of Pittsburgh approved and monitored all study procedures.

### **Measures**

#### *Psychopathology and Antisocial Behaviors*

The Diagnostic Interview Schedule for Children (DISC-IV) was used to measure the parent report of children's symptoms of ODD. The DISC is a structured, diagnostic interview designed to assess the presence of over thirty different DSM-IV psychiatric disorders and symptoms in children between the ages of six and seventeen. The DISC-IV can be administered by trained, non-clinician interviewers. For the purposes of this study, researchers administered the measure using a laptop computer (Computerized DISC, or C-DISC; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). Symptoms of disorders were derived from sets of primarily yes-no questions regarding the past year.

The DISC-IV has a test-retest reliability of 0.54 for ODD within a clinical sample (Shaffer et al., 2000). In terms of validity, in Angold et al.'s (2012) comparison of the DISC-IV,

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the Child and Adolescent Psychiatric Assessment (CAPA), and the Development and Well-Being Assessment (DAWBA), they found that, for ODD, the DISC had a kappa score of 0.50 compared to that CAPA (the McNemar score was non-significant) and the DISC had a kappa score of 0.29 compared to the DAWBA (the McNemar score was significant at  $p = 0.002$ , suggesting the DAWBA diagnosed significantly fewer cases of ODD). Thus, the authors concluded that the DISC is highly comparable to the CAPA (particularly in both measures' advantageous ability to generate symptom scale scores) and better able to avoid false negatives compared to the DAWBA.

### *Parent-School Interactions*

The Parent and Teacher Involvement Questionnaire: Parent Version (PTIQ; Conduct Problems Prevention Research Group, 1991) is a 26-item measure designed to assess parents' reports of their relationship with their children's teacher and school. Parents are asked to answer questions on item-specific five-point scales: 0 represents no involvement and 4 represents high involvement. This measure was given every year and estimated to appropriately garner teacher differences within the current study's population due to all children being at an age range where they would be interacting with multiple teachers within a given year (i.e. all children within this sample would at some point be in either middle or high school, and parents would be responding to the measure in aggregate of all those teachers).

Prior studies have conducted Confirmatory Factor Analyses on the PTIQ and identified four factors within this questionnaire (Kohl et al., 2000; Walter, 2001), the corresponding subscales for which have been re-named for the purposes of this analysis.

The first factor, Relationship, captures the affective and relational qualities between the parent and the child's teachers. Questions in this subscale have to do with whether the parent

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feels respected and valued by the teacher, including, for example, to what extent the parent feels their “child’s teacher pays attention to your suggestions”.

The second factor, Engagement, refers to how much personal time the parent invests in their child’s learning process with both school-related activities (e.g. how often the parent “attended a Parent Teacher Organization meeting” or “visited your child’s school for special events”) as well as home-based activities (e.g. how often did the parent “read to your child” or “take your child to the library”).

The third factor, Endorsement, relates to whether the parent approves of the overall school environment. Questions include items such as the extent to which the parent feels that their “child’s school is a good place for my child”.

The fourth factor, Correspondence, consists of questions that relate to how often the parent exchanges telephone calls and letters with the teacher. Questions include parent-initiated exchanges such as how often in the last year “you have called your child’s teacher”, as well as teacher-initiated correspondence.

For the purposes of this analysis, each of these subscales was looked at as four individual factors in order to account for how each might differently predict or be predicted by the different symptom levels. Within the current study, the measure had an overall Cronbach’s alpha of 0.96, and the following Cronbach’s alphas for each for each of the subscales: Relationship = 0.92, Engagement = 0.88, Endorsement = 0.94, and Correspondence = 0.81. The overall alpha and the bivariate correlations between the subscales at the first time point (Table 3) indicate that some of the subscales are significantly correlated with one another, raising questions about the degree to which these factors can be considered distinct from one another. Nonetheless, in order to be

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consistent with prior studies' utilization of the PTIQ measure (Kohl et al., 2000; Walter, 2001), our study will conceptualize and analyze these factors separately for the purposes of our analysis.

### *Demographics and Contextual Factors*

A Demographic Questionnaire was used to obtain information about the participants, including their race, ethnicity, age, and gender. The measure also included questions regarding the family's annual household income.

### **Data Analytic Plan**

#### *Predictive Relationship between Interaction and Symptoms.*

An evaluation of the distribution of ODD symptoms suggested that negative binomial regression models would be most appropriate to assess the predictive effects of each of the PTIQ factors on future levels of ODD symptom (Figure 1). For regression models predicting to outcomes of parent-school interactions, Gaussian distributions were determined to be appropriate to model Relationship and Endorsement, whereas both Correspondence and Engagement were found to have non-normal distributions. Square root transformations were determined to be most appropriate to address these concerns, and Gaussian regression models were used for these transformed outcomes (Figure 2). Post-estimation diagnostic plots of these regression models were evaluated in order to confirm that the transformations were suitable and the mean specification for each model was appropriate. All regression models were run using Stata and accounted for all three timepoints. Models were clustered by participant to account for within-individual correlations across time. In order to account for longitudinal and autoregressive effects, lagged variables (i.e. one year relative to the outcome) were used. All of these models controlled for gender, race, annual income, and age (which will be centered due to its being a continuous variable in which 0 would be more meaningful as the average age), as well as the

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level of the outcome variable at the preceding time-point. In this way, it was possible to see how each variable predicts to the other across time while accounting for autoregressive effects and beyond the effects of the demographic variables.

### *Inclusion of Covariates.*

Covariates were selected based on evidence that suggested meaningful associations with both predictors and outcomes. Specifically, the demographic variables age, gender, and annual income were selected due to evidence that they can affect parents' perception of schools as well as parents' perception of children's behavioral difficulties (Boduszek et al., 2014; Crosnoe et al., 2010; Fan, 2001; McNeal Jr, 2012).

### *Moderator Effects.*

In addition to examining the aforementioned predictive relationships between the PTIQ factors and the ODD symptoms, the effects of race were also examined as a moderator (Figure 3). The moderative effects of race were examined independent of whether the main effects are significant, as there is evidence that parent-school relationships may have different effects based on race (Maríñez-Lora & Quintana, 2009; McDermott & Rothenberg, 2000; Trotman, 2001; Villenas & Deyhle, 1999). In order to test the construct with optimally-powered variables, race was converted into a dichotomized variable of "White" and "non-White". Due to research indicating that race can affect the manner in which parents, students, and teachers interact and relate to one another, as well as the manner in which teachers appraise students' behavior and report it to parents (Maríñez-Lora & Quintana, 2009; McDermott & Rothenberg, 2000; Trotman, 2001; M. Wang et al., 2014), the extent to which race influences the direction and strength of the relationship between the PTIQ factors and ODD symptom counts will be examined.

## **Results**

### **Descriptive Statistics**

Bivariate correlations were conducted in order to examine concurrent associations between the four factors of parent-school interactions and ODD symptoms at the first time point (Table 3). Results suggest that all associations between the parent-school interaction factors and ODD symptoms are non-significant except for Correspondence. This stands to reason, as prior studies have similarly found that teachers tend to be in more frequent contact with parents of children with behavior problems (Catsambis, 1998; Epstein, 1996).

In addition, negative binomial regressions models were conducted to assess whether ODD symptoms differed significantly for White and non-White families. Regressions models were used to examine whether parent-school interaction factors differed between the groups (with Correspondence and Engagement transformed using the square root function in order to account for non-normal dispersions). Table 2 depicts the means and standard deviations of outcome variables for both White and non-White families at time point 1. Only Correspondence was significantly different for White and non-White families ( $B=-.68, p=.02$ ), suggesting that, though non-White parents were more likely to be in frequent contact with their child's teacher, ODD symptoms and all other PTIQ factors were comparable for White and non-White families at the first time point.

### **Parent-School Interaction Factors Predicting to ODD Symptom Counts**

#### *Main Effects*

Table 4 displays results of the negative binomial regression model testing effects of the four aspects of parent-school interactions (time T -1) on later child ODD symptom counts (time T), controlling for effects of age, gender, and socioeconomic status. ODD symptom counts at the previous timepoint (time T-1) were also controlled for in order to account for autoregressive

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effects. More frequent correspondence between parents and teachers were found to predict higher ODD symptom counts over time. In addition, greater parent engagement with the school and the child's learning progress was also predictive of higher ODD symptom counts over time. Neither the affective aspects of the parent-school relationship nor the parents' endorsement of the school environment were predictive of ODD symptom counts over time.

### *Moderator Effects*

Table 5 displays results of the negative binomial regression model testing moderator effects of race on the predictive relationship between parent-school interaction factors (time T – 1) and future child ODD symptom count (time T), controlling for effects of age, gender, socioeconomic status, and ODD symptoms at the previous timepoint (time T-1). Race did not significantly moderate the influence of parent-reported correspondence with the teacher. However, it did significantly moderate the influence of parents' engagement in their child's learning on ODD symptoms in that, for families of color, higher levels of engagement predicted increases in ODD symptoms in the following year, an effect not observed in White families (Table 6). In addition, race significantly moderated the impact of positive affect between parents and teachers on future levels of ODD symptoms. As depicted in Table 6, for White families, higher levels of positive affect were significantly predictive of decreases in ODD symptoms, an effect not observed in families of color. The effect of parents' endorsement of the school environment on future ODD symptoms was not moderated by race.

### **Prediction from ODD Symptoms to Aspects of Parent-School Interaction Effects**

#### *Main Effects*

Table 7 displays results of the negative binomial regression model testing effects of child ODD symptom count (time T – 1) on later aspects of parent-school interaction (time T),

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controlling for effects of age, gender, socioeconomic status, and race. Aspects of parent-school interactions at the previous timepoint (time T-1) were also controlled for in order to ascertain whether these regressions were reflective of a change over time. ODD symptoms did not significantly predict any of the four aspects of parent-school interaction.

### *Moderator Effects*

Table 8 displays the results of the negative binomial regression model testing moderator effects of race on the effects of child ODD symptom count (time T -1) on later aspects of parent-school interaction (time T), controlling for effects of age, gender, socioeconomic status, and aspects of parent-school interactions at the previous timepoint (time T-1). Race significantly moderated the impact of ODD symptoms on future levels of positive affect between parents and teachers, in that for White families, higher levels of ODD symptoms significantly predicted decreases in positive parent-teacher affect over time, an effect not observed in families of color (Table 9). Race did not moderate the predictive effects of ODD symptoms on any of the other aspects of parent-school relationships.

## **Discussion**

The purpose of the current study was to analyze the directionality of the relationship between aspects of parent-school relationships and ODD symptoms over time, with particular focus on examining the impact of the child's race on the strength and direction of these interactions. This study expanded upon previous literature with its operationalization of the different aspects of parent-school interactions, its focus on ODD symptomology, and its specification of the juvenile justice context. In addition, in examining the role of race in these interactions, this study elaborated on prior literature that posited non-White parents may interact with schools and teachers differently than White parents (Maríñez-Lora & Quintana, 2009).

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Furthermore, it provided additional support for the theory that the reciprocally predictive relationship between parent-school interactions and ODD symptoms for families of juvenile arrestees may be differentially impacted by a family's race, thereby adding nuance to the field.

### **ODD Symptoms Predicting Future Parent-School Interactions**

Contrary to my hypothesis, ODD symptom counts were not predictive of any of the four aspects of future parent-school interactions. Furthermore, race only significantly moderated one of these interactions (i.e. ODD symptoms predicting future Relationship, as discussed below in greater detail). Though this might seem at odds with prior findings that child behavior problems affect parents' perceptions and interactions (Carter et al., 2004; Jones et al., 2017; Li et al., 2018), our results may be understood in light of evidence that parental stress mediates the association between behavior problems and parents' interactions with others (BeLue et al., 2015). Our sample of parents whose children have come into first contact with the juvenile justice system are likely experiencing an unusually heightened level of stress. It may be that our sample's non-normative amount of stress is less affected by changes in children's ODD symptom changes, and therefore those children's symptom changes have less effect on the frequency with which parents correspond with teachers, engage in their child's learning process, and endorse the school environment. Future studies should examine the predictive relationship between these variables in a sample in which not all families are involved in the juvenile justice system, with particular attention paid to the mediating role of stress.

### **Parent-School Interactions Predicting Future ODD Symptoms**

#### *Parent-Teacher Relationships and ODD Symptoms: Reciprocally Predictive Moderator Effects*

The current study initially found no significant main effects when examining the reciprocally predictive relationship between ODD symptoms and the relationship between

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parents and teachers. Though unexpected in light of prior literature (Powell et al., 2010; Waanders et al., 2007), upon examination of potential moderator effects, results yielded insight into the unexpected findings: higher severity ODD symptoms predicted decreased positive affect between White parents and teachers (with no significant effect on non-White families) and, in the other direction, higher positive affect predicted decreased ODD symptoms for White children (again with no significant effect for non-White families). Therefore, it appears that the hypothesized trajectories occurred solely in White families, with no significant effects in non-White families.

Though the identified trajectories for White families are supported by prior studies' findings on the impactful interaction between behavior problems and parent-teacher trust and affect (Izzo, Weissberg, Kaspro, & Fendrich, 1999; Powell et al., 2010; Waanders et al., 2007), it is unclear why no effect was found for non-White families. To date, very few studies have examined how race affects the interaction between parent-teacher relationships and behavior problems. One such study by Powell et al. (2010) found that, in a sample of socioeconomically disadvantaged and racially diverse preschool-aged children, race did not have a statistically-significant effect on parents' feeling liked and respected by teachers. Thus, their finding that greater affect and respect in parent-teacher relationships predicted fewer behavior problems at the end of the academic year was not examined separately by racial and ethnic groups. In contrast, our study found that, though at the first time point White and non-White families did not differ in the extent to which they reported liking their child's teachers, over time our study found significant bidirectional associations between Relationship and ODD symptoms for White families only. One possible reason may be related to the age differences between our sample and that of Powell et al.'s study (2010). There is evidence that the parents of older children report

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liking and respecting their children's teachers less as children age into middle and high school (Adams & Christenson, 2000), suggesting that the effects of parent-teacher relationships may similarly change as children get older. Thus, it may be that our study's older sample affects the predictive strength of parent-teacher relationships such that White and non-White children's ODD behaviors may be differentially impacted over time.

Furthermore, it may be that non-White families were not significantly affected by parent-teacher relationships due to differing cultural values and prior experiences with discrimination lessening the long-term effects of parent-teacher relationships on child outcomes (Maríñez-Lora & Quintana, 2009). The United States has a long history of systematic and legislative discrimination of non-White youths by the American school system (Gilliam, 2005; M. Wang & Sheikh-Khalil, 2014). Accordingly, non-White families are significantly more likely to report perceiving bias and feeling distrust towards teachers and schools, subsequently distancing themselves from interacting with teachers and schools (McDermott & Rothenberg, 2000; Trotman, 2001). Thus, despite White and non-White parents reporting similar relationships with teachers at our study's first time point, over time these relationships for our non-White families may be less affected by ODD symptoms and less impactful on ODD trajectories. Furthermore, these differing interactions may also be affected by White families' social and cultural capital (i.e. privilege), which has been theorized to magnify the positive effects of their school-based interactions (McNeal Jr, 1999; Villenas & Deyhle, 1999). In this manner, White families' parent-teacher relationship may be more likely to impact and be impacted by children's behavior problems. Future research is needed to understand why White and non-White families are differentially impacted by parent-teacher relationships.

*Parent-School Engagement Predicting Future ODD Symptoms*

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Our findings provided support for the theory that parents' engagement in their child's learning experience would have an effect on the child's behavioral outcomes. However, whereas many studies have found that increases in parents' engagement in their child's learning experience is predictive of declines in behavior problems (Domina, 2005; El Nokali et al., 2010; Fantuzzo et al., 1999; McWayne et al., 2004; Rimm-Kaufman & Pianta, 2005), the current study demonstrated that increased engagement was predictive of greater ODD symptom counts over time. Furthermore, race was found to significantly moderate the interaction such that for non-White families, greater parental involvement in their child's learning experience was significantly predictive of higher ODD symptom counts over time, an effect not observed for White families. These findings were contrary to our initial hypotheses, and particularly intriguing in light of our having controlled for autoregressive effects, thus suggesting these effects reflect a change in symptoms across timepoints.

Though at first glance this finding appears to provide evidence against federal guidelines that mandate school promotion of parent-school engagement (No Child Left Behind Act, 2001), it may instead serve as support for a more nuanced approach to understanding the motivators and outcomes of families' engagement with their child's learning. Particularly considering this sample's exposure to the juvenile justice system, it may be that, for non-White families, greater engagement in their child's learning process (e.g. attending PTA meetings, reading to their child) is occurring as a reaction to the child's behavior problems. Indeed, there is literature to support that when parents (particularly those from the high stress, low resource communities that characterize this sample) become more involved with schools as a reaction to their child having school-related difficulties, their child's difficulties are more likely to worsen in subsequent years (Catsambis, 1998; Gutman & McLoyd, 2000; Izzo et al., 1999; McNeal Jr, 2012). Though the

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majority of studies that have examined reactive parent-school engagement have focused on academic outcomes, our study provides some preliminary evidence that the effects seen in prior literature may extend to ODD symptom trajectories.

It should be noted that these unexpected findings may also be reflective of issues with the way parents' engagement in their child's learning process is measured. Existing measures such as the PTIQ may be capturing both proactive and reactive reasons for parental engagement in their child's learning process, thus obscuring the relationship between Engagement and behavioral outcomes. Relatedly, prior researchers have noted that the various aspects of parent-school interactions, though conceptually-distinct, can often have a certain degree of empirical overlap (Kohl et al., 2000). Thus, it may be that certain variables that are considered as part of the Engagement construct may have some overlap with other domains (e.g. "in the past year, you have attended a parent-teacher conference"), and this overlap could have different effects for different populations. Though prior studies have found that the measure is valid for individuals of different racial groups (Kohl et al., 2000), it could be that for our high-stress, high-risk sample, the limitations of the measure and construct could at least in part explain our unexpected findings.

In addition, it may be that variables not accounted for by the PTIQ are to explain for why greater Engagement predicted increases in ODD symptoms over time for non-White families in particular. One potential mechanism may be related to evidence that non-White families engage in their child's learning process in a manner that is different from White families. Studies find that non-White parents are more likely to engage in home-based educational support, while White parents are more likely to engage in school-based educational support (M. Wang & Sheikh-Khalil, 2014). Though both approaches have been found to be predictive of fewer

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classroom-based problem behaviors in pre-kindergarten children (Fantuzzo, McWayne, Perry, & Childs, 2004; Powell et al., 2010), associations may be different for middle- and high-school-aged youths. At this age, youths are often striving for a sense of independence and autonomy (Froiland & Davison, 2014), and parent-school interactions tend to decline accordingly (Hill & Tyson, 2009; C. Wang et al., 2018). Therefore, for youths in middle and high school, parents' heightened engagement in their child's learning process (e.g. volunteering at school, checking grades and homework) may violate norms. That disruption of norms may in turn act as a mediator to explain why greater parent engagement is negatively associated with desired outcomes (Catsambis, 1998; Froiland & Davison, 2014; Hill & Tyson, 2009). Though the literature to support this trend has primarily been examined in the context of academic achievement, it may be that a similar process is occurring for behavioral outcomes. Furthermore, the different manner in which White and non-White families typically engage in their child's learning process may serve as a potential mechanism to explain our study's findings of race moderating the effects of Engagement on future ODD symptoms. Future research should examine the extent to which increased engagement violates norms and thereby predicts worsening behavior problems, with particular consideration of the role of culturally-preferred approaches to learning engagement.

### *Parent-School Correspondence and Endorsement Predicting Future ODD Symptoms*

Next, this study found that higher levels of correspondence predicted higher future levels of ODD symptoms. This finding is consistent with my hypothesis. There is evidence that parents and teachers primarily come into contact with one another when a child is having a problem (Catsambis, 1998; Epstein, 1996), especially if that problem is related to classroom disruptiveness (Deslandes & Royer, 1997). Thus, if a parent and teacher are communicating

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frequently over the phone or via letters, it may be indicative of higher severity disruptive behaviors that may worsen over time (Catsambis, 1998; Izzo et al., 1999). In addition, this association may be a result of frequent communication affecting parents' perception of their child's behavior so that, over time, they are becoming increasingly aware of and attuned to the behavior and thus reporting increasing symptom counts (Johnston & Burke, 2019; Lasky, 2000; Maselli, Brown, & Veaco, 1984).

However, contrary to our initial hypothesis, race did not moderate the predictive relationship between correspondence and future ODD symptoms. It may be that, though teachers have been found to contact non-White families about their children's disruptive behaviors more often (Cherng, 2016), differences in the amount of correspondence is not differentially impactful for these families. More frequent contact appears to predict greater ODD symptoms, regardless of the families' race.

Relatedly, parents' endorsement of the school environment was not found to significantly predict ODD symptoms, including when specifically examining race as a moderator. Though dissonant with our initial hypothesis, this finding is consistent with Konold, Cornell, Shukla, and Huang's (2017) finding that, though in their study White and Black adolescents differed in their appraisals of school climate, race did not appear to moderate associations between school climate and peer aggression.

However, these results, along with the non-significant moderation findings when predicting from ODD to future parent-school interactions, must be interpreted with caution. Our sample had a relatively small number of White families, and it is possible that this reduced the study's power to detect an effect. A more ethno-racially diverse sample might have revealed different findings, and future research is warranted in order to examine this more closely. In order

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to conclusively state that an effect was absent, a study with sufficient power to detect smaller effects is needed.

It should also be noted that, when examining our results, two interesting findings came to light. First, our sample's White and non-White families had empirically comparable annual salaries. Understanding the extent to which race and income co-occur is particularly important when examining interpersonal relationships and outcomes, as teachers' attitudes towards non-White families can also represent differences in their attitudes towards families of different socioeconomic statuses. Prior studies have struggled to disentangle the United States' systematically-entwined constructs of race and income, varying in their analytical methods as they at times controlled for income and at other times subsumed it under the construct of race. However, our sample's comparable annual incomes enable us to suggest that our results reflect patterns that are independent of annual income differences. Furthermore, it may be that some of this study's more unexpected, non-significant moderative effects are reflective of prior studies having inadvertently measured SES as opposed to race effects. Future studies should examine whether these effects of race in socioeconomically-comparable samples are also present when examined with a larger sample size.

Second, it should also be noted that in our analyses ODD symptoms appeared to have an unexpectedly weak autoregressive effect when covariates were included in the analyses. Thus, it may be that the ODD symptoms in this sample are not as stable as those found in other samples, which may have affected our results. Future research is needed to understand these effects.

### **Limitations**

The study was conducted using a single reporter, thus limiting the extent to which the results can be generalized and interpreted. There is evidence that parent perception of schools is

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associated with parent ratings of a child's behavior, but not with the ratings of teachers or the children themselves (Leadbeater et al., 2015). Results from this study must therefore be understood as being primarily reflective of the parents' perception, and as standing to complement other studies whose data has primarily focused on teacher perception. Relatedly, in using parent-reported questionnaires about their own behavior and that of their child, it is also important to take into account the potential impact of social desirability. The measures used for the purposes of this study were highly face valid, and thus susceptible to those effects. In addition, parents were asked to report on their child's ODD symptoms over the past year, and thus the limitations of retrospective recall and reporting must also be taken into account.

Furthermore, in not collecting teacher data, the study was limited in its ability to make conclusions related to parent-teacher racial mismatch. Though for the purposes of this study we assumed a certain degree of racial mismatch due to 94.4% of Pennsylvania's teachers being White (Fontana & Lapp, 2018), we did not collect data on the racial makeup of the schools and their personnel. This reliance on proxy variables for the suggestion of potential bias is a common one in the literature, as others have similarly struggled to assess bias directly. Ascertaining the presence of racial prejudice, particularly as endorsement of racial attitudes carries a certain degree of stigma (Chang & Sue, 2003). Future research should nonetheless attempt to directly and indirectly assess for teacher and parent bias in order to further elucidate possible mechanisms. Nonetheless, for the purposes of our study, the effects of racial mismatch and potential bias are hypothesized, but not directly tested by our measures.

The sample as a whole also had some limitations with regards to its small size and predominantly non-White group. Though the proportion of non-White to White families in our study is fairly representative of the disproportion in the state of Pennsylvania's juvenile justice

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racial demographics (68.1% Black, 28.3% White, 3.6% Other; Pennsylvania Juvenile Court Judges' Commission, 2017), the current study's small sample size, small proportion of White families, and large proportion of Black families may impact some of the findings. In particular, non-significant moderation effects should be interpreted with caution, as the White sample was quite small in size. Thus, the findings' specificity as it relates to different, specific racial groups, as well as its generalizability to other states and counties outside of Allegheny County, Pennsylvania, is limited.

### **Future Directions**

Data for the current sample was collected annually over three years via parent report of their own and their child's behaviors. Though this adds to and expands upon previous literature, future studies should continue to examine the nuance of these parent-school interactions and their impact on children's behavioral outcomes by collecting additional data from teachers and children, including observational data, demographic information, multiple-reporter ratings of interactions and behavior, and potential mediating factors such as stress and implicit bias. In particular, examination of parent-school interactions via measures that provide greater empirical distinction between factors could provide some additional clarity on these constructs.

Furthermore, in light of evidence that parent expectations have a stronger relationship with academic achievement than school-based parent engagement (Fan & Chen, 2001; Hong & Ho, 2005), future work might examine the effect of parent expectations on behavioral problems to see if similar trajectories exist. In addition, there is evidence that when teachers initiate and explicitly invite parent-school engagement, non-White families are more likely to see positive academic outcomes (Kohl et al., 2000; McNeal Jr, 2012). Thus, future studies should examine whether these same trajectories also extend to ODD symptoms for first-time juvenile arrestees,

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as it is possible that teacher-initiated engagement may act as a way to ameliorate some of the racial distinctions suggested by our findings.

Finally, future studies should examine these variables with a larger sample and a wider range of ethnic and racial groups, specifically oversampling equal proportions of different groups so as to be able to examine differences with greater specificity. Non-White children are disproportionately involved in the juvenile justice system, and it has been suggested that this may be directly related to racial disparities in the diagnosis and treatment of children of color (Gudiño, Lau, Yeh, McCabe, & Hough, 2009). Within both community samples and juvenile justice settings, non-White youths have repeatedly been found to have higher levels of mental health symptoms despite receiving less mental health diagnosis and treatment (Garland et al., 2005; Herz, 2001; Rawal et al., 2004). Thus, future studies should examine these constructs over a larger span of time so as to account for both risk factors in children with ODD's engaging with the juvenile justice system as well as their trajectories in the years following. Further and more detailed examination of these constructs could provide important information for additional avenues of support for these youths and their families.

Overall, the results of our study add to the extant literature by providing additional support to prior findings and by emphasizing the importance of considering the role of race in understanding the reciprocal, predictive relationship between parent-school involvement and ODD symptoms. A great deal of the extant literature on parent-school interactions has been conducted with White families (Maríñez-Lora & Quintana, 2009; M. Wang & Sheikh-Khalil, 2014). Norms for this group have been used to shape schools' expectations (including at the legislative level; No Child Left Behind Act, 2001) for families of a wide array of backgrounds and may further set up non-White families to be at a disadvantage (Coll et al., 1996). Likewise,

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in addition to greater cultural capital, White parents may have a greater comfort, willingness, and knowledge of how to interact with schools in a manner that will benefit their child's socioemotional development (M. Wang & Sheikh-Khalil, 2014). It is important to understand how these associations might be different for non-White families, and all the more so for high-risk youths who have come into contact with the juvenile justice system for the first time. Greater understanding of how these factors affect one another may provide opportunities to inform culturally-competent recommendations for parents and school systems. Though this study provides an initial examination of these factors within this context, future research is needed.

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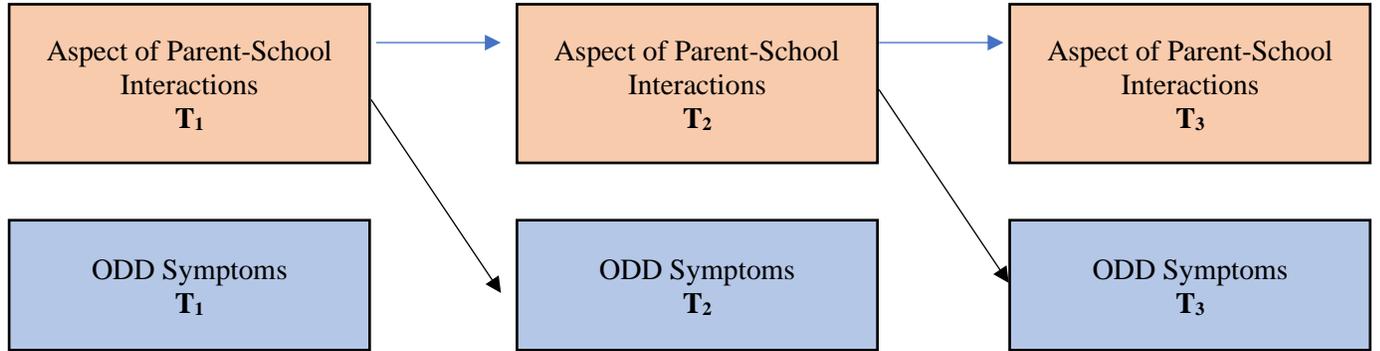
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**Tables & Figures**

Figure 1. *Model of Parent-School Interactions Predicting ODD Symptom Counts Over Time (Time points  $T_{1-3}$ ) while Accounting for Autoregressive Effects*



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Figure 2. *Model of ODD Symptom Counts Predicting Parent-School Interactions Over Time (Time points  $T_{1-3}$ ) while Accounting for Autoregressive Effects*

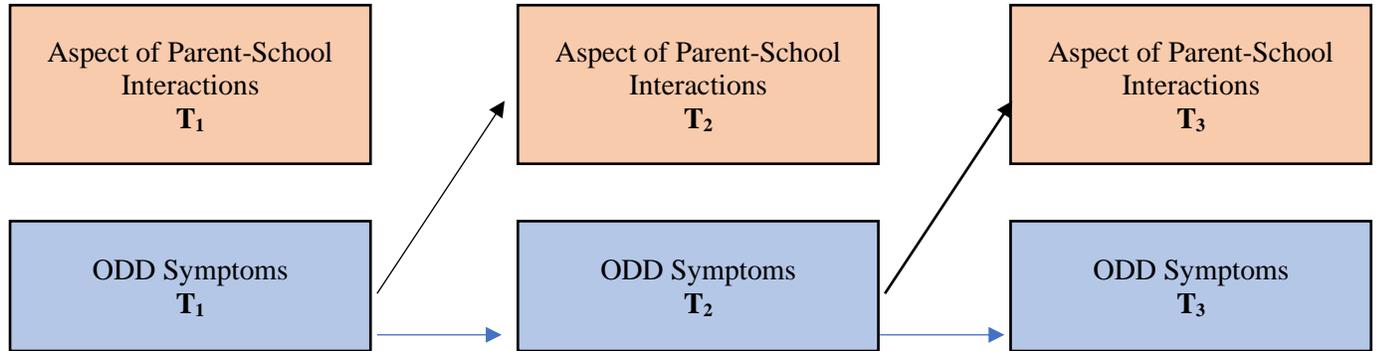
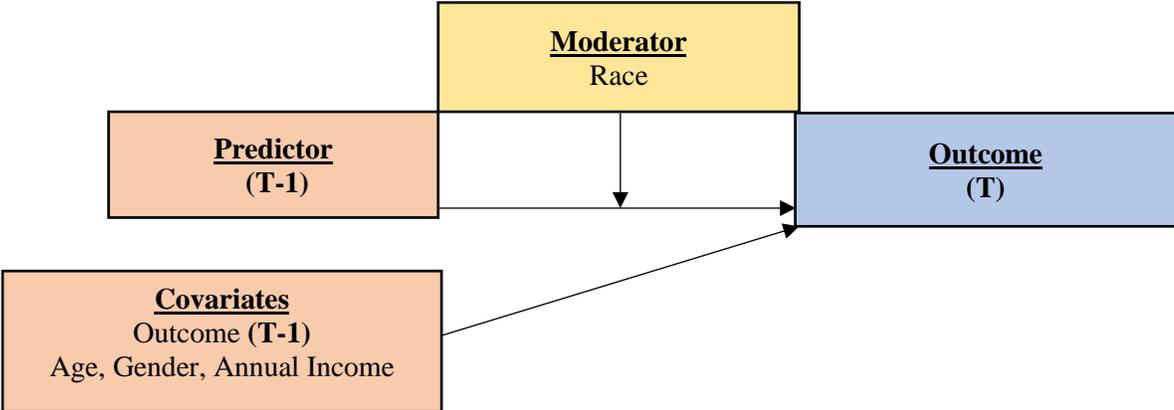


Figure 3. Model of Negative Binomial Regressions Over Time with Race Included as Moderator



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Table 1. *Youth Demographics*

Sample Size	75
Male	48 (64.0%)
Female	27 (36.0%)
Black/African American	55 (73.3%)
White	12 (16.0%)
American Indian or Alaskan Native	0 (0.0%)
Other	8 (10.7%)
Age Range (years)	10.9* – 15.1
Mean Age (years)	13.62* (SD = 1.06)
Annual Family Income - Median	\$15,000-\$19,999
Annual Family Income – Mode	\$0-\$3,999 (n = 14)
	10,000-\$14,999 (n = 14)

Note: SD = Standard Deviation.

\*With the state’s criminal age of responsibility set at 10 years old, this study did not expect to sample those younger than 10 in the juvenile justice system.

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Table 2. *Descriptive Statistics of Outcome Variables for White and Non-White Families at Time 1*

		Relationship	Engagement	Endorsement	Correspondence	ODD Sx
WF	M	15.10	9.00	11.20	3.60	0.75
	SD	6.37	7.77	3.49	2.59	0.97
Non-WF	M	15.57	11.60	9.15	6.68	1.53
	SD	6.75	7.59	4.54	4.13	2.02

Note: Sx = Symptoms; WF=White Families. Score range was as follows: PTIQ Relationship 0-28; PTIQ Engagement 0-44; PTIQ Endorsement 0-16; PTIQ Correspondence 0-16; ODD symptoms 0-8.

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Table 3. *Bivariate Correlations of PTIQ Measure Factors at Time 1*

	Relationship	Engagement	Endorsement	Correspondence	ODD Symptoms
Relationship	1.000				
Engagement	0.342** 0.003	1.000			
Endorsement	0.593*** <0.001	-0.060 0.619	1.000		
Correspondence	0.161 0.175	0.627*** <0.001	-0.360** 0.002	1.000	
ODD Symptoms	0.172 0.148	0.091 0.446	-0.001 0.995	0.303* 0.010	1.000

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05

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Table 4. *Parent-School Interactions (Time T-1) Predicting ODD Symptom Counts (Time T): Main Effects*

<i>Negative Binomial Regressions</i>	b	Robust Std. Err.	z	p >  z	[95% Confidence Interval]	
<u>ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.122	0.064	1.91	0.056	-0.003	0.247
Relationship <sup>T-1</sup>	0.013	0.020	0.64	0.522	-0.026	0.513
Race	0.036	0.353	0.10	0.919	-0.655	0.728
Age	0.001	0.001	0.20	0.844	-0.001	0.001
Gender	-0.563	0.287	-1.96	0.050	-1.125	-0.001
Annual income	-0.001	0.042	-0.000	0.996	-0.083	0.082
constant	0.324	0.532	0.61	0.543	-0.719	1.366
<u>ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.085	0.057	1.50	0.134	-0.026	0.197
Engagement <sup>T-1</sup>	0.052	0.014	3.66	<0.001***	0.024	0.080
Race	0.190	0.363	0.52	0.600	-0.521	0.902
Age	0.001	0.001	1.93	0.053	-0.001	0.001
Gender	-0.698	0.275	-2.54	0.011	-1.237	-0.159
Annual income	-0.014	0.042	-0.33	0.744	-0.095	0.068
constant	-0.152	0.385	-0.39	0.693	-0.907	0.603
<u>ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.096	0.064	1.50	0.133	-0.029	0.222
Endorsement <sup>T-1</sup>	-0.036	0.034	-1.06	0.291	-0.103	0.031
Race	0.051	0.339	0.15	0.879	-0.103	0.031
Age	0.001	0.001	0.07	0.947	-0.001	0.001
Gender	-0.585	0.299	-1.95	0.051	-1.172	0.003
Annual income	-0.014	0.039	-0.37	0.709	-0.090	0.062
constant	1.069	0.602	1.78	0.076	-0.111	2.249
<u>ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.049	0.062	0.79	0.431	-0.073	0.170
Correspondence <sup>T-1</sup>	0.130	0.034	3.83	<0.001***	0.063	0.196
Race	0.254	0.339	0.75	0.453	-0.410	0.918
Age	0.001	0.001	2.22	0.026	0.001	0.001
Gender	-0.562	0.265	-2.12	0.034	-1.081	-0.043
Annual income	-0.029	0.039	-0.75	0.454	-0.104	0.047
constant	-0.338	0.382	-0.88	0.376	-1.087	0.411

Note: T-1 specifies a lagged variable measurement at prior timepoint. Race considered a dichotomous variable (non-White = 0, White = 1). Age was mean centered.

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05

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Table 5. *Parent-School Interactions (Time T-1) Predicting ODD Symptom Counts (Time T): Moderation by Race*

<i>Negative Binomial Regressions</i>	b	Robust Std. Err.	z	p >  z	[95% Confidence Interval]	
<u>ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.093	0.064	1.45	0.146	-0.032	0.218
Relationship <sup>T-1</sup>	0.026	0.023	1.17	0.243	-0.018	0.071
RaceXRelation. <sup>T-1</sup>	-0.091	0.040	-2.29	0.022*	-0.170	-0.013
Race	1.369	0.678	2.02	0.043	0.041	2.697
Age	0.001	0.001	0.33	0.743	-0.001	0.001
Gender	-0.605	0.286	-2.11	0.035	-1.167	-0.044
Annual income	-0.017	0.043	-0.40	0.692	-0.101	0.066
constant	0.241	0.525	0.46	0.646	-0.787	1.270
<u>ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.068	0.056	1.21	0.226	-0.042	0.178
Engagement <sup>T-1</sup>	0.064	0.014	4.62	<0.001	0.037	0.091
RaceXEngage. <sup>T-1</sup>	-0.092	0.043	-2.17	0.030*	-0.176	-0.009
Race	0.989	0.372	2.66	0.008	0.261	1.718
Age	0.001	0.001	2.02	0.043	0.001	0.001
Gender	-0.810	0.278	-2.92	0.004	-1.355	-0.266
Annual income	-0.005	0.044	-0.11	0.914	-0.090	0.081
constant	-0.259	0.380	-0.68	0.495	-1.001	0.485
<u>ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.105	0.063	1.66	0.098	-0.019	0.229
Endorsement <sup>T-1</sup>	-0.043	0.037	-1.15	0.249	-0.115	0.030
RaceXEndorse. <sup>T-1</sup>	0.058	0.086	0.68	0.499	-0.111	0.227
Race	-0.608	0.965	-0.63	0.528	-2.499	1.283
Age	0.001	0.001	0.10	0.919	-0.001	0.001
Gender	-0.579	0.299	-1.93	0.053	-1.167	0.008
Annual income	-0.011	0.039	-0.27	0.786	-0.088	0.066
constant	1.085	0.616	1.76	0.078	-0.122	2.292
<u>ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.048	0.060	0.81	0.421	-0.069	0.165
Correspondence <sup>T-1</sup>	0.122	0.034	3.57	<0.001	0.055	0.189
RaceXCorrespon. <sup>T-1</sup>	0.170	0.150	1.13	0.258	-0.124	0.463
Race	-0.518	0.888	-0.58	0.559	-2.259	1.222
Age	0.001	0.001	2.48	0.013	0.001	0.001
Gender	-0.471	0.271	-1.74	0.082	-1.002	0.060
Annual income	-0.040	0.036	-1.10	0.269	-0.111	0.031
constant	-0.296	0.370	-0.80	0.424	-1.022	0.430

Note: T-1 specifies a lagged variable measurement at prior timepoint. Race considered a dichotomous variable (non-White = 0, White = 1). Age was mean centered.

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05

ODD, PARENT-SCHOOL INTERACTIONS, AND RACE

Table 6. *Parent-School Interactions (Time T-1) Predicting ODD Symptom Counts (Time T) Separately by Race*

<i>Negative Binomial Regressions</i>	b	Robust Std. Err.	z	p >  z	[95% Confidence Interval]	
<u>WF ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	-0.499	0.335	-1.49	0.137	-1.155	0.158
Relationship <sup>T-1</sup>	-0.223	0.103	-2.18	0.029*	-0.424	-0.022
Age	-0.001	0.001	-0.92	0.359	-0.002	0.001
Gender	-2.933	0.722	-4.06	<0.001	-4.348	-1.518
Annual income	-0.193	0.161	-1.19	0.232	-0.509	0.123
constant	7.646	3.455	2.21	0.027	0.875	14.417
<u>Non-WF ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.134	0.061	2.18	0.030	0.013	0.254
Relationship <sup>T-1</sup>	0.021	0.023	0.93	0.353	-0.024	0.066
Age	0.001	0.001	0.48	0.633	-0.001	0.001
Gender	-0.300	0.314	-0.96	0.339	-0.916	0.315
Annual income	-0.043	0.042	-1.02	0.310	-0.126	0.040
constant	0.209	0.498	0.42	0.675	-0.768	1.186
<u>WF ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	-0.198	0.732	-0.27	0.784	-1.616	1.219
Engagement <sup>T-1</sup>	-0.094	0.149	-0.64	0.525	-0.386	0.197
Age	-0.001	0.002	-0.49	0.627	-0.005	0.003
Gender	-1.574	1.815	-0.87	0.386	-5.131	1.983
Annual income	0.265	0.298	0.89	0.373	-0/319	0.849
constant	1.468	6.070	0.24	0.809	-10.429	13.365
<u>Non-WF ODD Symptoms</u>						
ODD Symptoms <sup>T-1</sup>	0.081	0.055	1.48	0.139	-0.027	0.190
Engagement <sup>T-1</sup>	0.063	0.013	4.68	<0.001***	0.037	0.089
Age	0.001	0.001	2.73	0.006	0.001	0.001
Gender	-0.498	0.298	-1.67	0.095	-1.083	0.087
Annual income	-0.053	0.042	-1.27	0.204	-0.134	0.029
constant	-0.247	0.358	-0.69	0.491	-0.949	0.456

Note: T-1 specifies a lagged variable measurement at prior timepoint. WF = White families; Non-WF = non-White families. Age was mean centered.

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05

ODD, PARENT-SCHOOL INTERACTIONS, AND RACE

Table 7. *ODD Symptom Counts (Time T-1) Predicting Parent-School Interactions (Time T): Main Effects*

<i>Regressions</i>	<i>b</i>	<i>Robust Std. Err.</i>	<i>z</i>	<i>p &gt;  z </i>	<i>[95% Confidence Interval]</i>	
<u>Relationship</u>						
Relationship <sup>T-1</sup>	0.379	0.160	2.36	0.022	0.057	0.701
Engagement <sup>T-1</sup>	0.006	0.102	0.06	0.950	-0.198	0.211
Endorsement <sup>T-1</sup>	0.003	0.225	0.01	0.991	-0.448	0.454
Correspondence <sup>T-1</sup>	0.067	0.242	0.28	0.782	-0.418	0.553
ODD Symptoms <sup>T-1</sup>	0.178	0.361	0.49	0.625	-0.547	0.903
Race	-2.540	2.059	-1.23	0.223	-6.672	1.592
Age	0.001	0.002	0.02	0.985	-0.003	0.004
Gender	0.824	1.393	0.59	0.557	-1.971	3.619
Annual income	0.173	0.228	0.76	0.452	-0.284	0.629
constant	8.835	3.220	2.74	0.008	2.373	15.297
<u>Engagement</u>						
Relationship <sup>T-1</sup>	0.010	0.026	0.39	0.698	-0.042	0.062
Engagement <sup>T-1</sup>	0.072	0.022	3.25	0.002	0.027	0.117
Endorsement <sup>T-1</sup>	-0.080	0.052	-1.52	0.135	-0.185	0.026
Correspondence <sup>T-1</sup>	-0.035	0.044	-0.80	0.430	-0.124	0.054
ODD Symptoms <sup>T-1</sup>	-0.052	0.055	-0.96	0.343	-0.163	0.058
Race	0.039	0.236	0.16	0.871	-0.436	0.513
Age	-0.001	0.001	-2.38	0.021	-0.002	-0.001
Gender	-0.045	0.216	-0.21	0.837	-0.477	0.388
Annual income	-0.069	0.037	-1.88	0.066	-0.143	0.005
constant	3.989	0.779	5.12	<0.001	2.426	5.553
<u>Endorsement</u>						
Relationship <sup>T-1</sup>	0.157	0.093	1.68	0.099	-0.030	0.344
Engagement <sup>T-1</sup>	-0.015	0.068	-0.22	0.828	-0.150	0.121
Endorsement <sup>T-1</sup>	0.098	0.142	0.69	0.492	-0.187	0.384
Correspondence <sup>T-1</sup>	-0.201	0.167	-1.20	0.235	-0.536	0.135
ODD Symptoms <sup>T-1</sup>	0.227	0.200	1.13	0.262	-0.175	0.630
Race	-1.211	1.253	-0.97	0.338	-3.725	1.303
Age	-0.001	0.001	-0.78	0.439	-0.002	0.001
Gender	0.214	0.849	0.25	0.802	-1.490	1.919
Annual income	-0.003	0.118	-0.02	0.982	-0.240	0.235
constant	8.848	1.820	4.86	<0.001	5.197	12.500
<u>Correspondence</u>						
Relationship <sup>T-1</sup>	-0.009	0.024	-0.37	0.716	-0.057	0.039
Engagement <sup>T-1</sup>	0.020	0.019	1.05	0.296	-0.018	0.059
Endorsement <sup>T-1</sup>	-0.005	0.033	-0.14	0.886	-0.072	0.062
Correspondence <sup>T-1</sup>	0.079	0.036	2.14	0.037	0.005	0.151
ODD Symptoms <sup>T-1</sup>	0.005	0.048	0.10	0.924	-0.092	0.101
Race	0.242	0.210	1.15	0.254	-0.179	0.662
Age	-0.001	0.001	-1.92	0.060	-0.001	0.001
Gender	-0.029	0.192	-0.15	0.882	-0.413	0.356
Annual income	0.002	0.037	0.05	0.957	-0.072	0.076
constant	1.865	0.529	3.53	0.001	0.803	2.926

Note: T-1 specifies a lagged variable measurement at prior timepoint. Race considered a dichotomous variable (non-White = 0, White = 1). Age was mean centered. The models predicting to Correspondence and Engagement were run using transformed variables.

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05

ODD, PARENT-SCHOOL INTERACTIONS, AND RACE

Table 8. *ODD Symptom Counts (Time T-1) Predicting Parent-School Interactions (Time T): Moderation by Race*

<i>Regressions</i>	<i>b</i>	<i>Robust Std. Err.</i>	<i>z</i>	<i>p &gt;  z </i>	<i>[95% Confidence Interval]</i>	
<u>Relationship</u>						
Relationship <sup>T-1</sup>	0.353	0.163	2.16	0.035	0.026	0.681
Engagement <sup>T-1</sup>	-0.015	0.104	-0.15	0.883	-0.223	0.193
Endorsement <sup>T-1</sup>	-0.022	0.225	-0.10	0.921	-0.473	0.428
Correspondence <sup>T-1</sup>	0.065	0.244	0.27	0.791	-0.424	0.554
ODD Symptoms <sup>T-1</sup>	0.362	0.402	0.90	0.372	-0.445	1.168
RaceXODD <sup>T-1</sup>	-1.328	0.633	-2.10	0.041*	-2.598	-0.059
Race	-0.494	2.317	-0.21	0.832	-5.143	4.156
Age	-0.001	0.002	-0.25	0.803	-0.004	0.003
Gender	0.798	1.348	0.59	0.556	-1.907	3.504
Annual income	0.237	0.228	1.04	0.304	-0.221	0.695
constant	9.358	3.336	2.81	0.007	2.664	16.052
<u>Engagement</u>						
Relationship <sup>T-1</sup>	0.009	0.026	0.34	0.732	-0.043	0.061
Engagement <sup>T-1</sup>	0.071	0.023	3.03	0.004	0.024	0.118
Endorsement <sup>T-1</sup>	-0.081	0.054	-1.50	0.141	-0.189	0.028
Correspondence <sup>T-1</sup>	-0.035	0.045	-0.79	0.435	-0.125	0.055
ODD Symptoms <sup>T-1</sup>	-0.044	0.064	-0.69	0.493	-0.173	0.084
RaceXODD <sup>T-1</sup>	-0.059	0.148	-0.40	0.692	-0.356	0.238
Race	0.129	0.361	0.36	0.721	-0.595	0.853
Age	-0.001	0.001	-2.27	0.027	-0.002	-0.001
Gender	-0.046	0.216	-0.21	0.834	-0.480	0.389
Annual income	-0.066	0.037	-1.78	0.082	-0.142	0.009
constant	4.013	0.808	4.97	<0.001	2.392	5.634
<u>Endorsement</u>						
Relationship <sup>T-1</sup>	0.144	0.092	1.57	0.123	-0.040	0.330
Engagement <sup>T-1</sup>	-0.026	0.067	-0.38	0.704	-0.160	0.109
Endorsement <sup>T-1</sup>	0.086	0.144	0.60	0.554	-0.204	0.375
Correspondence <sup>T-1</sup>	-0.202	0.167	-1.21	0.233	-0.537	0.134
ODD Symptoms <sup>T-1</sup>	0.319	0.201	1.58	0.119	-0.085	0.723
RaceXODD <sup>T-1</sup>	-0.662	0.470	-1.41	0.165	-1.606	0.282
Race	-0.191	1.207	-0.16	0.875	-2.612	2.231
Age	-0.001	0.001	-0.99	0.328	-0.003	0.001
Gender	0.201	0.836	0.24	0.811	-1.475	1.878
Annual income	0.029	0.124	0.24	0.813	-0.219	0.278
constant	9.109	1.892	4.82	<0.001	5.314	12.905
<u>Correspondence</u>						
Relationship <sup>T-1</sup>	-0.009	0.025	-0.38	0.709	-0.059	0.041
Engagement <sup>T-1</sup>	0.020	0.020	1.00	0.321	-0.020	0.060
Endorsement <sup>T-1</sup>	-0.005	0.034	-0.16	0.875	-0.073	0.062
Correspondence <sup>T-1</sup>	0.078	0.037	2.13	0.038	0.004	0.151
ODD Symptoms <sup>T-1</sup>	0.009	0.052	0.17	0.869	-0.095	0.112
RaceXODD <sup>T-1</sup>	-0.028	0.126	-0.22	0.824	-0.281	0.225
Race	0.285	0.295	0.97	0.337	-0.306	0.877
Age	-0.001	0.001	-1.88	0.066	-0.001	0.001
Gender	-0.029	0.192	-0.15	0.880	-0.415	0.357
Annual income	0.003	0.039	0.09	0.931	-0.074	0.081
constant	1.876	0.543	3.46	0.001	0.787	2.965

## ODD, PARENT-SCHOOL INTERACTIONS, AND RACE

Note: T-1 specifies a lagged variable measurement at prior timepoint. Race considered a dichotomous variable (non-White = 0, White = 1). Age was mean centered. The models predicting to Correspondence and Engagement were run using transformed variables.

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$

ODD, PARENT-SCHOOL INTERACTIONS, AND RACE

Table 9. *ODD Symptom Counts (Time T-1) Predicting Parent-School Relationships (Time T) Separately by Race*

<i>Regressions</i>	b	Robust Std. Err.	z	p >  z	[95% Confidence Interval]	
<u>WF Relationship</u>						
Relationship <sup>T-1</sup>	-0.545	0.569	-0.96	0.366	-1.858	0.767
Engagement <sup>T-1</sup>	0.594	0.267	2.23	0.057	-0.021	1.209
Endorsement <sup>T-1</sup>	-2.412	0.716	-3.37	0.010	-4.063	-0.761
Correspondence <sup>T-1</sup>	-3.114	0.939	-3.31	0.011	-5.280	-0.947
ODD Symptoms <sup>T-1</sup>	-4.660	1.076	-4.33	0.003**	-7.140	-2.179
Age	-0.026	0.008	-3.28	0.011	-0.044	-0.008
Gender	-22.027	8.242	-2.67	0.028	-41.033	-3.021
Annual income	-3.874	1.270	-3.05	0.016	-6.803	-0.945
constant	116.475	31.374	3.71	0.006	44.127	188.822
<u>Non-WF Relationship</u>						
Relationship <sup>T-1</sup>	0.243	0.178	1.37	0.179	-0.116	0.602
Engagement <sup>T-1</sup>	-0.034	0.114	-0.30	0.766	-0.264	0.195
Endorsement <sup>T-1</sup>	0.181	0.207	0.87	0.387	-0.237	0.599
Correspondence <sup>T-1</sup>	0.249	0.258	0.97	0.339	-0.271	0.770
ODD Symptoms <sup>T-1</sup>	0.349	0.413	0.84	0.404	-0.485	1.183
Age	0.001	0.002	0.21	0.834	-0.003	0.004
Gender	0.961	1.486	0.65	0.521	-2.036	3.959
Annual income	0.322	0.214	1.50	0.140	-0.110	0.753
constant	7.214	3.040	2.37	0.022	1.083	13.344

Note: T-1 specifies a lagged variable measurement at prior timepoint. WF = White families; Non-WF = non-White families. Age was mean centered.

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05