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**MENTAL HEALTH AND VIOLENT OFFENDING IN CHICAGO YOUTH: A
MULTILEVEL APPROACH**

**Final Technical Report for the Data Resources Program:
Funding for Analysis of Existing Data**

Submitted to the National Institute of Justice

Award No: 2009-IJ-CX-0007

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ABSTRACT

Mental Health and Violent Offending in Chicago Youth: A Multilevel Approach

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The early identification of mental illness in youngsters is an important goal for researchers who are interested in determining if a causal relationship exists between various forms of mental disorder and offending. Consideration of mental health problems is also of great importance to practitioners in criminal justice who treat youth presenting with co-morbid mental and behavioral issues. Building upon preliminary work, this study utilizes gender- and age-appropriate continuous indicators of DSM-oriented scales of psychopathology to explore the link between child and adolescent mental health and youth violence. This study examines the role of various mental health problems on self-reported violence among Project on Human Development in Chicago Neighborhoods (PHDCN) across age cohorts while controlling for various community-, friend-, familial-, and individual-level risk factors that may also influence violence pathways. Results from the multilevel analyses suggest a continuity of oppositional defiant and antisocial personality problems over the life-course may predict violence. The implications of these findings are offered as they relate to public policy, treatment, and future research efforts.

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EXECUTIVE SUMMARY

There are a number of critical social and policy implications for identifying the causes and correlates of violence, with a specific emphasis on factors that may temporally predict the onset and persistence of violence across various developmental stages. The early identification and treatment of mental health issues in troubled youngsters is an essential goal for researchers who are trying to determine if a causal relationship exists between various forms of psychopathology and offending. Such inquiries have the potential to substantively contribute to our understanding of the etiology of violent pathways across the life span and, in turn, guide best practices on a public policy level as governments and communities work to promote prosocial outcomes for at-risk youth and families.

With these larger issues in mind, the present study seeks to further contribute to our understanding of violence by exploring the complex relationship between the onset of various DSM-oriented (*Diagnostic and Statistical Manual of Mental Disorders*, see American Psychiatric Association, 2000) mental health problems and other factors. The study utilizes multilevel analyses to determine the ability of specific individual-, family- and community-level variables to predict self-reported violent offending in children and adolescents participating in the Project on Human Development in Chicago Neighborhoods (PHDCN) study. The PHDCN is a prospective community-based project that includes a longitudinal study of over 6,000 Chicago youngsters and their families and a neighborhood survey of roughly 9,000 residents within 80 neighborhood clusters in greater Chicago. Utilizing data from the Child Behavior Checklist (CBCL) and other highly reliable and commonly-used instruments like the Youth Self Report (YSR) and Young Adult Self Report (YASR) from Thomas Achenbach and his colleagues (see e.g., Achenbach, 2001; Achenbach & Rescorla, 2001; Achenbach, Dumenci, & Rescorla, 2002; Achenbach, Dumenci, & Rescorla, 2003), DSM-oriented scales of psychopathology were created. Importantly, these scales represent dimensional and taxonomic measures of mental health problems that are age- and gender-appropriate. They also offer considerable practical utility since the continuous nature of the DSM-oriented scales allows researchers and practitioners to identify youth who do not meet the criteria for a clinical disorder diagnosis but who have enough significant mental health issues, when compared with their “normal” peers, to be considered within a borderline range for psychopathology and therefore at increased risk for negative outcomes.

This study joins a small number of scholarly works to date that have adopted DSM-oriented scales as developmentally age- and gender-appropriate predictors of offending (see e.g., Boots, 2008 for an examination of mental health and offending in Pittsburgh Youth Study boys; also Boots & Wareham, 2009, 2010 and Boots et al., 2011 in PHDCN youth). However, it is noteworthy that none of these previous works were able to account for family, peer, or community influences that may contribute to the etiology of youth violence. Accordingly, the current study addresses this gap in the literature and utilizes a multilevel approach to test the effects of DSM-oriented problems in the prediction of youth violence in PHDCN youth. These DSM-oriented scales include five different forms of childhood and adolescent psychopathology, including oppositional defiant (ODP), depressive, anxiety, somatic, and attention-

deficit/hyperactivity problems. For older youths displaying oppositional behaviors, antisocial personality problems (APP) were also assessed.

The present study reports the results of separate hierarchical linear modeling (HLM) logistic regressions estimated for the three DSM-oriented assessment instruments (i.e., CBCL, YSR, and YASR) to explore three main objectives. The objectives and a brief summary of the findings are reported below. In general, *individual* (age, sex, socioeconomic status, race, and prior violence at Wave 1), *peer* (delinquent peers and poor friendships), *family* (family conflict, physical maltreatment, poor family relations, family member depression, family member anxiety, and family member criminality), and *neighborhood* (anomie, neighborhood decline, neighborhood organizations, neighborhood ties, social cohesion, and perceived violence) served as predictors of future self-reported violence. The violence outcome was a dichotomous indicator of whether youths reported engaging in eight violent or aggressive acts at Wave 2.

Objective 1: Examine whether individual-level DSM-oriented problems in PHDCN youth remain significant as predictors of violence when controlling for other individual-, family-, and neighborhood-level indicators that may contribute to violent offending.

CBCL (Parent-Reported) Results:

- None of the DSM-oriented problems significantly predicted future violence, when controlling for peer, family, and community influences.
- Being male and older significantly increased the odds of future violence.
- The strongest predictor of future violence was prior violence, controlling for all else.
- Delinquent peer associations significantly increased the risk of future violence, but poor friend relationships did not.
- None of the family variables significantly predicted future violence.
- None of the neighborhood variables significantly affected violence.

YSR (Youth-Reported) Results:

- Oppositional defiant problems was the only DSM-oriented scale that significantly predict future violence, when controlling for peer, family, and community influences.
- Being male and non-white significantly increased the odds of future violence.
- The strongest predictor of future violence was prior violence, controlling for all other variables.
- Delinquent peer associations significantly increased the risk of future violence, but poor friend relationships did not.
- Poor family relations, family member depression, and family member criminality significantly increased the odds of future violence, while family member anxiety significantly decreased the odds of future violence. Family conflict and physical maltreatment did not significantly affect future violence.
- Neighborhood decline significantly increased the odds of violence. None of the remaining neighborhood variables significantly affected violence.

YASR (Young Adult-Reported) Results:

- Antisocial personality problems was the only DSM-oriented scale to significantly predicted future violence, when controlling for peer, family, and community influences. (The attention deficit/hyperactivity problems scale was not available for the YASR.)
- Being male significantly increased the odds of future violence.
- Again, the strongest predictor of future violence was prior violence, controlling for all else.
- Delinquent peer associations significantly increased the risk of future violence, but poor friend relationships did not.
- None of the family variables significantly predicted future violence. (The physical maltreatment variable was not available for the YASR.)
- None of the neighborhood variables significantly affected violence.

Objective 2: Determine the magnitude of the DSM-oriented problem effect sizes when controlling for other multilevel indicators.

Summary of DSM-Oriented Results:

- The effect of oppositional defiant problems for YSR youth on future violence was significant but weak, controlling for all other variables. A unit-increase in oppositional defiant problems increases the odds of future violence by 4%.
- The effect of antisocial personality problems for YASR youth on future violence was also significant but weak, controlling for all other variables. A unit-increase in oppositional defiant problems increases the odds of future violence by 7%.

Objective 3: If DSM-oriented problems remain significant predictors of violence in a multilevel model after controlling for family- and neighborhood-level variables, explore the interactions between these various indicators.

Summary of Interaction Effects for DSM-Oriented Variables:

- None of the interaction effects were significant for oppositional defiant problems in the YSR models, controlling for all else. Hence, the impact of oppositional defiant problems on the future violence measure was not dependent on various sociodemographic, peer, family, and neighborhood factors.
- None of the interaction effects were significant for antisocial personality problems in the YASR models, controlling for all else. The effect of antisocial personality problems on future violence was not conditioned on various sociodemographic, peer, family, and neighborhood factors.

In summary, our findings provide further empirical support for the relevance of developmental perspectives as they largely corroborate the existing body of research on mental health and violence that has primarily focused on forensic or clinical populations to examine the link between ODP and violence. Despite a rather impressive body of research on covariates of mental health problems, there is still much to be understood

about how these pieces fit into the larger puzzle of risk factors associated with negative life outcomes. The current project sought to complement and extend previous works on this topic to provide a more comprehensive, multi-tiered, and nuanced understanding of specific mental health problems associated with violence. Our results also point to the need to examine and include the family, especially in adolescence with regard to the familial effects reported on cohorts 12 and 15. Perhaps most importantly from a public policy perspective, the multidimensional component of our study has important practical and policy-oriented implications for intervention and prevention methods calling for more holistic treatment strategies. In conjunction with other studies, our work contributes insights into which mental health difficulties may be most problematic among urban youth, how other individual, family, and neighborhood risk factors affect the magnitude of mental health consequences of violence, and which components play a greater part in violent behavior across various developmental stages. While we did not find as many community-level effects as we might have expected from the outset of this study due to the robust community-level findings found in previous studies off the PHDCN, our findings regarding neighborhood decline are intriguing in light of the voluminous body of research related to social ecology produced since the 1990s that has debated how neighborhood social processes and mechanisms may facilitate life outcomes such as crime. Our findings are therefore generally supported by previous studies that have shown community disorder and a lack of neighborhood cohesion to be associated with poor mental health outcomes. While our research does not suggest that *only* mental health should receive increased resources at the exclusion of other social problems that also appear to contribute to violence, public policies and community initiatives that ignore the salient role of mental illness are argued to fall short of holistic treatment needed to ameliorate youth violence. Mental illness, and the prevalence of specific forms of psychopathology at various points in childhood and adolescence, is posited to be a critical component in effective treatment that should be part of best practices in youth violence reduction efforts, especially in urban centers with persistent and severe economic disadvantage.

Introduction

A large number of national and local studies point toward the co-occurrence of violent behaviors with other problems in youth such as mental health issues (Huizinga & Jakob-Chen, 1998). When compared to other age groups, children and adolescents have the highest rates of deviant, noncompliant, and problem behaviors (Mash & Wolfe, 2005). There is robust evidence between mental health and poor life-course outcomes throughout the empirical literature. Within the juvenile justice system, an alarming number of youth with mental health problems are being processed into the system who subsequently recidivate, with scarce rehabilitation resources available for these offenders (Teplin et al., 2006; Vermeiren, 2003). Over the last decade, a consensus has emerged among criminal justice practitioners and scholars of a growing mental health crisis in dealing with justice-involved youth (Grisso, 2008). Indeed, recent polls of juvenile justice staff rate mental health as the top problem facing this workforce nationally (Cocozza, 2002).

There are a number of critical social and policy implications for identifying the causes and correlates of violence, and specifically in relation to factors that may temporally predict the onset and persistence of violence across various developmental stages (Molnar, Roberts, Browne, Gardener, & Buka, 2005). The early identification and treatment of mental health issues in troubled youngsters is an essential goal for researchers who are trying to determine if a causal relationship exists between various forms of psychopathology and offending (Loeber, 2004; Moreland & Dumas, 2008). Such inquiries have the potential to substantively contribute to our understanding of the etiology of violent pathways across the life span and, in turn, guide best practices on a

public policy level as governments and communities work to promote prosocial outcomes for at-risk youth and families.

With these policy issues in mind, the purpose of the present study is to further contribute to our understanding of violence by exploring the complex relationship between the onset of various DSM-oriented (Diagnostic and Statistical Manual of Mental Disorders, see American Psychiatric Association, 2000) mental health problems and other familial and community factors within a multilevel model to determine the ability of these variables to predict criminal offending in children and adolescents participating in the Project on Human Development in Chicago Neighborhoods (PHDCN) study. The PHDCN is a prospective community-based project that includes a longitudinal study of over 6,000 Chicago youngsters and their families and a neighborhood survey of roughly 9,000 residents within 80 neighborhood clusters in greater Chicago. Utilizing data from the Child Behavior Checklist (CBCL) and other highly reliable and commonly-used instruments of psychopathology from Thomas Achenbach and his colleagues (see e.g., Achenbach, 2001; Achenbach & Rescorla, 2001; Achenbach, Dumenci, & Rescorla, 2002; Achenbach, Dumenci, & Rescorla, 2003), DSM-oriented scales are created and represent dimensional and taxonomic measures of mental health problems that are age- and gender-appropriate. The non-categorical nature of these scales allow researchers to identify youth who do not meet the criteria for a clinical disorder diagnosis but who have enough significant mental health issues, when compared with their “normal” peers, to be considered within a borderline range for psychopathology and therefore at increased risk for negative outcomes. (Appendix A contains a list of acronyms used consistently throughout this report.)

This work builds upon recent findings from Boots and Wareham (2009) that suggests that specific DSM-oriented scales were more salient than others in various stages of childhood and adolescence at predicting subsequent violent offending in PHDCN boys and girls. That is, youth who self-reported oppositional defiant and antisocial personality problems in childhood and adolescence at Wave 1 had an increased likelihood of committing future property crimes or violence at Wave 2 across developmental stages. Moreover, oppositional deficits remained significant in predicting violence from the ages of 10 through 19 in PHDCN youngsters, even when controlling for other co-occurring DSM-oriented mental health conditions, sociodemographics, and prior violent offending histories (Boots & Wareham, 2010).

These results are partially supported by Boots' (2008) findings regarding Pittsburgh Youth Study boys, which similarly found that DSM-oriented scales of oppositional defiant behaviors in adolescence were a valid predictor of violence into young adulthood. Overall, these findings are consistent with a sizeable body of literature that has linked child oppositional and antisocial behaviors to violence and aggression over the life-course (Connor, 2002). However, it is noteworthy that none of these recent works were able to account for socialization, family, peer influences, or community factors that may significantly contribute to the etiology of youth violence. Such meso- and macro-level factors may play a significant role in violence pathways when simultaneously considering the role of mental health issues in the development of such antisocial behaviors. Youth with multiple risk factors across domains are at significantly greater odds for long-term social dysfunction and problems (France, 2008). Accordingly, the current study addresses this gap in the literature and utilizes a multilevel approach to test the effects of DSM-oriented problems in the prediction of

youth violence across various stages of human development in PHDCN youth. These issues are explored through a life-course and developmental framework, which offers an age-sensitive rubric to investigate violence.

Review of Relevant Literature

Developmental and Life-Course Theoretical Perspectives

In recent years, the major disciplines of sociology, public health, epidemiology, and criminology have integrated with psychological orientations to create a more global psychosocial perspective on the genesis of violence and offending over the lifespan (Farrington, 2000; France & Utting, 2005; Patel, Flisher, Hetrick, & McGorry, 2007). Since the 1990s, an expansive amount of scholarly evidence has emerged under the domain of life-course and developmental criminology which considers the onset, persistence, and desistence of a wide range of psychosocial problems and deviant behaviors (see e.g., Sampson & Laub, 1993). These developmental perspectives assume that the correlates of antisocial behavior may change as a function of age and situational factors, creating dynamic feedback loops whereby behavioral traits and outcomes produce “risk factors” that lead to poor life-course outcomes (Loeber & Farrington, 2001; Loeber & Hay, 1994). Since deviant behaviors in some individuals have been shown to begin well prior to adolescence, research that includes samples of younger children provides the greatest chance to identify mental health problems from a causal perspective that influence the development of types of serious offending at various life stages (Tremblay et al., 1992).

An ever-growing volume of extant literature shows that a subset of the most serious, chronic offenders began their antisocial behaviors in early childhood and then

persisted on these deviant trajectories throughout their lives (see e.g., Loeber & Farrington, 2000; Moffitt, 1993; Piquero & Mazerolle, 2001). Thus, while chronic youthful violent offending is relatively rare (Esbensen, 2004; Klein, 1995; Loeber & Farrington, 2000) and the majority of juvenile offenders desist from criminal activities in their early to mid 20s (see Moffitt, 1993; Moffitt, Caspi, Dickson, Silva, & Stanton, 1996), boys, gang members, and youngsters of color continue to both engage and become victims of violent and antisocial behaviors in alarming numbers (Spergel, 1990; Thornberry, 1998). These disturbing findings are further supported from the work conducted in the U.S. Department of Justice Office of Juvenile Justice and Delinquency Prevention's Causes and Correlates of Juvenile Delinquency Program (Loeber & Farrington, 1998; Thornberry, 1998; Thornberry, Huizinga, & Loeber, 1995). These data from three longitudinal, prospective study sites in Pittsburgh, Pennsylvania, Denver, Colorado, and Rochester, New York also indicate a high prevalence of violent offending by urban at-risk youths. In each of the three samples, between 14 and 17 percent of the youths were chronic, serious male or female offenders. These youngsters committed an astonishing 75 to 82 percent of all violent offenses committed by the samples (Thornberry et al., 1995). The finding that approximately 6 to 14 percent of chronic violent persons are ever arrested for their violent crimes is even more disconcerting (Elliott, 2000; Huizinga, Esbensen, & Weiher, 1996), especially when considering the prominence of mental health in these justice-involved populations (Loeber, 2004).

There are persistent findings that point toward the co-occurrence of violent behaviors with select mental health problems (Wolfe & Mash, 2006; Boots, Wareham, & Weir, 2011). Yet while "violence is relatively widespread among adolescents, few studies have been undertaken on the co-occurrence of violence and mental health problems or

disorders among U.S. adolescents” (U.S. Department of Health and Human Services, 2001a, p. 50). Troubled youths within the criminal justice system have higher rates than the general population of various psychopathological problems that have been empirically linked to delinquency and adult offending (Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007). While rates vary between studies and distinct methodologies employed, on average, justice-involved youth have a two to three times higher probability of having a mental health disorder than the general population (Cocozza, 2002; U.S. Health and Human Services, 2001b). Many of these youngsters come from areas of disproportionately concentrated urban poverty and disadvantage in underserved communities that are plagued with high rates of neighborhood violence, racial/ethnic barriers, a lack of social capital and services, family dysfunction, parental psychopathology, and academic failure of youngsters (Massey & Denton, 1993; Messner & Rosenfeld, 1994; Sampson & Laub, 1994). An expansive body of literature regarding the continuation of problem behaviors over the life-course and the link between early problem behaviors and later aggression points to the need to investigate these issues in greater depth (see Blumstein, Cohen, Roth, & Visher, 1986; Farrington, 1995; Sampson & Laub, 1990). Taken within a developmental context, the examination of mental health problems warrants sensitivity to age- and gender-appropriate contexts (Popper, Ross, & Jennings, 2000).

Co-Occurrence of Mental Health and Offending

Mental health problems are defined herein as “either psychiatric diagnoses or extreme scores on mental health rating scales” (Loeber, Farrington et al., 2002, p. 273). The terms mental health problems, mental illnesses, and mental disorders are used interchangeably hereafter and refer to the same general concept of dysfunction in this

area. To be clear, the presence of violent or aggressive behaviors in and of itself does not suffice to constitute a mental illness. Likewise, the presence of a mental disorder does not ensure that someone will act violently. While the latest generation of research has supported these propositions, this same literature suggests that specific types of mental illness may play a significant role in the development of some forms of violent behaviors (Hiday, 2006; Link & Stueve, 1995; Mulvey, 1994; Silver, Felson, & Vaneseltine, 2006). That is, “while most people who develop one of these disorders do not commit violent crimes, there is reason to believe that the presence of mental disorders may interact with other factors to facilitate violent offending” (Meadows & Kuehnel, 2005, p. 181). Moreover, “evidence suggests that a not insignificant amount of aggressive behavior occurring in institutions such as psychiatric treatment facilities and in the community may be associated with an underlying psychiatric condition that may or may not be recognized at the time the aggressive behavior occurs” (Connor, 2002, p. 63). Questions arise regarding the temporal order of some types of mental health problems and violence as well as the strength of these relationships, when controlling for other factors, which may thereby influence pathways to aggression and offending. There are also serious considerations in this type of research due to the tremendous potential for spuriousness in the findings, with similar risk factors and life experiences common for both of these outcomes (see Link, Andrews, & Cullen, 1992, Silver & Teasdale, 2005; Silver et al., 2008).

In an extensive review of the literature surrounding mental illness and crime, Monahan and Steadman (1983) identified two distinctive typologies of studies: 1) those ‘pure’ studies that investigate either crime rates of persons diagnosed as mentally disordered *or* the rates of mental disorder among persons labeled as criminal and 2)

more 'mixed' cases that identify groups of 'mentally disordered' offenders, or individuals that have been treated for both mental disorder and criminality. There is no universally accepted definition of a mentally disordered offender (MDO) across disciplines or in the extant literature. Rather, it can be said that the legal, policy, and health fields have different and varying standards, measurements, and conditions for commonly-used terms such as "insanity," "competency," and "mental illness." These definitional challenges when investigating MDOs make comparisons across studies oftentimes problematic for comparison.

In a broad review of 11 studies that focused on the relationship between mental illness and criminality, Andrews and Bonta (2003) reported several key conclusions. First, most criminal offenders were diagnosed with some type of mental health problem, with between 18.9 and 100 percent of all study subjects classified as having at least one type of disorder. One of the most common diagnoses within this population was antisocial personality disorder, or APD. An important caveat of these results was that some studies used measures of lifetime incidence, thereby inflating the positive diagnoses. Yet it appeared that serious psychiatric dysfunction was not common overall, with most studies in the analysis showing low prevalence rates for disorders such as schizophrenia (approximately 7%), manic depression (2-3%), and major depressive disorder (7%).

Despite findings such as these, MDOs are considered by many in the public to pose a significant risk to the community with respect to dangerousness (Phelan & Link, 1998). While mental patients have been shown to have higher arrest rates than non-patients (see Brennan, Mednick & Hodgins, 2000), the rise of deinstitutionalization in the U.S. beginning in the 1960s may have much to do with these rising rates.

Deinstitutionalization refers to the treatment of mentally ill persons within a community setting versus one of formal hospitalization. Research in the 1920s through the 1950s showed that mental patients had similar arrest rates as that of the general population. In contrast, studies in the 1960s and 1970s suggested that mentally ill persons were responsible for a disproportionate number of violent crimes. As a result, “such findings naturally fueled public fear about the consequences of deinstitutionalization” (Curran & Renzetti, 2001, p. 84). Other researchers have reported that the majority of violent arrests of former mental patients came from those patients with a prior history of serious criminal arrests (Cocozza, Melick & Steadman, 1978). Scholars have further speculated that arrests of the mentally ill were driven by police bias against the mentally ill, with findings both supporting (Teplin, 1984) and opposing (Engel & Silver, 2001) this argument.

In a meta-analysis of the predictors of general and violent offending, Bonta and his colleagues (1998) reviewed 64 longitudinal studies spanning from 1959 and 1995. Recidivism measures included both arrest and hospitalization items. In their review summary, the authors argued that antisocial supports and cognitions were not given enough attention in the study of MDOs. They further noted that “the training of clinical psychologists and psychiatrists naturally predisposes them to seek explanations in factors such as psychosis and other measures of psychological disturbance” (Andrews & Bonta, 2003, p. 365) to the exclusion of other general psychosocial explanations of criminal conduct. Criminal history, antisocial personality, substance abuse, and family factors were the strongest predictors of recidivism, respectively. Perhaps most importantly, the authors reported that MDOs were actually less likely to recidivate ($r = .19$) or commit a violent crime ($r = -.10$) than were general offenders.

When comparing the Bonta study with two other recent meta-analyses (see Gendreau, Little & Goggin, 1996; Hanson & Bussiere, 1998), Andrews and Bonta (2003) also found that MDOs and other offenders had comparable *predictors* of recidivism. That is, the same factors that contributed to offending in general also appeared to contribute to MDOs' offending. These predictors included factors across domains such as the family and environment. Another body of literature has similarly compared formerly hospitalized patients with the general population. "Overall, these studies show that former mental patients are slightly more likely than individuals never hospitalized to engage in violent behavior. However, the research also shows that people with mental illnesses are more likely to be *victims* of violence rather than perpetrators" (Curran & Renzetti, 2001, p. 87).

These observations highlight the importance of further teasing out what role mental illness may play in the development of aggression when considering contextual factors within the family social setting and community. For instance, inasmuch as mental disorders may be precipitated or be exacerbated by interactions with an abusing or psychologically-disturbed parent, childhood maltreatment and dysfunctional family environments may help reinforce the development and persistence of mental disorders in their children as well (Dodge, Pettit, & Bates, 1997; Jacobvitz & Sroufe, 1987; Murray, Sinclair, Cooper, Ducournau, & Turner, 1999). Moreover, children and adolescents exposed to community disorder, decay, and violence have been shown to be at significantly greater odds of both victimization and offending (Beyers, Loeber, Wikstrom, & Stouthamer-Loeber, 2001; Lipsey & Derzon, 1998; Rowe, Almeida, & Jacobsen, 1999).

A perusal of the mental health and violence literature indicates there is an abundance of studies that have retrospectively investigated violence. While these types of studies are practical, cheaper, and easier to complete, they have a number of shortcomings. Namely, these studies are limited by the potential retrospective memory bias of the participants, are often lacking in comparison groups, and temporally are unable to contribute substantially to our knowledge of childhood contributors to violent behaviors (Loeber, Farrington, Stouthamer-Loeber & Van Kammen, 1998). Caution must be used when retrospectively asking respondents to determine the onset, persistence, or desistance of problem behaviors. Thus, while they may yield intriguing insights into possible correlates, such retrospective studies are unable to speak to the temporal order and causal nature of the mental health-violence relationship that are a prerequisite of sound public policy and programming decisions equated with best practices. In addition, a majority of these works have focused on adolescent, adult, or referred populations (see e.g., Capaldi, 1992; Drabick, Beauchaine, Gadow, Carlson & Bromet, 2006; Loeber et al., 1998; Tremblay, Pagani-Kurtz, Masse, Vitaro & Pihl, 1995).

Of the research that has utilized a prospective or longitudinal approach, a sizeable number of these studies have either concentrated primarily on the development or prevalence of specific mental disorders in child and adolescent populations (see e.g., Angold & Costello, 1993; Boots et al., 2011; Burke, Loeber, Lahey, & Rathouz, 2005; Kessler et al., 2009; Morrell & Murray, 2003) and/or has minimized the role of gender or explored the onset and continuance with concern to strictly male antisocial behaviors (see e.g., Boots, 2008; Capaldi, 1992; Capaldi & Stoolmiller, 1999; Loeber et al., 1998; Loeber, Farrington, Stouthamer-Loeber, & White, 2008). The majority of works rely

upon the diagnostic criteria found within the Diagnostic and Statistical Manual of Mental Disorders, or DSM (American Psychiatric Association, 2000).

Development of DSM-Oriented Problem Scales

A lengthy history of the significant transformations that have occurred within the DSM manuals is beyond the scope of the current study. In short, the manual has reflected the changes in theoretical direction that have transformed the fields of psychiatry and psychology over time. That is, whereas the first and second versions of the DSM were deeply influenced by Freudian theory and psychoanalytic thought, the later editions have moved away from subjective, causal, and theoretical foci. Instead, the third edition “tried to eliminate theory and etiology and concentrate on description and classification, although it is debatable to what extent that was accomplished” (Bartol & Bartol, 2005, p. 191). In the fourth edition of the DSM-IV-TR, individual behavioral patterns and psychological characteristics are gathered into distinctive diagnostic categories (Andrews & Bonta, 2003). These categories are based largely on empirical and clinical evidence, with considerable effort made toward a consensus regarding criteria, mechanisms, prevalence, and sequences of disorders when applicable. Five axes are used to record information on individuals, with the first two of these classification axes focusing specifically on mental disorders (American Psychiatric Association, 2000).

Inasmuch as “each of the mental disorders is conceptualized as a clinically significant behavioral or psychological syndrome or pattern that occurs in an individual and that is associated with present distress (e.g., a painful symptom) or disability (i.e., impairment in one or more important areas of functioning) or with a significantly increased risk of suffering death, pain disability, or an important loss of freedom”

(American Psychiatric Association, 2000, p. xxxi), there must be a negative consequence for the person with the mental condition. Thus, a certain number of criteria must be present *and* these criteria must also be “considered a manifestation of a behavioral, psychological, or biological dysfunction in the individual” (American Psychiatric Association, 2000, p. xxxi). This categorical system further states that the behaviors, thoughts, and motivations of individuals diagnosed with mental disorders cannot be a product of expected coping mechanisms or normal functioning. There must be some type of dysfunction present within the person’s internal processing system. However, “at present there is no unified, overarching theory of aggression in psychiatric disorders that allows for a single classification system to explain all the variegated presentations of aggressive behavior” (Connor, 2002, p. 63). For an individual to be “diagnosed” with a disorder, they must have a certain number of set criteria. Another rich subset of extant literature investigates the correlation of violence with mental health with a principal focus on externalizing versus internalizing behaviors that utilized categorical DSM diagnoses (Cheong & Raudenbush, 2000; Molnar et al., 2005; Xue, Leventhal, Brooks-Gunn, & Earls, 2005).

In response to ongoing criticisms regarding the categorical, yes or no, diagnostic criteria of DSM disorders (Frances, Pincus, Widiger, Davis, & First, 1990), multidimensional, non-categorical nosological approaches to studying mental illness have recently risen in prominence (Connor, 2002). DSM-based profiles display multi-informant data on subjects in relation to the norms for their age and gender (Achenbach & Rescorla, 2001). These DSM-oriented scales are not exact equivalents to a formal DSM diagnosis because they do not include all the specific criteria for all DSM diagnoses. Rather, these scales capture judgments from different informants on a 3-

point scale and record the presence of various behaviors for a child within two months (teacher-based reports from Teacher Report Form or TRF) or six months (parent-based reports from Child Behavior Checklist or CBCL) of the form being administered. Assessments such as the CBCL are frequently used and have been widely accepted as valid and reliable (Achenbach et al., 2002; Achenbach, Bernstein, & Dumenci, 2005). These types of standardized instruments have been converted to capture information from multiple informants (e.g., parents and self) as a way to provide a more global picture of problem behaviors across distinct domains. The use of multiple informants yields valuable information and varying perspectives of problem behaviors across domains (Smith, 2007; Renk & Phares, 2004). Borrowing extensively from the work of Achenbach and colleagues (Achenbach & Rescorla, 2001), the present project uses innovative, multidimensional, and non-categorical DSM-oriented scales at the individual-level and combines these measures with relevant family- and neighborhood-level correlates of violence into a theoretically-grounded multilevel model. As a next step, we now briefly review the literature linking ecologically-related factors to violence and aggression over the life-course.

Neighborhoods, Social Disorganization, and Violence

Recent sociological inquiries into the dynamics surrounding crime have placed significantly greater emphasis on the broader social contexts, via community characteristics, that impact a range of life-course outcomes (see e.g., Ainsworth, 2002; Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Browning, 2002; Jarrett, Jefferson, & Kelly, 2010; Rankin & Quane, 2002; Sampson, 1997; Wilson, 1987). Indeed, questions surrounding the role of larger social environments on children's well-being and normative development have led to an interdisciplinary field of study termed

neighborhood research (see Brooks-Gunn, Duncan, & Aber, 1997). Such empirical research focuses on the key compositional, institutional, contextual, and normative demographic features that impact family and community processes (Sampson, 2001; Jencks & Mayer, 1990; Leventhal & Brooks-Gunn, 2003; Wilson, 1987). Social environments are posited to be dramatically influenced by changes in immigration and residential habitation patterns, as well as discrimination, segregation, and other forms of residential instability within a community-oriented focus (Burton & Jarrett, 2000). Concentrated disadvantage (e.g., poverty, unemployment, racial segregation, single-parent households, etc.) and the relative deprivation of basic needs leads to negative outcomes for families living in these neighborhoods. Families living in socially segregated and disorganized areas are much less likely to develop strong ties with their neighbors or form critical social networks, which in turn leads to a lack of collective attitudes and goals. This inability to foster and participate in routine, positive neighborhood interactions contributes to low collective efficacy and adversely impacts families since these neighborhoods are unlikely to have resources to improve conditions (Jencks & Mayer, 1990).

A recent meta-analysis reveals that neighborhood factors consistently yielded small to moderate effects, with preschool and school-age children in higher socioeconomic status (SES)-communities having higher verbal abilities, IQ scores, and overall school achievement (Leventhal & Brooks-Gunn, 2000). Comparatively, young children living in lower-SES neighborhoods were at greater risk for mental health problems. For adolescent populations, youngsters residing in higher SES-areas were associated with high school attainment and completion while poorer adolescents had a greater likelihood of being delinquent or criminally-involved, having problems with

mental health, and early pubertal development, low birth weight, and early-life pregnancies (see Cerda, Buka, & Rich-Edwards, 2008; Leventhal & Brooks-Gunn, 2000; Obeidallah, Brennan, Brooks-Gunn, & Earls, 2004). Other studies have suggested that children from deprived neighborhoods were at increased risk for mental health problems even when controlling for genetic links (Caspi, Taylor, Moffitt, & Plomin, 2000).

A criticism of this body of neighborhood research is the non-experimental design which may result in selection biases since families and individuals have some choice in the location they reside. However, quasi-experimental research from the Gautreaux Program and Moving to Opportunity Program at various sites across the United States have supported previous findings, with families in these studies randomly assigned vouchers to move and contingent upon on availability (see Rubinowitz & Rosenbaum, 2000; Leventhal & Brooks-Gunn, 2004). Neighborhood effects were large across the studies, were more pronounced for males, and impacted those persons who relocated to more deprived neighborhoods than to moderately poor areas. Youth moving to healthier economic conditions were in better physical and mental health, were less likely to be arrested for a violent act, and had significantly greater academic achievement (Katz, Kling, & Liebman, 2001; Ludwig, Duncan, & Hirschfield, 2001). A substantial body of literature over the past three or four decades has found links between mental health outcomes and family and community structure and contexts (Wallen & Rubin, 1997).

A rich body of research has explored neighborhood factors that promote or reduce youth violence. Youth violence imposes substantial costs on communities in the form of health care, reduced property values and disrupted social services in the affected

communities and reflects wide disparities by race/ethnicity, gender, and SES. However, such research has been limited by a lack of consistent conceptualization of neighborhood context and the difficulty of measuring neighborhood dynamics. As the second leading cause of death in youth ages 10 to 24, homicides claim approximately 16 youth per day of this age group in the United States (Centers for Disease Control, 2010). A disproportionate amount of youth violence occurs in low income neighborhoods with a high concentration of minority populations (Centers for Disease Control & Prevention, 2010; Sampson & Groves, 1989; Sampson & Raudenbush, 1999). Longitudinal studies that explore the unique gender, cultural, and social differences that impact life-course trajectories of violence at the individual-, family-, and neighborhood-levels are critical for developing effective prevention strategies to reduce youth violence (Rutter & Tienda, 2005; Sampson, 1993; Sampson, Morenoff, & Raudenbush, 2005).

This current project addresses many of the shortcomings of previous retrospective, cross-sectional, non-generalizable studies by using PHDCN data, which offers a representative community sample of socioeconomically and culturally diverse children, families, and neighborhoods across multiple data waves, informants, and age cohorts of youth. In addition, the proposed study contributes further to the already impressive number of works off the PHDCN that have employed multilevel modeling techniques to explore various competing hypotheses of violence perpetuation and offending continuity (e.g., Sampson et al., 2005; Sampson, Raudenbush, & Earls, 1997; Gibson & Miller, 2010; also see Kuo, Mohler, Raudenbush, & Earls, 2000 for discussion of advantages of multilevel analyses). However, to date, few of these studies have focused on mental health issues (e.g., Mendelson, Kubzansky, Datta, & Buka, 2008; Fauth, Roth, & Brooks-Gunn, 2007) and none has included DSM-oriented scales as

valid individual-level predictors of violence. Furthermore, none of these works have investigated the more complex cross-level interactions that may occur between mental health, family-, and neighborhood-level correlates of violence.

The Current Study

This study joins a small number of scholarly works to date that have adopted DSM-oriented scales as developmentally age- and gender-appropriate predictors of offending (see e.g., Boots, 2008 for an examination of mental health and offending in Pittsburgh Youth Study boys; also Boots & Wareham, 2009, 2010 and Boots et al., 2011 in PHDCN youth). The superior longitudinal study design and diverse array of assessment instruments available within the PHDCN offer a unique opportunity to temporally examine DSM-oriented mental health problems and antisocial outcomes in a diverse community-based sample. Notably, the goal of the proposed study expands on preliminary analyses of PHDCN data recently completed by the Principal Investigator (PI) and Co-PI that finds robust and consistent positive relationships between certain individual DSM-oriented behaviors and violence across age cohorts, even when controlling for comorbid mental health effects. Specifically, we utilize a multilevel hierarchical linear design that incorporates individual-level DSM-oriented (e.g., Anxiety, Affective, Somatic, Attention-Deficit Hyperactivity, and Oppositional Defiant) problems while simultaneously controlling for other relevant family and neighborhood variables that may be theoretically linked to antisocial outcomes. Thus, this study explores the interconnectedness between these multiple levels of predictors and offers insights into how resources might best be used in regard to violence intervention and prevention programs. The community-based design of the PHDCN and numerous

measures of family- and neighborhood-level factors provide a rich dataset from which to conduct such analyses. The key *objectives* of our study are as follows:

- 1) *Use multilevel modeling to examine whether individual-level DSM-oriented problems in PHDCN youth remain significant as predictors of violence when controlling for other individual-, family-, and neighborhood-level indicators that may contribute to violent offending. As mentioned, recent studies have indicated that DSM-oriented problems significantly increase the odds of future violence among PHDCN youth at the individual level. Our proposal extends these works and seeks to determine if these DSM-oriented problems continue to predict future violence once other individual-, familial-, and community-level risk factors have been controlled.*
- 2) *Determine the magnitude of DSM-oriented problem effect sizes when controlling for other multilevel indicators. Assuming DSM-oriented problems continue to have a significant effect on future violence when controlling for other multilevel factors, the next step will be to examine the magnitude of these effects. That is, will the strength of mental health predictors on violence be diminished once other measures are included in a more complex multilevel model, and if so, by how much? These findings have substantive theoretical and methodological implications for researchers and practitioners, since more simplistic statistical models may be overemphasizing the contribution of mental health in explaining violent offending over the lifespan. For instance, if we find that various mental health problems remain robust predictors of violence in youth even after controlling for other salient familial and community variables, these results would suggest that individual-level interventions or prevention programs that*

target the early onset of serious mental health problems may be the best strategy in reducing the number of violent offenders versus directing resources more exclusively toward family or community-based solutions. On the other hand, if our findings suggest that a combination of multilevel factors equally increases the odds of future violent behaviors in youth, then a more multi-systemic approach that crosses domains might be a more advisable strategy on a public policy level.

- 3) *If these DSM-oriented problems remain significant predictors of violence in a multilevel model after controlling for family- and neighborhood-level variables, we will further explore the interactions, including cross-level, between these various indicators. Determining that community-, family-, and individual-level factors affect violence is not enough; we must also determine whether or not these factors have moderating effects on how mental health problems influence future violence propensity. For instance, while both poverty (a community-level predictor) and oppositional defiant problems (an individual-level mental health predictor) may separately be related to violent behavior, it would also be important to know that youths who are both poor and have oppositional defiance problems are more likely to offend than those who are not. Such research has critical public policy implications and practical applications in the determination of how best to use precious resources seeking to ameliorate youth violence.*

Research Design and Methods

Individual-Level Sample

For the individual-level measures, this study relies on secondary data from the first two waves of the Longitudinal Cohort Study from the PHDCN. The Longitudinal

Cohort Study collected extensive in-home and assessment data from parents (primary caregivers) and youths for seven age cohorts (birth, 3, 6, 9, 12, 15, and 18). Participants were selected utilizing a three-stage stratified sampling design. First, the 847 census tracts demarcating the city of Chicago were aggregated into 343 neighborhood clusters, comprised of contiguous census tracts containing populations of approximately 8,000 people and relatively homogeneous with respect to housing structure, racial/ethnic, and SES characteristics. Second, neighborhood clusters were stratified by (a) seven levels of racial/ethnic mix and (b) three levels of SES, from which 80 neighborhood clusters were randomly selected for sampling. The 21 strata combinations for the 343 neighborhood clusters exclude clusters for predominately White and low SES, predominately Hispanic and high SES, or Hispanic and Black mixed and high SES clusters; therefore, the PHDCN sample lacks representation for these areas. Finally, dwelling units were randomly selected, proportionate to size, from blocks within the 80 neighborhood clusters. The result was a sample representative of the general population in the Chicago area with respect to racial/ethnic and socioeconomic distribution at the neighborhood level.

The Longitudinal Cohort Study of individuals selected by the PHDCN was administered at three waves over a 6-year period: Wave 1 in 1995-1997 (75% average response rate), Wave 2 in 1997-2000 (86% average response rate), and Wave 3 in 2000-2001 (78% average response rate). In the present study, Wave 1 and Wave 2 data are used for youths who were at least seven years old from cohorts 9 through 18 at Wave 1. Among these participants, 2,415 provided responses to at least one of the items used to create the dependent variable at Wave 2.

Dependent Variable

Violent crime was measured as an additive index comprised of 8 items from Wave 2 pertaining to the youths' self-reported offending behaviors within the past year ($\alpha = .583$), including: hitting someone you live with (8.9% reported committing), hitting someone you do not live with (18.7% reported committing), attacking someone with a weapon (2.9% reported committing), using force to rob (0.3% reported committing), throwing objects at people (8.7% reported committing), shooting at someone (1.2% reported committing), being in a gang fight (4.0% reported committing), and threatening to hurt someone (5.4% reported committing). The majority of affirmative responses to the violence items pertained to physical assault and throwing objects at people. Very few youth engaged in more violent behaviors like robbery or aggravated assault. Since the sample is representative of the general population of Chicago youth, low prevalence rates were expected. Due to low offending rates and the skewed distribution of these data, a dichotomous indicator of whether the youths had reported committing any of these violent behaviors was created for analysis.

Individual-Level Independent and Control Variables

Several control variables and independent variables were included from Wave 1 as predictors of Wave 2 violence. Table 1 contains descriptive statistics for each of the variables used in this study.

Sociodemographic Characteristics. A dichotomous measure for *gender* was included, where 0 = female and 1 = male. Race was measured as a dichotomous variable for white (0) versus non-white (1; i.e., Black/African American, Hispanic, Asian, etc.). Family SES was based on an imputed indicator available in the PHDCN data for maximum SES reported by the primary caregiver or young adult at Wave 1. The

imputed maximum SES measure was based on the Duncan Socio-Economic Index (Reiss, 1961) of social status which ranged from 0 to 100, with 100 being the “excellent” or highest social stratification level. For the purposes of analysis, this indicator was recoded based on quartiles for the entire sample such that high = top 25th percentile of SES, middle = 50th percentile of SES, and low = 25th percentile of SES. A dichotomous indicator of SES was included in the analyses, where 1 = middle or low SES and 0 = high SES.

Prior Delinquency. As previous engagement in aggressive or violent behaviors has consistently been shown to influence future antisocial behavior, a control variable for prior violence was used in the analyses. An index for ever reported *prior violent* behavior ($\alpha = .611$) was created from the same items from Wave 1 as the dependent variable for violence at Wave 2, except Wave 1 did not contain items for shooting at someone or threatening to hurt someone (prevalence rates reported: 15.1% for hitting someone they lived with; 29.5% for hitting someone they did not live with; 4.1% for attacking someone with a weapon; 0.5% for robbery; 15.2% for throwing objects; and 7.3% for gang fights). Due to low offending rate and skewness, this indicator was dichotomized (0 = never; 1 = ever).

DSM-Oriented Scales. At Wave 1, primary caregivers completed the 120-item CBCL for cohorts 9, 12, and 15. Primary caregivers were asked to report whether the assessment items applied to their child’s behavior within the past six months. In addition, youths were also asked to self-report the same problem behaviors as measured in the CBCL. For cohorts 12 and 15, youths were administered the Youth Self Report (YSR), a 112-item instrument containing comparable items to the CBCL and appropriate for older children. For cohort 18, older youths were administered the Young Adult Self

Report (YASR) instrument, a 138-item instrument containing comparable items to the CBCL and appropriate for adults ages 18 to 30. For each instrument, responses were 0 = not true, 1 = somewhat true, and 2 = very true. The CBCL, YSR, and YASR are widely recognized as reliable and valid instruments that include age and gender appropriate measures of emotional and behavioral problems among children and young adults (see Achenbach & Edelbrock, 1983; Achenbach, McConaughy, & Howell, 1987; Achenbach & Rescorla, 2001).

Achenbach and his colleagues have developed several DSM-oriented scales from the CBCL, YSR, and YASR, of which five of six scales are included here: Oppositional Defiant Problems (ODP), Attention Deficit/Hyperactivity Problems (ADHP), Anxiety Problems, Affective Problems, and Somatic Problems. Achenbach and Rescorla (2001) provide raw score conversions to *T* scores to allow for comparisons with normalized populations. For each of the five DSM-oriented scales (described below), we created an adjusted *T* score using Achenbach and Rescorla's conversion tables minus 50; hence the scores ranged from 0 to 50, rather than 50 to 100. As mentioned, Achenbach and Rescorla provide a classification of normal, borderline, and clinical level mental health problems with respect to each DSM-oriented scale. Scores of 0 to 14 were within Achenbach's "*normal*" range for the five mental health problem scales. Scores of 15 to 19 were within the "*borderline*" range for the five mental health problems. Scores of 20 to 50 were within the "*clinical*" range for the five mental health problem scales.

An additive index for *Affective Problems* was created from the CBCL ($\alpha = .692$) and the YSR ($\alpha = .714$) items. Affective Problems included responses to 12 items, including: frequent crying, attempts to harm one's self or suicide, sleeping problems, and feelings of worthlessness. (For the PHDCN, one item dealing with lack of

enjoyment was missing from Achenbach's original 13-item Affective Problems index.) Among the older adolescents in cohort 18, the YASR contains a similar index of *Depressive Problems* that summarizes 12 items ($\alpha = .792$). (For the PHDCN, two items dealing with lack of enjoyment and success were missing from Achenbach's original 14-item depressive problems index.) The raw scores for these affective/depressive indexes were converted to adjusted *T* scores with scores ranging from 0 to 50.

An additive scale for DSM-oriented *Anxiety Problems* was created from raw scores for 6 items from the CBCL ($\alpha = .543$) and the YSR ($\alpha = .564$). These measures include problems as unusual dependence on adults, fear of certain situations, nervousness, and worrying. Among the older adolescents, the YASR also contains an index of *Anxiety Problems* ($\alpha = .606$), with a summary measure of the raw scores for 5 items comparable to those available for the younger participants. (For the PHDCN, two items dealing with worry about family and physical manifestations of anxiety were missing from Achenbach's original 7-item anxiety problems index.) Raw scores for the anxiety indexes were converted to adjusted *T* scores.

An additive index for *Somatic Problems* was created from 7 items from the CBCL ($\alpha = .687$) and the YSR ($\alpha = .721$). These items describe physical problems with unknown medical causes such as headaches, nausea, rashes, and vomiting. Among the older adolescents in cohort 18, the YASR also contains an index of *Somatic Problems* ($\alpha = .756$), with 8 items comparable to the younger cohorts. (For the PHDCN, one item dealing with unknown causes for numbness in body parts was missing from Achenbach's original 9-item somatic problems index.) The measures of *Somatic Problems* were also converted to adjusted *T* scores.

An additive index for 5 items related to *Attention-Deficit/Hyperactivity Problems (ADHP)* was created from the CBCL ($\alpha = .691$) and the YSR ($\alpha = .663$). (For the PHDCN, two items dealing inattention and failing to finish tasks were missing from Achenbach's original 7-item ADHP index.) Problems included restlessness, lack of concentration, impulsivity, and loudness. The ADHP indexes were converted to adjusted *T* scores for analyses. Among the older adolescents, less than 50 percent of the items used to create Achenbach's ADHP scale were available for the PHDCN. Therefore, an ADHP scale was not created for youths in cohort 18.

Finally, a DSM-oriented scale for *Oppositional Defiant Problems (ODP)* was created from the CBCL ($\alpha = .822$) and the YSR ($\alpha = .787$) items. The ODP index is a summary measure of the raw scores for 5 items, with problems such as arguing and disobeying parents/teachers and having a hot temper. For older adolescents, the YASR allows for the creation of an index of *Antisocial Personality Problems (APP)*: $\alpha = .780$ that contains items similar to ODP and Conduct Problems in youths. This DSM-oriented scale was included here to allow for a continual examination of developmentally-appropriate problem behaviors across the age cohorts since ODP is a diagnostic pre-cursor to APP later in life. The APP index is a summary measure of the raw scores for 15 items such as arguing a lot, being mean to others, lack of guilt, lying, threatening people, fighting, and having a bad temper. (For the PHDCN, five items dealing with blaming others, not getting along with family, irresponsible behavior, and an inability to keep a job were missing from Achenbach's original 20-item APP index.) To avoid tautological issues when using the APP index with items related to criminal offending to predict later offending, six items were excluded from the index that refer to criminal behavior: damaging property, fighting, attacking people, stealing, threatening

to hurt people, and doing things to get in trouble with the law. In this way, the APP items are a better reflection of the issues examined in the ODP index. Adjusted *T* scores were created for the ODP and adjusted APP indexes. Descriptive statistics for the DSM-oriented adjusted *T* scores are reported in Table 1.

Family Variables. Six measures of family relations were included in this study. *Family conflict* ($\alpha = .663$) is an index from the Family Environment Scale (FES; Moos & Moos, 1994) protocol measuring conflict in family functioning. For youths in cohorts 9, 12, and 15, primary caregivers were administered the FES, while young adults in cohort 18 were administered the FES. The family conflict index is a summary of 9 true/false items regarding family relations: "We fight a lot in our family," "Family members rarely become openly angry" (reverse), "Family members sometimes get so angry they throw things," "Family members hardly ever lose their tempers" (reverse), "Family members often criticize each other," "Family members sometimes hit each other," "If there's a disagreement in our family, we try hard to smooth things over and keep the peace" (reverse), "Family members often try to one-up or out-do each other," and "In our family, we believe you don't ever get anywhere by raising your voice" (reverse). Mean substitution was used to replace missing values ($n = 51$). Higher scores reflected greater family conflict issues.

Three dichotomous (0 = no, 1 = yes) measures of family mental health and criminal involvement history were also included in the study. In the Longitudinal Cohort Study primary caregivers for all cohorts were asked to complete extensive information about the family structure, identifying who the members of the family were. Then, primary caregivers were asked to provide information about the family member's history of mental health problems and legal issues (Janca, Bucholz, & Janca, 1992).

Family member depressed was a dichotomous measure indicating that someone in the family had "ever suffered from depression, that is, they have felt so low for a period of at least two weeks that they hardly ate or slept, or couldn't work or do whatever they usually do." *Family member anxiety* was a dichotomous measure indicating that someone in the family had "ever had problems with their nerves or had a nervous breakdown." *Family member criminal* was a dichotomous measure indicating that a family member "had trouble with the police or been arrested." Missing values were replaced with the mode, or zero ($n = 25$; $n = 24$; $n = 43$, for depressed, anxiety, and criminal, respectively).

Parental maltreatment reflected an additive index of 5 items ($\alpha = .639$) from the Conflict Tactic Scale (Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) for interactions between parent and child. The Conflict Tactic Scale for parent-child relations was administered to cohorts 9, 12, and 15, but not 18. In any analyses using the DSM-oriented mental health problem indicators from the YASR, therefore, the parental maltreatment indicator was excluded. Primary caregivers were asked to indicate how many times in the past year they had done the following to the youth: "Push, grab, or shove," "slap or spank," "kick, bite, or hit," "hit or try to hit [youth] with something," and "beat [youth] up." Responses were 0 = never, 1 = once, 2 = twice, 3 = 3-5 times, 4 = 6-10 times, 5 = 11-20 times, or 6 = more than 20 times. Mean substitution was used to replace missing values for cohorts 9 to 15 ($n = 31$). Due to high skewness, the index was log transformed for the purpose of analyses. Higher scores indicated greater problems with parental abuse or maltreatment of the youth.

Youths were also administered the Provision of Social Relations (Turner, Frankel, & Levin, 1983) protocol to evaluate social support available to the youth from family and

friends. *Poor family relations* reflected an additive index of 6 items ($\alpha = .650$) relating to family support. This index included responses to the following items: "No matter what happens, I know that my family will always be there for me should I need them," "Sometimes I'm not sure if I can completely rely (*count*) on my family" (reverse), "My family lets me know they think I'm a worthwhile (*valuable*) person," "People in my family have confidence in me," "People in my family help me find solutions to my problems," and "I know my family will always stand by me." Responses were 1 = very true, 2 = somewhat true, or 3 = not true. Mean replacement was used for missing values ($n = 30$). Due to high skewness, this measure was log transformed. Higher scores reflected poor family relations. Descriptive statistics for the family variables are reported in Table 1.

Friend Variables. Two measures of friend or peer relations were included in the study. *Poor friendships* was a measure created from youths' responses to the Provision of Social Relations (Turner, Frankel, & Levin, 1983) protocol to evaluate social support available to the youth from friends. The poor friendships variable was an additive index of 5 items ($\alpha = .652$), including: "When I'm with my friends I feel completely able to relax and be myself," "When I want to go out to do things, I know that many of my friends would enjoy (*like*) doing these things with me," "I have at least one friend that I could tell anything to," "I feel very close to some of my friends," and "My friends would take the time to talk about my problems, should I ever want to." Responses were 1 = very true, 2 = somewhat true, or 3 = not true. Mean replacement was used for missing values ($n = 29$). Higher scores reflected poor friend relations.

Youths were also administered the Deviance of Peers (Huizinga, Esbenson, & Weiher, 1991) protocol where they were asked to report on the deviance of their peers.

Youths were asked to indicate how many of their friends during the past year had engaged in certain activities, where 1 = none, 2 = some of them, and 3 = all of them. *Delinquent peers* was an additive index of 8 items ($\alpha = .784$), including: "purposely damaged or destroyed property that did not belong to them," "stolen something worth \$5 or less," "stolen something worth more than \$5 but less than \$500," "stolen something worth more than \$500," "gone into or tried to go into a building to steal something," "gotten into physical (fist) fights with schoolmates/co-workers or friends," "hit someone with the idea of hurting them," and "attacked someone with a weapon with the idea of seriously hurting them." Mean replacement was used for missing values ($n = 23$). Higher scores reflected greater involvement with delinquent peers. Descriptive statistics for the friend variables are reported in Table 1.

Table 1. *Descriptive Statistics for Individual and Community Measures.*

<i>Individual-Level Variables:</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Gender (male)	2415	0.50	0.50	0	1
Age	2415	12.76	3.34	7	19
Prior violence	2389	0.40	0.49	0	1
Middle/low SES	2281	0.74	0.44	0	1
Race (non-white)	2411	0.84	0.36	0	1
Affective problems (CBCL)	1442	5.44	6.78	0	46
Anxiety problems (CBCL)	1440	6.09	6.87	0	30
Somatic problems (CBCL)	1441	5.78	7.55	0	50
Attention deficit problems (CBCL)	1439	3.59	4.84	0	22
Oppositional defiant problems (CBCL)	1441	6.58	7.22	0	30
Affective problems (YSR)	1216	5.22	6.08	0	35
Anxiety problems (YSR)	1216	6.65	6.67	0	26
Somatic problems (YSR)	1216	9.08	8.89	0	50
Attention deficit problems (YSR)	1211	2.72	3.92	0	19
Oppositional defiant problems (YSR)	1216	5.80	7.02	0	30
Depressive problems (YASR)	501	5.93	6.78	0	41
Anxiety problems (YASR)	501	4.00	4.49	0	19
Somatic problems (YASR)	500	6.96	7.56	0	44
Antisocial personality problems (YASR)	499	5.10	5.10	0	23
Delinquent peers	2415	11.44	2.58	8	24
Family conflict	2415	2.82	2.02	0	9
Family member depressed	2415	0.24	0.43	0	1
Family member anxiety	2415	0.19	0.40	0	1
Family member criminal	2415	0.33	0.47	0	1
Parental maltreatment (ln) ^a	1911	1.10	0.90	0	3.22
Poor friendships	2415	7.25	2.13	4	15
Poor family relations (ln)	2415	2.01	0.24	0.69	2.89
Violence at Wave 2 (0/1)	2415	0.30	0.46	0	1

<i>Neighborhood-Level Variables:</i>	<i>J</i>	<i>Mean</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
Neighborhood ties (EB)	82	3.13	0.26	2.71	4.16
Anomie (EB)	82	2.49	0.13	2.21	2.83
Social cohesion (EB)	82	3.35	0.25	2.78	3.96
Decline (EB)	82	1.92	0.18	1.47	2.40
Organizations (EB)	82	-0.27	0.57	-1.80	1.15
Perceived violence (EB)	82	2.00	0.32	1.41	2.74

Note. a. Parental abuse measure only available for cohorts 9 through 15, not cohort 18. EB = Measures reflect Bayesian estimation of average person-level scores, adjusted for missing, of Chicago neighborhood clusters.

Community-Level Sample

For the community-level measures, this study relies on secondary data from the Community Survey from the PHDCN. Using the same sampling design described above

for the Longitudinal Cohort Study, the Community Survey collected data from adult Chicago residents in randomly-selected households in 1994. The community version of the Community Survey contains aggregate data at the neighborhood cluster level derived from individual residents' responses. Unfortunately, the restricted PHDCN data that were available to the authors are limited to measures created directly from the Community Survey, which include various measures of collective efficacy and neighborhood social support. These data do not provide crime and census population (e.g., poverty, race distribution, residential mobility) indicators for the Chicago neighborhood clusters.

The scientific directors of the Community Survey have created several community indicators of neighborhood conditions, social support, and perceived crime/disorder. These indicators were created from mean scores for individuals residing in certain neighborhood clusters ($n = 82$), adjusted for missing data. Each of the community measures were created by the PHDCN scientific directors using Empirical Bayes (EB) estimation based on the distribution of the data.

Six community measures were included for multilevel analyses. *Perceived violence* was an additive index of 5 items for how often residents perceived the following problems occurring in their neighborhoods within the past six months: "a fight in this neighborhood in which a weapon was used," "a violent argument between neighbors," "gang fights," "a sexual assault or rape," and "a robbery or mugging." Responses ranged from 1 = never to 4 = often.

Cohesion was an index of social cohesion within neighborhoods. This index was created by combining residents' responses to how well they agree with 5 items from the Community Survey: "This is a close-knit neighborhood," "People around here are willing

to help their neighbors," "People in this neighborhood generally don't get along with each other" (reverse), "People in this neighborhood do not share the same values" (reverse), and "People in this neighborhood can be trusted." Responses ranged from 1 = strongly disagree to 5 = strongly agree.

Neighborhood decline is a index that measures whether residents felt certain conditions in their neighborhoods had changed over the past five years. Four items about neighborhood conditions were combined to create this index: "personal safety," "the way the neighborhood looks," "the people living in the neighborhood," and "the level of police protection in the neighborhood." Responses for each item were 1 = better, 2 = same, 3 = worse.

Number of ties is a summary measure reflecting the total number of friends and relatives living in residents' neighborhoods. Residents were asked to report how many (1) relative or in-laws and (2) friends lived in their neighborhood. Responses ranged from 1 = none to 5 = ten or more.

Anomie is a summary index reflecting residents' attitudes about abiding by the law and being goal-oriented. Five items from the survey were combined to create this index. Residents were asked to indicate how much they agreed (1 = strongly disagree to 5 = strongly agree) with the following statements: "Laws were made to be broken," "It's okay to do anything you want as long as you don't hurt anyone," "To make money, there are no right and wrong ways anymore, only easy ways and hard ways," "Fights between friends or within families is nobody else's business," and "Nowadays a person has to live pretty much for today and let tomorrow take care of itself."

Finally, *neighborhood organizations* is a summary index of the presence of specific social programs, activities, and services within residents' neighborhoods. This

index was created by combining affirmative responses (1 = yes) to 8 items about organizations. The follow is a list of the items referring to neighborhood organizations included in the index: "a park, playground, or open space within walking distance of your home," "neighborhood have a community newspaper, newsletter, or bulletin," "neighborhood have a crime prevention program or a neighborhood watch," "a family health service in this neighborhood," "a block group, tenant association, or any other group dealing with local issues," "an alcohol or drug treatment program in neighborhood," "a family planning clinic in the neighborhood," and "a mental health center in the neighborhood."

Data Analysis Plan

Objective 1: The first goal of this study was to examine the influence of DSM-oriented problems (from Wave 1) among PHDCN youths by developmental stage on future self-reported violence (from Wave 2), controlling for various community-, family- and individual-level characteristics for PHDCN youth from Wave 1. Initially, we proposed estimating separate models for four developmental stages: ages 7-9, 10-12, 13-16, and 17-19. Due to the cohort design and data limitations across cohorts, the subsample size was small across these four developmental stages. We were concerned about power issues in estimating the models across the four developmental stages; therefore, we controlled for age in combined models.

Hierarchical linear modeling was used to examine the relationship between DSM-oriented scales and violent crime prevalence, while controlling for a number of individual-level demographic, family, and friend characteristics and community-level characteristics (significance level of $p < .05$). The regression analyses were performed

separately for different sources of the DSM-oriented problems, namely CBCL, YSR, and YASR.

Objective 2: Next, we examined the magnitude of the effects of DSM-oriented mental health problems on future self-reported violence among PHDCN youths compared to the other individual-, family-, community-level factors included in the multilevel models for Objective 1.

Objective 3: Lastly, we considered individual-level and cross-level interactions between community-level factors and youths' DSM-oriented problems.

Results

Bivariate Results

As shown in Tables 2 through 4, an examination of bivariate correlations between the individual-level measures indicated that a few of the variables demonstrated moderately strong correlations. The correlation between anxiety problems and affective/depressive problems was strongly positive across DSM-oriented instruments (CBCL: $r = .52$; YSR: $r = .55$; YASR: $r = .52$). The association between ADHP and ODP was also strongly positive across the youth instruments (CBCL: $r = .61$; YSR: $r = .54$). Moreover, depressive problems was strongly associated with antisocial personality problems among the young adults in the PHDCN (YASR: $r = .53$). All of the individual-level measures were significantly associated with future violence propensity, except SES, family anxiety problems, poor friend relations, self-reported anxiety problems, and self-reported somatic problems among the young adults only. The strongest associations with future violent behavior were with prior violent behavior at wave 1 and delinquent peer associations.

Table 2. *Bivariate Correlations for Individual-Level Measures with CBCL Measures for Youths.*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Gender	---																	
2. Age at wave 1	-.02	---																
3. Race	-.02	-.04*	---															
4. Middle/low SES	-.03	.09*	.18*	---														
5. Prior violence	.11*	.28*	.01	-.04*	---													
6. Affective	-.02	.02	.04	.02	.05*	---												
7. Anxiety	.01	.01	.06*	.05*	.03	.52*	---											
8. Somatic	-.06*	.10*	.03	.01	.11*	.39*	.30*	---										
9. ADHP	-.09*	.09*	.08*	.07*	.12*	.46*	.44*	.24*	---									
10. ODP	.00	.03	.01	.00	.14*	.48*	.38*	.27*	.61*	---								
11. Delinquent peers	.12*	.12*	.07*	.02	.30*	.04	.04	.04	.16*	.16*	---							
12. Family conflict	.00	.15*	-.04*	.00	.12*	.24*	.19*	.14*	.24*	.32*	.14*	---						
13. Family depressed	-.03	.02	-.07*	-.03	.10*	.11*	.13*	.12*	.12*	.14*	.07*	.11*	---					
14. Family anxiety	-.06*	.01	-.02	.00	.05*	.12*	.12*	.09*	.09*	.13*	.04*	.12*	.37*	---				
15. Family criminal	-.00	.11*	.00	-.03	.20*	.08*	.07*	.08*	.11*	.15*	.12*	.18*	.21*	.15*	---			
16. Maltreatment (ln)	.06*	-.16*	.06*	-.03	.05*	.25*	.20*	.14*	.33*	.42*	.09*	.23*	.08*	.05*	.10*	---		
17. Poor friendships	.12*	-.16*	.10*	-.04	.01	.10*	.07*	.01	.09*	.07*	.11*	.01	.01	.02	.01	.12*	---	
18. Poor family (ln)	-.01	.15*	.05*	.07*	.13*	.14*	.08*	.07*	.16*	.18*	.20*	.19*	.05*	.05*	.09*	.05*	.24*	---
19. Violence at wave 2	.13*	.13*	.06*	-.02	.37*	.07*	.07*	.12*	.10*	.16*	.25*	.13*	.09*	.02	.15*	.09*	-.02	.14*

Note. CBCL = Child Behavior Checklist . ADHP = Attention Deficit/Hyperactivity Problems. ODP = Oppositional Defiant Problems. *p <.05

Table 3. *Bivariate Correlations for Individual-Level Measures with YSR Measures for Youths.*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Gender	---																	
2. Age at wave 1	-.02	---																
3. Race	-.02	-.04*	---															
4. Middle/low SES	-.03	.09*	.18*	---														
5. Prior violence	.11*	.28*	.01	-.04*	---													
6. Affective	.03	.07*	.03	-.02	.18*	---												
7. Anxiety	.07*	.03	.05*	-.02	.11*	.55*	---											
8. Somatic	.04	-.03	.04	-.02	.18*	.42*	.32*	---										
9. ADHP	-.07*	.12*	-.03	-.07*	.24*	.46*	.35*	.27*	---									
10. ODP	-.02	.25*	-.01	-.07*	.37*	.42*	.29*	.22*	.54*	---								
11. Delinquent peers	.12*	.12*	.07*	.02	.30*	.23*	.16*	.19*	.23*	.34*	---							
12. Family conflict	.00	.15*	-.04*	.00	.12*	.07*	-.01	-.01	.06*	.11*	.14*	---						
13. Family depressed	-.03	.02	-.07*	-.03	.10*	.05*	-.01	.02	.04	.08*	.07*	.11*	---					
14. Family anxiety	-.06*	.01	-.02	.00	.05*	.05*	.02	.04	.04	.05*	.04*	.12*	.37*	---				
15. Family criminal	-.00	.11*	.00	-.03	.20*	.00	-.01	.05	.05*	.09*	.12*	.18*	.21*	.15*	---			
16. Maltreatment (ln)	.06*	-.16*	.06*	-.03	.05*	.09*	.07*	.11*	.10*	.16*	.09*	.23*	.08*	.05*	.10*	---		
17. Poor friendships	.12*	-.16*	.10*	-.04	.01	.14*	.14*	.10*	.02	.01	.11*	.01	.01	.02	.01	.12*	---	
18. Poor family (ln)	-.01	.15*	.05*	.07*	.13*	.30*	.17*	.16*	.19*	.29*	.20*	.19*	.05*	.05*	.09*	.05*	.24*	---
19. Violence at wave 2	.13*	.13*	.06*	-.02	.37*	.05*	.04	.07*	.11*	.20*	.21*	.12*	.09*	.02	.15*	.08*	-.01	.09*

Note. YSR = Youth Self Report. ADHP = Attention Deficit/Hyperactivity Problems. ODP = Oppositional Defiant Problems. *p < .05

Table 4. *Bivariate Correlations for Individual-Level Measures with YASR Measures for Youths.*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Gender	---																	
2. Age at wave 1	-.02	---																
3. Race	-.02	-.04*	---															
4. Middle/low SES	-.03	.09*	.18*	---														
5. Prior violence	.11*	.28*	.01	-.04*	---													
6. Depressive	-.24*	.01	.05	.10*	.09*	---												
7. Anxiety	-.01	-.03	.01	.05	.10*	.52*	---											
8. Somatic	-.17*	.01	.11*	.03	.12*	.50*	.36*	---										
9. ADHP	a	a	a	a	a	a	a	a	---									
10. APP	-.16*	-.07	.08*	.04	.26*	.53*	.34*	.39*	a	---								
11. Delinquent peers	.12*	.12*	.07*	.02	.30*	.15*	.08	.14*	a	.34*	---							
12. Family conflict	.00	.15*	-.04*	.00	.12*	.34*	.24*	.16*	a	.36*	.14*	---						
13. Family depressed	-.03	.02	-.07*	-.03	.10*	.14*	.13*	.04	a	.10*	.07*	.11*	---					
14. Family anxiety	-.06*	.01	-.02	.00	.05*	.14*	.11*	.14*	a	.10*	.04*	.12*	.37*	---				
15. Family criminal	-.00	.11*	.00	-.03	.20*	.10*	.04	.14*	a	.13*	.12*	.18*	.21*	.15*	---			
16. Maltreatment (ln)	b	b	b	b	b	b	b	b	a, b	b	b	b	b	b	b	---		
17. Poor friendships	.12*	-.16*	.10*	-.04	.01	.14*	.06	.12*	a	.08	.11*	.01	.01	.02	.01	b	---	
18. Poor family (ln)	-.01	.15*	.05*	.07*	.13*	.32*	.17*	.20*	a	.28*	.20*	.19*	.05*	.05*	.09*	b	.24*	---
19. Violence at wave 2	.13*	.13*	.06*	-.02	.37*	.08*	.07	.02	a	.17*	.21*	.12*	.09*	.02	.15*	b	-.01	.09*

Note. ^a Measure was missing for cohort 18 due to large number of missing items in the PHDCN for this scale. ^b Parental maltreatment of youth indicator was not available for adult youth in cohort 18 of the PHDCN. YASR = Young Adult Self Report. ADHP = Attention Deficit/Hyperactivity Problems. APP = Antisocial Personality Problems. *p <.05

Table 5 reports the bivariate correlation results for the six community-level, or neighborhood cluster-level, measures. The strongest associations were between social cohesion and perceived violence, indeed this relationship suggests multicollinearity. Therefore, subsequent regression analyses were completed using social cohesion and perceived violence in separate multilevel models. Perceived violence was also strongly, positively associated with anomie, but this relationship did not suggest multicollinearity problems. Neighborhood organizations was only significantly and negatively related to neighborhood decline. An examination of collinearity diagnostics, including variance inflation factors, tolerance scores, and residuals for the regression models did not indicate that multicollinearity was a problem, once social cohesion and perceived violence were separated.

Table 5. *Bivariate Correlations for Neighborhood Cluster Measures.*

	1.	2.	3.	4.	5.	6.
1. Neighborhood ties	---					
2. Anomie	.30*	---				
3. Social cohesion	.41*	-.47*	---			
4. Perceived violence	-.07	.55*	-.82*	---		
5. Decline	-.11	.33*	-.24*	.06	---	
6. Organizations	.09	-.19	.19	.05	-.33*	---

*p < .05

While the nested nature of the individual level variables, including the dependent variable, within Chicago neighborhood clusters does not easily permit examination of bivariate correlations across levels, exploratory *t*-tests were conducted using the HLM version 6.08 (Raudenbush, Bryk, & Congdon, 2004) multilevel regression analysis software. The *t*-tests are estimated by regressing EB residuals on the community

measures of interest. Table 6 reports the exploratory regression results for the six community-level measures. The results indicate that none of the measures is significantly associated with self-reported violence prevalence among PHDCN youths. However, these results do not account for differences within DSM-oriented instrumentation and multivariate effects.

Table 6. *Exploratory t-Test Results for Self-Reported Violence on Neighborhood Cluster Measures.*

<i>Variables</i>	<i>Coefficient</i>	<i>se</i>	<i>t</i>
Neighborhood ties	0.10	0.13	0.77
Anomie	0.35	0.26	1.35
Social cohesion	0.09	0.13	0.65
Perceived violence	0.05	0.10	0.48
Decline	0.17	0.19	0.88
Organizations	0.07	0.06	1.23

*p <.05

HLM Regression Results

An unconditional model was estimated to examine the variance in self-reported future violent behavior among the PHDCN youths across Chicago neighborhood clusters. The HLM models were estimated with the Bernoulli distribution specified due to the dichotomous nature of the dependent variable. The results for the unconditional model are reported in Table 7. For a neighborhood cluster with a "typical" violence prevalence rate, the expected log-odds of violence was -0.85, corresponding to an odds of $EXP[-0.85] = 0.426$, which corresponded to a probability of $1/(1 + EXP[0.85]) = 0.299$. This typical probability, associated with a neighborhood cluster-level random effect of zero, was approximately equivalent to the population-wide violence rate

estimate (mean reported in the descriptive statistics in Table 1) of 0.30. This suggests that the outcome was approximately normally distributed.

The intraclass correlation was 0.300, but this statistic is not informative in nonlinear models where the individual-level variance is heteroscedastic (Raudenbush & Bryk, 2002). However, the chi-square results indicated that significant variation did exist among the neighborhood clusters in violence prevalence. This finding suggests that a hierarchical linear model is best for examining the influence of community-, family-, and individual-level predictors of violence prevalence among the PHDCN youth. Examination of the 95% confidence intervals for the log-odds indicated that 95% of the neighborhood clusters fell between 15.3% and 49.2% with respect to probability of violence. It appears that very few of the neighborhood clusters had violence rates near zero, and in others almost half of the youths were involved in violent behavior at wave 2.

Table 7. *Unconditional Model Results for Future Violence across Neighborhood Clusters.*

<i>Fixed Effect</i>		<i>Coefficient</i>	<i>se</i>		
Average log-odds neighborhood mean, γ_{00}		-0.85	0.07**		
	<i>Variance Component</i>	<i>df</i>	χ^2	<i>p value</i>	
Neighborhood mean, u_{0j}	0.18	81	171.76	0.000	
Level-1 effect, r_{ij}	0.43				
95% Plausible values NC-average log-odds of variance, β_{0j}	-1.71	-0.03			
Reliability estimate	0.48				

Note: NC = neighborhood cluster. Model coefficients and standard errors are based on the population-average models. * $p < .05$; ** $p < .01$

To address Objectives 1 and 2, separate HLM models were estimated, again with the Bernoulli distribution specified (because of the non-normal distribution the analyses were technically hierarchical generalized linear models but will be referred to as HLMs throughout this report), for the three DSM-oriented assessment instruments (i.e., CBCL, YSR, and YASR). Regressions were conducted without mean centering, with grand-mean centering, and group-mean centering (see Raudenbush & Bryk, 2002, pp. 134-149). In the HLM regression analyses reported here, the individual-level predictors were group-mean centered around the level-2 (i.e., neighborhood cluster) mean. Group-mean centering allows for a better estimation of contextual effects in the models, especially considering the stratified nature of the data. The group-mean centered estimation allows for the examination of the change in violence prevalence that occurs to a youth by virtue of residing in one neighborhood versus another, i.e., the contextual effect. The HLM regression results reported below were for random effects models that assume each predictor varies across neighborhood (i.e., level-2 class).

Table 8 reports the results for the regression of violence on individual and community factors, including the CBCL DSM-oriented problems. Model 1 in Table 8 reports the results of self-reported violence prevalence regressed on the youths' sociodemographic characteristics and DSM-oriented problems reported by their parents, or primary care givers. As expected, the strongest predictor of future violent behavior was prior violent behavior. For youths who self-reported prior violence, the odds of engaging in future violence were 3.75 times greater. Male youths and older youths were also significantly more likely to engage in future violence than those who were younger or female. Only one of the five DSM-oriented problems from the CBCL

was significant. Youths whose parents reported greater problems with oppositional defiance issues were more likely to become involved in self-reported violence.

Model 2 in Table 8 includes family and peer measures in the DSM-oriented model. The significant positive effects of prior violence, sex, and age remained relatively stable when controlling for family and peer factors. None of the family factors predicted future violence among youths who were administered the CBCL. One peer factor, self-reported delinquent peer involvement, significantly affected violence prevalence. Youths who reported knowing a higher proportion of friends that were involved in delinquent activities were significantly more likely to engage in future violence. The delinquent peer measure was, however, the weakest predictor in the model, accounting for only a 6% increase in the odds of violent behavior. Interestingly, the effect of ODP on violence was reduced to non-significance when controlling for family and peer factors.

Table 8 also contains the multilevel regressions of violence prevalence on individual-level factors and community-level factors. Model 3 examines the effects of the community-level predictors including social cohesion, as well as the individual-level predictors. None of the community-level factors significantly predicted self-reported violence among the youths administered the CBCL instrument. Model 4 replaces the community measure of social cohesion with perceived violence. Similar to the social cohesion model, none of the community factors affected future violent behavior among the youths administered the CBCL in this study. In the full multilevel models, prior violence, gender, age, and delinquent peer association significantly increased the odds of future violence. Indeed, the coefficients for these measures remained stable despite the inclusion of the community factors. Significant chi-square results for the models

revealed significant variation in violence existed between the neighborhood clusters. This suggests that the inclusion of additional measures at the community-level may better explain the variance in violence for this sample, rather than, or in addition to, those included in this study.

Table 8. Multilevel Regression Results for CBCL Parent Informant Measures and Violence.

	Model 1			Model 2		
	Coefficient	se	Odds Ratio	Coefficient	se	Odds Ratio
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-1.11	0.10**	0.33	-1.12	0.10**	0.33
Sex (male), γ_{10}	0.47	0.13**	1.60	0.50	0.14**	1.64
Age, γ_{20}	0.10	0.03**	1.10	0.09	0.03**	1.10
SES (middle/low), γ_{30}	0.04	0.16	1.05	0.03	0.16	1.04
Race (non-white), γ_{40}	0.03	0.23	1.03	0.11	0.23	1.12
Prior violence, γ_{50}	1.32	0.15**	3.75	1.20	0.15**	3.32
Affective problems, γ_{60}	0.01	0.01	1.01	0.01	0.01	1.01
Anxiety problems, γ_{70}	0.00	0.01	1.00	0.00	0.01	1.00
Somatic problems, γ_{80}	0.02	0.01	1.02	0.02	0.01	1.02
Attention deficit problems, γ_{90}	-0.01	0.02	0.99	-0.01	0.02	0.99
Oppositional problems, γ_{100}	0.03	0.01**	1.03	0.02	0.01	1.02
Delinquent peers, γ_{110}	--	--	--	0.06	0.03*	1.06
Family conflict, γ_{120}	--	--	--	0.05	0.04	1.05
Family member depressed, γ_{130}	--	--	--	0.16	0.17	1.18
Family member anxiety, γ_{140}	--	--	--	-0.18	0.18	0.84
Family member criminal, γ_{150}	--	--	--	0.28	0.15	1.33
Parental maltreatment, γ_{160}	--	--	--	0.05	0.09	1.05
Poor friendships, γ_{170}	--	--	--	-0.06	0.03	0.94
Poor family relations, γ_{180}	--	--	--	0.14	0.30	1.15
	<i>N</i> =	1,430		1,430		
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	--	--	--	--	--	--
Anomie, γ_{02}	--	--	--	--	--	--
Social cohesion, γ_{03}	--	--	--	--	--	--
Perceived violence, γ_{04}	--	--	--	--	--	--
Decline, γ_{05}	--	--	--	--	--	--
Organizations, γ_{06}	--	--	--	--	--	--
	<i>N</i> =	78		78		
<i>T</i>	0.38			0.40		
Reliability estimate	0.50			0.50		
Chi-square (<i>df</i>)	168.45(77)**			170.01(77)**		

(continues on next page)

Table 8. (cont.)

	Model 3			Model 4		
	Coefficient	se	Odds Ratio	Coefficient	se	Odds Ratio
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-7.97	3.75*	0.00	-5.15	2.63	0.00
Sex (male), γ_{10}	0.50	0.14**	1.65	0.50	0.14**	1.65
Age, γ_{20}	0.09	0.03**	1.10	0.09	0.03**	1.10
SES (middle/low), γ_{30}	0.04	0.16	1.04	0.04	0.16	1.04
Race (non-white), γ_{40}	0.12	0.24	1.13	0.12	0.24	1.13
Prior violence, γ_{50}	1.21	0.15**	3.34	1.20	0.15**	3.33
Affective problems, γ_{60}	0.01	0.01	1.01	0.01	0.01	1.01
Anxiety problems, γ_{70}	0.00	0.01	1.00	0.00	0.01	1.00
Somatic problems, γ_{80}	0.02	0.01	1.02	0.02	0.01	1.02
Attention deficit problems, γ_{90}	-0.01	0.02	0.99	-0.01	0.02	0.99
Oppositional problems, γ_{100}	0.02	0.01	1.02	0.02	0.01	1.02
Delinquent peers, γ_{110}	0.06	0.03*	1.06	0.06	0.03*	1.06
Family conflict, γ_{120}	0.05	0.04	1.06	0.05	0.04	1.06
Family member depressed, γ_{130}	0.16	0.17	1.18	0.16	0.17	1.18
Family member anxiety, γ_{140}	-0.18	0.18	0.84	-0.17	0.18	0.84
Family member criminal, γ_{150}	0.29	0.15	1.33	0.28	0.15	1.33
Parental maltreatment, γ_{160}	0.05	0.09	1.05	0.05	0.09	1.05
Poor friendships, γ_{170}	-0.06	0.03	0.94	-0.06	0.03	0.94
Poor family relations, γ_{180}	0.14	0.31	1.15	0.14	0.30	1.15
	<i>N</i> =	1,430		1,430		
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	-0.05	0.53	0.96	0.27	0.45	1.31
Anomie, γ_{02}	1.31	1.16	3.69	0.68	1.17	1.97
Social cohesion, γ_{03}	0.62	0.58	1.87	--	--	--
Perceived violence, γ_{04}	--	--	--	-0.10	0.40	0.91
Decline, γ_{05}	0.89	0.66	2.45	0.92	0.68	2.50
Organizations, γ_{06}	0.34	0.19	1.40	0.36	0.20	1.43
	<i>N</i> =	78		78		
<i>T</i>	0.39			0.41		
Reliability estimate	0.49			0.50		
Chi-square (<i>df</i>)	158.69(72)**			162.03(72)**		

Note: Model coefficients and standard errors are based on the population-average models. All individual-level variables are group centered. * $p < .05$;

** $p < .01$

Table 9 reports the results for the regression of violence on individual and community factors, using the YSR DSM-oriented problems. Model 1 in Table 9 examined the effects of sociodemographic and DSM-oriented predictors on youths' violence prevalence. Similar to the findings using the CBCL, prior violence was the strongest predictor of future violence among the youth. Further, male youths were significantly more likely to become involved in violence than their female peers. Age, however, was not a significant predictor of future violence among youths who were administered the YSR version of mental health problem assessment. Similar to the CBCL model, ODP was a significant positive predictor of future violent behavior. Once again, ODP did not appear to have a great impact on violence prevalence, with those scoring high on these problems demonstrating only a 5% increased risk of violence.

Model 2 in Table 9 reports the results of the full individual-level model that includes family and peer risk factors of violence. The greatest predictor of violence, controlling for other individual-level factors, was prior violence. The odds of future violence were 2.5 times greater for youths who self-reported prior violent behavior, compared to those without prior violence. Male youths and non-white youths were also significantly more likely to engage in future violence.

Similar to the CBCL model, delinquent peer association was significantly related to future violence. Unlike the CBCL model, several of the family factors also affected future violent prevalence. Youths who reported poor family relations were almost twice as likely as those with few of these problems to become involved in future violence. Indeed, poor family relations was the second strongest predictor in the model. Youths who came from families with a history of depression-related problems and criminal involvement were also more likely to become involved in future violence. Youths who

came from families with a history of anxiety-related problems among their family members were significantly less likely to become involved in future violence. Family member anxiety reduced the chances of future violence by 40%, compared to youths who had such family histories.

Unlike the CBCL model, ODP remained statistically significant when controlling for sociodemographic, family, and peer factors. While the magnitude of the effects of ODP on future violence were weak, this measure seems arguably robust because it remained significant while controlling for a variety of other individual-level predictors. The magnitude of the effect of ODP is approximately comparable to that of delinquent peer associations among the youths administered the YSR in this study.

Models 3 and 4 in Table 9 report the findings of the full multilevel models for YSR DSM-oriented problems, including social cohesion and perceived neighborhood violence, respectively. The inclusion of the community-level measures in the models did not impact the individual-level predictors of violence. In both multilevel models, prior violence, sex, race, poor family relations, family member depressive problems, family member criminal involvement, and ODP increased the odds of future violence. Further, in both models, family member anxiety problems decreased the odds of future violence. The effect sizes of the individual-level predictors remained relatively stable across the models for YSR DSM-oriented problems.

Interestingly, one community-level predictor was significantly related to future violent behavior among the youths administered the YSR instrument. Youths who resided in neighborhoods where the residents perceived increased conditions of neighborhood decline (e.g., safety, neighborhood condition, and policing problems)

Table 9. Multilevel Regression Results for YSR Youth Informant Measures and Violence.

	Model 1			Model 2		
	Coefficient	se	Odds Ratio	Coefficient	Se	Odds Ratio
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-0.68	0.09**	0.50	-0.71	0.09**	0.49
Sex (male), γ_{10}	0.57	0.13**	1.77	0.62	0.14**	1.87
Age, γ_{20}	-0.06	0.04	0.94	-0.08	0.05	0.92
SES (middle/low), γ_{30}	0.03	0.16	1.03	0.00	0.16	1.00
Race (non-white), γ_{40}	0.39	0.24	1.48	0.51	0.25*	1.66
Prior violence, γ_{50}	1.07	0.15**	2.92	0.93	0.16**	2.54
Affective problems, γ_{60}	-0.02	0.01	0.98	-0.02	0.01	0.98
Anxiety problems, γ_{70}	-0.00	0.01	1.00	-0.00	0.01	1.00
Somatic problems, γ_{80}	-0.00	0.01	1.00	-0.00	0.01	1.00
Attention deficit problems, γ_{90}	0.01	0.02	1.01	0.02	0.02	1.02
Oppositional problems, γ_{100}	0.05	0.01**	1.05	0.04	0.01**	1.04
Delinquent peers, γ_{110}	--	--	--	0.06	0.03*	1.06
Family conflict, γ_{120}	--	--	--	0.07	0.04	1.07
Family member depressed, γ_{130}	--	--	--	0.41	0.17*	1.51
Family member anxiety, γ_{140}	--	--	--	-0.50	0.18**	0.60
Family member criminal, γ_{150}	--	--	--	0.37	0.15*	1.45
Parental maltreatment, γ_{160}	--	--	--	0.01	0.08	1.01
Poor friendships, γ_{170}	--	--	--	-0.06	0.04	0.95
Poor family relations, γ_{180}	--	--	--	0.68	0.33*	1.97
	<i>N</i> =	1,201			1,201	
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	--	--	--	--	--	--
Anomie, γ_{02}	--	--	--	--	--	--
Social cohesion, γ_{03}	--	--	--	--	--	--
Perceived violence, γ_{04}	--	--	--	--	--	--
Decline, γ_{05}	--	--	--	--	--	--
Organizations, γ_{06}	--	--	--	--	--	--
	<i>N</i> =	78			78	
<i>T</i>	0.29			0.31		
Reliability estimate	0.43			0.45		
Chi-square (<i>df</i>)	144.48(77)**			147.51(77)**		

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Table 9. (cont.)

	Model 3			Model 4		
	Coefficient	se	Odds Ratio	Coefficient	Se	Odds Ratio
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-9.35	3.49**	0.00	-6.59	2.45**	0.00
Sex (male), γ_{10}	0.64	0.14**	1.89	0.64	0.14**	1.89
Age, γ_{20}	-0.09	0.05	0.92	-0.09	0.05	0.92
SES (middle/low), γ_{30}	0.01	0.16	1.01	0.01	0.16	1.01
Race (non-white), γ_{40}	0.51	0.25*	1.66	0.51	0.24*	1.66
Prior violence, γ_{50}	0.95	0.16**	2.58	0.95	0.16**	2.58
Affective problems, γ_{60}	-0.03	0.01	0.98	-0.03	0.01	0.98
Anxiety problems, γ_{70}	-0.00	0.01	1.00	-0.00	0.01	1.00
Somatic problems, γ_{80}	-0.00	0.01	1.00	-0.00	0.01	1.00
Attention deficit problems, γ_{90}	0.02	0.02	1.02	0.02	0.02	1.02
Oppositional problems, γ_{100}	0.04	0.01**	1.04	0.04	0.01**	1.04
Delinquent peers, γ_{110}	0.06	0.03*	1.06	0.06	0.03*	1.06
Family conflict, γ_{120}	0.07	0.04	1.07	0.07	0.04	1.07
Family member depressed, γ_{130}	0.42	0.17*	1.52	0.42	0.17*	1.52
Family member anxiety, γ_{140}	-0.51	0.18**	0.60	-0.50	0.18**	0.60
Family member criminal, γ_{150}	0.37	0.15*	1.45	0.37	0.15*	1.45
Parental maltreatment, γ_{160}	0.01	0.08	1.01	0.01	0.08	1.01
Poor friendships, γ_{170}	-0.06	0.04	0.95	-0.06	0.04	0.95
Poor family relations, γ_{180}	0.69	0.34*	1.98	0.69	0.34*	1.98
	<i>N</i> =	1,201			1,201	
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.25	0.48	1.29	0.55	0.40	1.73
Anomie, γ_{02}	1.28	1.07	3.58	0.85	1.08	2.34
Social cohesion, γ_{03}	0.65	0.54	1.92	--	--	--
Perceived violence, γ_{04}	--	--	--	-0.22	0.38	0.80
Decline, γ_{05}	1.32	0.63*	3.74	1.33	0.64*	3.80
Organizations, γ_{06}	0.33	0.18	1.39	0.36	0.18	1.43
	<i>N</i> =	78			78	
<i>T</i>	0.26			0.28		
Reliability estimate	0.40			0.41		
Chi-square (<i>df</i>)	126.48(72)**			129.10(72)**		

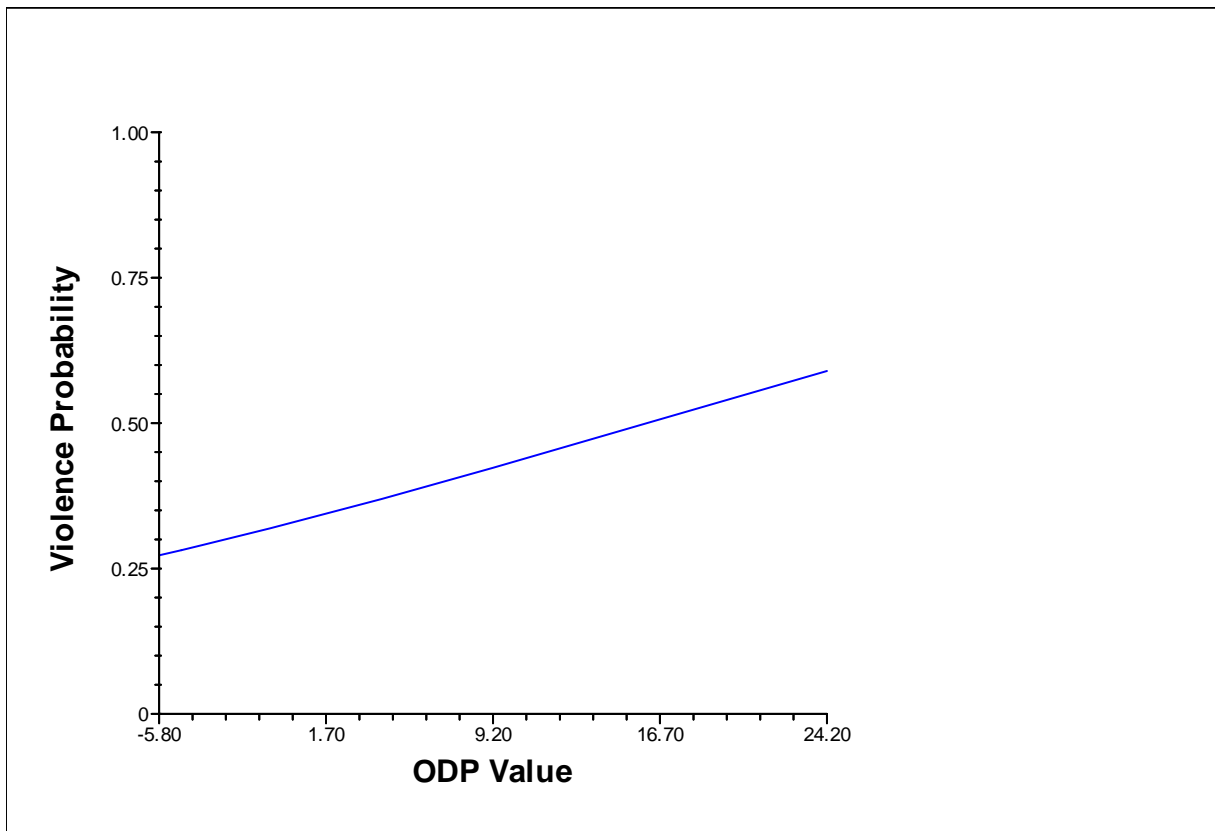
Note: Model coefficients and standard errors are based on the population-average models. All individual-level variables are group centered. * $p < .05$;

** $p < .01$

were significantly more likely to engage in future violent behavior. This measure was the strongest predictor in the model, increasing the odds of future violent behavior by over 3.5 times compared to youths living in neighborhood clusters with few of the residents reporting such problems.

Figure 1 illustrates the relationship between ODP and future violence for the HLM random-effects regression equation that includes social cohesion as a neighborhood-level predictor. The graph in Figure 1 illustrates the predicted probabilities for future violence for the entire range of ODP scores, where the remaining predictors in the regression equation are held constant at the mean. The fixed effects are from population-average estimates, which are those reported in Table 9. Since the individual-level predictors were group mean centered within each of the 78 neighborhood clusters (i.e., the 78 level-2 classes), the values for ODP are the average of these averages, rather than the true range of values (i.e., 0 to 30). The predicted relationship between future violence and ODP for the sample demonstrates that, all else held at the mean, the probability of a youth who was administered the YSR engaging in violence at Wave 2 ranges from approximately 25% with no reported ODP problems to 60% with high or clinical levels of ODP problems. (The results were comparable for the model replacing social cohesion with perceived violence.)

Figure 1. Relationship between Violence and ODP for Youth Administered the YSR



In an effort to explore the more practical utility of the DSM-oriented scales, Figure 2 shows the predicted probabilities of future violence for youths administered the YSR by prior violence and ODP score. The bar graph to the left shows the predicted probabilities of violence for youth reported never having engaged in prior violence, while the right portion of the graph shows the probabilities for youths reporting ever having engaged in prior violence. Six bars are displayed for each prior violence category. Each bar represents the starting and ending scores for the normal, borderline, and clinical ranges of the ODP scale. For youths who reported no history of violence, the probability of future violence for those who also reported ODP problems within the normal range (0 to 14 on the adjusted *T* score measure) was approximately 25% to 35%;

37% to 42% for those who reported borderline levels of ODP problems (15 to 19); and 43% to 55% for those who reported clinical levels of ODP problems (20 to 30 for existing values). For youths who reported a history of violence, however, the probabilities of future violence were much higher: approximately 44% to 60% for those with normal ODP scores; 61% to 65% for those with borderline ODP scores; and 66% to 76% for those with clinical ODP scores.

Figure 2. Relationship between Violence and Prior Violence by ODP Scores

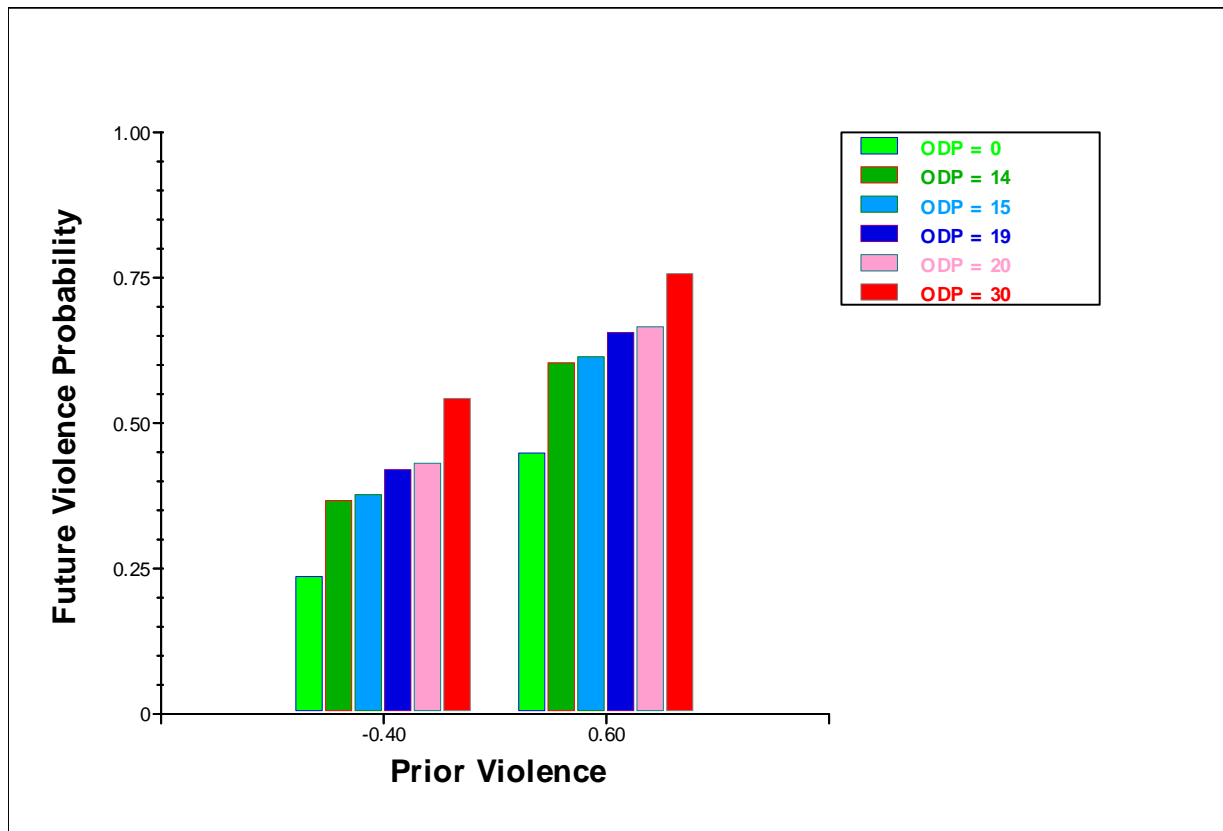


Table 10 reports the results for the regression of violence on individual and community factors, including the YASR DSM-oriented problems. Model 1 in Table 10, indicates the results of the individual-level regression of violence prevalence on

sociodemographic characteristics and DMS-oriented problems taken from the YASR. Consistent with the CBCL and YSR models, prior violence was the strongest predictor of future violence, increasing the odds of violence by over 3 times. Male young adults were significantly more likely to engage in future violence. Moreover, young adults who self-reported greater problems with antisocial personality issues were significantly more likely to engage in future violence. Antisocial personality problems increased the odds of future violence by 10%.

Model 2 in Table 10 reports the findings from the full individual-level model, which included family and peer factors. Prior violence and being male significantly increased the odds of violence among the youth. Antisocial personality problems also significantly increased the odds of future violence among the young adults. Consistent with the regression findings using the CBCL and YSR versions of mental health assessment, young adults who associated with criminally involved peers were significantly more likely to engage in future violent behavior. None of the other peer- or family-related measures were significantly related to future violence. This finding is inconsistent with the YSR model results, but similar to those of the CBCL model results.

Models 3 and 4 in Table 10 report the findings for the full multilevel models using the YASR DSM-oriented measures. Similar to the CBCL-based models, none of the community factors affected the likelihood of future self-reported violence among the PHDCN youth in this study. The individual-level measures remained when controlling for community-level factors. Youths who reported prior involvement in violence behavior, being male, associating with a large proportion of deviant peers, and greater levels of antisocial personality problems were significantly more likely to engage in future violent behavior.

Table 10. Multilevel Regression Results for YASR Youth Informant Measures and Violence.

	Model 1			Model 2		
	Coefficient	se	Odds Ratio	Coefficient	Se	Odds Ratio
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-0.88	0.14**	0.41	-0.90	0.14**	0.41
Sex (male), γ_{10}	1.02	0.29**	2.78	1.04	0.30**	2.82
Age, γ_{20}	0.34	0.27	1.40	0.37	0.28	1.44
SES (middle/low), γ_{30}	-0.20	0.40	0.82	-0.12	0.42	0.89
Race (non-white), γ_{40}	0.49	0.43	1.63	0.46	0.44	1.58
Prior violence, γ_{50}	1.18	0.30**	3.25	0.94	0.33**	2.56
Depressive problems, γ_{60}	0.02	0.03	1.02	0.02	0.03	1.02
Anxiety problems, γ_{70}	-0.00	0.04	1.00	-0.01	0.04	0.99
Somatic problems, γ_{80}	-0.02	0.02	0.98	-0.01	0.02	0.99
Attention deficit problems, γ_{90}	--	--	--	--	--	--
Antisocial problems, γ_{100}	0.10	0.03**	1.10	0.07	0.03*	1.07
Delinquent peers, γ_{110}	--	--	--	0.13	0.06*	1.14
Family conflict, γ_{120}	--	--	--	0.08	0.08	1.09
Family member depressed, γ_{130}	--	--	--	0.23	0.34	1.26
Family member anxiety, γ_{140}	--	--	--	0.11	0.40	1.11
Family member criminal, γ_{150}	--	--	--	-0.33	0.30	0.72
Parental maltreatment, γ_{160}	--	--	--	--	--	--
Poor friendships, γ_{170}	--	--	--	-0.10	0.07	0.91
Poor family relations, γ_{180}	--	--	--	0.24	0.61	1.27
<i>N</i> =	382			382		
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	--	--	--	--	--	--
Anomie, γ_{02}	--	--	--	--	--	--
Social cohesion, γ_{03}	--	--	--	--	--	--
Perceived violence, γ_{04}	--	--	--	--	--	--
Decline, γ_{05}	--	--	--	--	--	--
Organizations, γ_{06}	--	--	--	--	--	--
<i>N</i> =	74			74		
<i>T</i>	0.18			0.22		
Reliability estimate	0.14			0.16		
Chi-square (<i>df</i>)	87.73(73)			91.03(73)		

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Table 10. (cont.)

	Model 3			Model 4		
	Coefficient	se	Odds Ratio	Coefficient	se	Odds Ratio
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-9.89	5.31	0.00	-7.59	3.76*	0.00
Sex (male), γ_{10}	1.06	0.31**	2.89	1.06	0.31**	2.89
Age, γ_{20}	0.39	0.28	1.48	0.38	0.28	1.47
SES (middle/low), γ_{30}	-0.11	0.42	0.89	-0.12	0.42	0.89
Race (non-white), γ_{40}	0.50	0.45	1.66	0.50	0.45	1.64
Prior violence, γ_{50}	0.97	0.34**	2.64	0.98	0.34**	2.66
Depressive problems, γ_{60}	0.02	0.03	1.02	0.02	0.03	1.02
Anxiety problems, γ_{70}	-0.01	0.04	0.99	-0.01	0.04	0.99
Somatic problems, γ_{80}	-0.01	0.02	0.99	-0.01	0.02	0.99
Attention deficit problems, γ_{90}	--	--	--	--	--	--
Antisocial problems, γ_{100}	0.07	0.03*	1.07	0.07	0.03*	1.07
Delinquent peers, γ_{110}	0.13	0.06*	1.14	0.13	0.06*	1.14
Family conflict, γ_{120}	0.09	0.07	1.09	0.09	0.07	1.09
Family member depressed, γ_{130}	0.24	0.35	1.27	0.24	0.35	1.27
Family member anxiety, γ_{140}	0.12	0.40	1.12	0.12	0.40	1.13
Family member criminal, γ_{150}	-0.32	0.30	0.73	-0.32	0.30	0.72
Parental maltreatment, γ_{160}	--	--	--	--	--	--
Poor friendships, γ_{170}	-0.10	0.07	0.91	-0.10	0.07	0.91
Poor family relations, γ_{180}	0.23	0.61	1.26	0.23	0.61	1.26
<i>N</i> =	382			382		
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.05	0.79	1.05	0.39	0.65	1.48
Anomie, γ_{02}	2.35	1.74	10.46	1.47	1.71	4.37
Social cohesion, γ_{03}	0.49	0.81	1.62	--	--	--
Perceived violence, γ_{04}	--	--	--	0.10	0.54	1.10
Decline, γ_{05}	0.72	1.02	2.06	0.84	1.04	2.32
Organizations, γ_{06}	0.22	0.28	1.25	0.21	0.29	1.23
<i>N</i> =	74			74		
<i>T</i>	0.31			0.32		
Reliability estimate	0.20			0.21		
Chi-square (<i>df</i>)	88.01(68)			88.43(68)*		

Note: Model coefficients and standard errors are based on the population-average models. All individual-level variables are group centered. * $p < .05$; ** $p < .01$

Figure 3 illustrates the relationship between APP and future violence for the HLM random-effects regression equation that includes social cohesion as a neighborhood-level predictor. Similar to Figure 1, the graph in Figure 3 displays the predicted probabilities for future violence for the range of APP scores, where the remaining predictors in the regression equation are held constant at the mean. The fixed effects are from population-average estimates, which are those reported in Table 10. The predicted relationship between future violence and APP for the sample demonstrates that, all else held at the mean, the probability of a youth who was administered the YASR engaging in violence at Wave 2 ranges from approximately 70% with no reported APP problems to 93% with high or clinical levels of APP problems. (The results were comparable for the model replacing social cohesion with perceived violence.)

Figure 3. Relationship between Violence and APP for Youth Administered the YASR

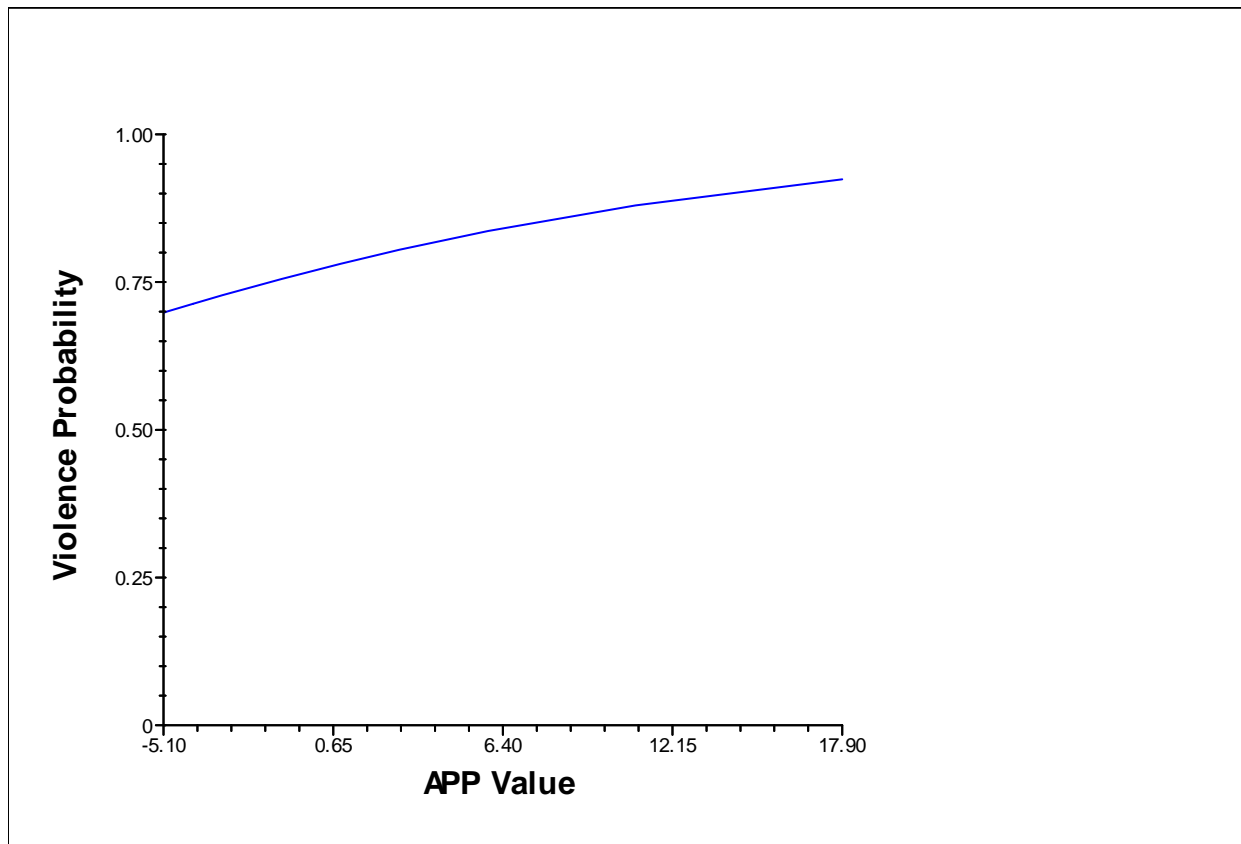
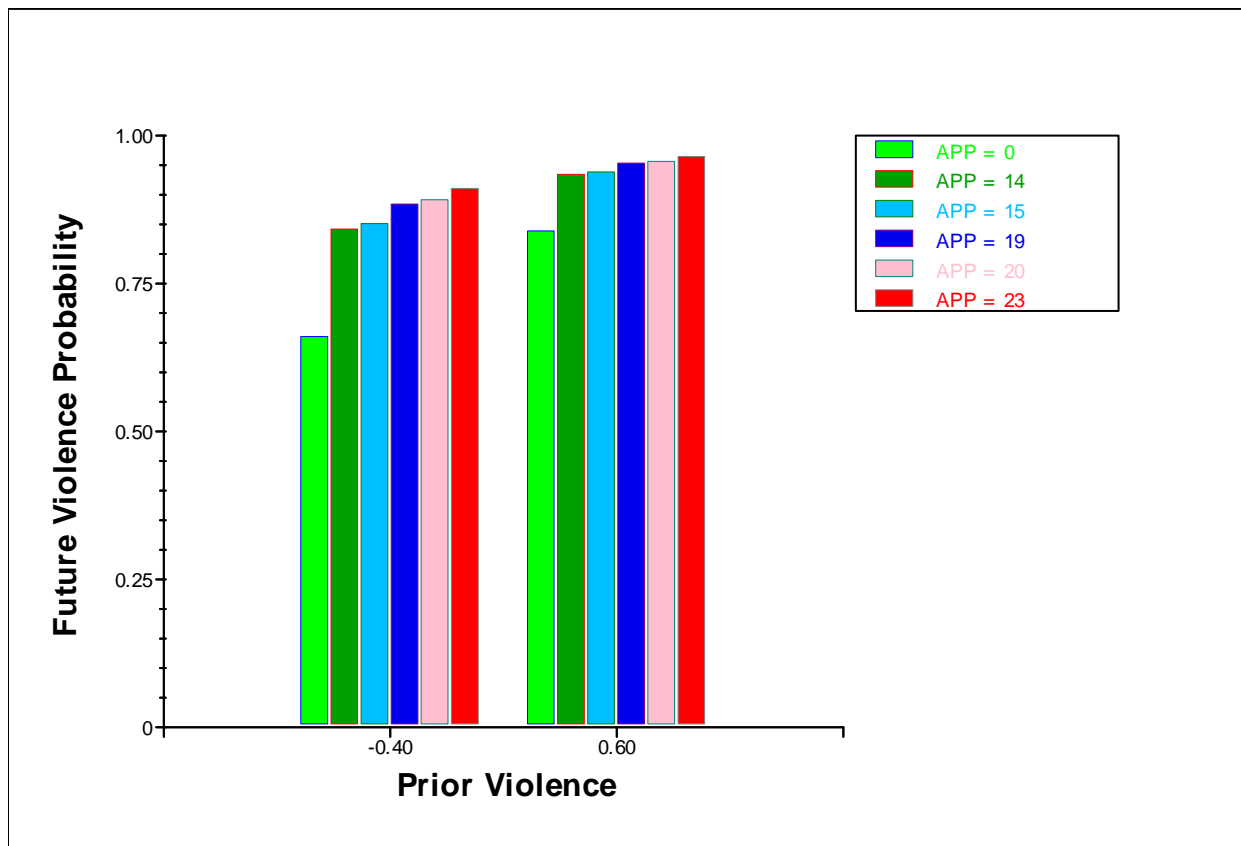


Figure 4 shows the predicted probabilities of future violence for youths administered the YSR by prior violence and APP score. For youths who reported no history of violence, the probability of future violence for those who also reported APP problems within the normal range (0 to 14 on the adjusted *T* score measure) was approximately 65% to 84%; 85% to 88% for those who reported borderline levels of APP problems (15 to 19); and 89% to 91% for those who reported clinical levels of APP problems (20 to 23 for existing values, which is much lower due to the adjusted measure omitting criminogenic items). For youths who reported a history of violence, however, the probabilities of future violence were much higher: approximately 84% to 93% for

those with normal APP scores; 94% to 95% for those with borderline APP scores; and 95% to 96% for those with clinical APP scores.

Figure 4. Relationship between Violence and Prior Violence by APP Scores



Interaction Effects for DSM-Oriented Measures

Objective 3 called for the examination of interaction effects in models demonstrating significant relationships between DSM-oriented problems and violence prevalence, when controlling for sociodemographic, family, peer, and community factors. None of the DSM-oriented problems were significant predictors of future violence when using the CBCL-based items (see Models 3 and 4 in Table 8). Therefore, interaction effects were not examined for the CBCL-based model. DSM-oriented

problems were significantly associated with future violence for the YSR-based (Models 3 and 4 in Table 9) and YASR-based models (Models 3 and 4 in Table 10). Since ODP and APP were significant in the YSR- and YASR-based models, respectively, interaction effects were examined for the YSR and YASR models. Furthermore, cross-level interaction effects were examined for the YSR model, which indicated a significant effect for neighborhood decline.

Table 11 contains the HLM regression results for the interaction variables between ODP using the YSR assessment instrument and the eight other significant predictors in the model: sex, race, prior violence, delinquent peers, family member depression, family member anxiety, family member criminal, and poor family relations. The interaction models were estimated separately using the community measures of social cohesion and perceived violence. Hence, sixteen interaction models were estimated for the YSR-based subsample. As reported in Table 11, none of the interactions for the YSR models were significant. While ODP increases the odds of future violence among PHDCN youths administered the YSR, this effect does not appear to be dependent on other sociodemographic, peer, or family risk factors.

Table 11. *Interaction Effects for Oppositional Defiant Problems for YSR Youth Informant.*

	Model 1		Model 2		Model 3	
	Coefficient	se	Coefficient	se	Coefficient	se
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-9.35	3.49*	-9.35	3.49*	-9.32	3.49*
Sex (male), γ_{10}	0.69	0.19**	0.64	0.14**	0.64	0.14**
Age, γ_{20}	-0.09	0.05	-0.09	0.05	-0.09	0.05
SES (middle/low), γ_{30}	0.01	0.16	0.01	0.16	0.00	0.16
Race (non-white), γ_{40}	0.51	0.25*	0.47	0.31	0.52	0.25*
Prior violence, γ_{50}	0.95	0.16**	0.95	0.16**	0.87	0.20**
Affective problems, γ_{60}	-0.03	0.01	-0.03	0.01	-0.02	0.01
Anxiety problems, γ_{70}	-0.00	0.01	-0.00	0.01	-0.00	0.01
Somatic problems, γ_{80}	-0.00	0.01	-0.00	0.01	-0.00	0.01
Attention deficit problems, γ_{90}	0.02	0.02	0.02	0.02	0.02	0.02
Oppositional problems, γ_{100}	0.05	0.02**	0.04	0.03	0.03	0.02
Delinquent peers, γ_{110}	0.06	0.03*	0.06	0.03*	0.06	0.03*
Family conflict, γ_{120}	0.07	0.04	0.07	0.04	0.07	0.04
Family member depressed, γ_{130}	0.42	0.17*	0.42	0.17*	0.42	0.17*
Family member anxiety, γ_{140}	-0.51	0.18**	-0.51	0.18**	-0.50	0.18**
Family member criminal, γ_{150}	0.37	0.15*	0.37	0.15*	0.38	0.15*
Parental maltreatment, γ_{160}	0.01	0.08	0.01	0.08	0.01	0.08
Poor friendships, γ_{170}	-0.05	0.04	-0.06	0.04	-0.06	0.04
Poor family relations, γ_{180}	0.67	0.34*	0.69	0.34*	0.68	0.34*
ODP * sex, γ_{190}	-0.01	0.02	--	--	--	--
ODP * race, γ_{190}	--	--	0.01	0.03	--	--
ODP * prior violence, γ_{190}	--	--	--	--	0.02	0.02
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.25	0.48	0.25	0.48	0.26	0.48
Anomie, γ_{02}	1.27	1.07	1.27	1.07	1.27	1.07
Social cohesion, γ_{03}	0.65	0.54	0.65	0.54	0.65	0.54
Perceived violence, γ_{04}	--	--	--	--	--	--
Decline, γ_{05}	1.32	0.63*	1.32	0.63*	1.32	0.63*
Organizations, γ_{06}	0.33	0.18	0.33	0.18	0.33	0.18
<i>T</i>	0.26		0.26		0.26	
Reliability estimate	0.40		0.40		0.40	
Chi-square (<i>df</i>)	126.52(72)**		126.47(72)**		126.62(72)**	

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Table 11. (cont.)

	Model 4		Model 5		Model 6	
	Coefficient	se	Coefficient	se	Coefficient	se
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-9.35	3.49**	-9.33	3.49*	-9.33	3.50*
Sex (male), γ_{10}	0.64	0.14**	0.64	0.14**	0.64	0.14**
Age, γ_{20}	-0.09	0.05	-0.09	0.05	-0.08	0.05
SES (middle/low), γ_{30}	0.01	0.16	0.01	0.16	0.01	0.16
Race (non-white), γ_{40}	0.51	0.25*	0.52	0.25*	0.51	0.25*
Prior violence, γ_{50}	0.95	0.16**	0.95	0.16**	0.94	0.16**
Affective problems, γ_{60}	-0.03	0.01	-0.03	0.01	-0.02	0.01
Anxiety problems, γ_{70}	-0.00	0.01	-0.00	0.01	-0.00	0.01
Somatic problems, γ_{80}	-0.00	0.01	-0.00	0.01	-0.00	0.01
Attention deficit problems, γ_{90}	0.02	0.02	0.02	0.02	0.02	0.02
Oppositional problems, γ_{100}	0.03	0.05	0.05	0.01**	0.05	0.01**
Delinquent peers, γ_{110}	0.05	0.04	0.06	0.03*	0.06	0.03*
Family conflict, γ_{120}	0.07	0.04	0.07	0.04	0.07	0.04
Family member depressed, γ_{130}	0.42	0.17*	0.64	0.22**	0.42	0.17*
Family member anxiety, γ_{140}	-0.50	0.18**	-0.50	0.18**	-0.33	0.24
Family member criminal, γ_{150}	0.37	0.15*	0.36	0.15*	0.37	0.15*
Parental maltreatment, γ_{160}	0.01	0.08	0.01	0.08	0.01	0.08
Poor friendships, γ_{170}	-0.06	0.04	-0.06	0.04	-0.06	0.04
Poor family relations, γ_{180}	0.69	0.34*	0.67	0.34*	0.70	0.34*
ODP * delinquent peers, γ_{190}	0.00	0.00	--	--	--	--
ODP * family depression, γ_{190}	--	--	-0.03	0.02	--	--
ODP * family anxiety, γ_{190}	--	--	--	--	-0.02	0.02
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.25	0.48	0.26	0.48	0.25	0.48
Anomie, γ_{02}	1.28	1.07	1.26	1.07	1.27	1.07
Social cohesion, γ_{03}	0.65	0.54	0.64	0.54	0.65	0.54
Perceived violence, γ_{04}	--	--	--	--	--	--
Decline, γ_{05}	1.32	0.63*	1.33	0.63*	1.32	0.63*
Organizations, γ_{06}	0.33	0.18	0.33	0.18	0.32	0.18
<i>T</i>	0.26		0.26		0.26	
Reliability estimate	0.40		0.40		0.40	
Chi-square (<i>df</i>)	126.42(72)**		126.78(72)**		126.97(72)**	

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Table 11. (cont.)

	Model 7		Model 8	
	Coefficient	se	Coefficient	se
<i>Individual-Level Variables:</i>				
Intercept, γ_{00}	-9.35	3.49*	-9.36	3.49**
Sex (male), γ_{10}	0.63	0.14**	0.63	0.14**
Age, γ_{20}	-0.08	0.05	-0.09	0.05
SES (middle/low), γ_{30}	0.00	0.16	0.00	0.16
Race (non-white), γ_{40}	0.51	0.25*	0.51	0.25*
Prior violence, γ_{50}	0.94	0.16**	0.95	0.16**
Affective problems, γ_{60}	-0.03	0.01	-0.02	0.01
Anxiety problems, γ_{70}	-0.00	0.01	-0.00	0.01
Somatic problems, γ_{80}	-0.00	0.01	-0.00	0.01
Attention deficit problems, γ_{90}	0.02	0.02	0.02	0.02
Oppositional problems, γ_{100}	0.05	0.01**	0.08	0.08
Delinquent peers, γ_{110}	0.06	0.03*	0.06	0.03*
Family conflict, γ_{120}	0.07	0.04	0.07	0.04
Family member depressed, γ_{130}	0.42	0.17*	0.41	0.17*
Family member anxiety, γ_{140}	-0.51	0.18**	-0.50	0.18**
Family member criminal, γ_{150}	0.47	0.20*	0.37	0.15*
Parental maltreatment, γ_{160}	0.01	0.08	0.01	0.08
Poor friendships, γ_{170}	-0.06	0.04	-0.06	0.04
Poor family relations, γ_{180}	0.69	0.34*	0.84	0.46
ODP * family criminal, γ_{190}	-0.01	0.02	--	--
ODP * poor family rel., γ_{190}	--	--	-0.02	0.04
<i>Neighborhood-Level Variables:</i>				
Neighborhood ties, γ_{01}	0.26	0.48	0.25	0.48
Anomie, γ_{02}	1.27	1.07	1.28	1.07
Social cohesion, γ_{03}	0.65	0.54	0.65	0.54
Perceived violence, γ_{04}	--	--	--	--
Decline, γ_{05}	1.33	0.63*	1.32	0.63*
Organizations, γ_{06}	0.33	0.18	0.33	0.18
<i>T</i>	0.26		0.26	
Reliability estimate	0.40		0.40	
Chi-square (<i>df</i>)	126.63(72)**		126.64(72)**	

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Table 11. (cont.)

	Model 9		Model 10		Model 11	
	Coefficient	se	Coefficient	se	Coefficient	se
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-6.59	2.45**	-6.58	2.45**	-6.57	2.45*
Sex (male), γ_{10}	0.69	0.19**	0.64	0.14**	0.64	0.14**
Age, γ_{20}	-0.09	0.05	-0.09	0.05	-0.09	0.05
SES (middle/low), γ_{30}	0.01	0.16	0.01	0.16	0.01	0.16
Race (non-white), γ_{40}	0.51	0.25*	0.47	0.31	0.51	0.25*
Prior violence, γ_{50}	0.95	0.16**	0.95	0.16**	0.87	0.20**
Affective problems, γ_{60}	-0.03	0.01	-0.03	0.01	-0.02	0.01
Anxiety problems, γ_{70}	-0.00	0.01	-0.00	0.01	-0.00	0.01
Somatic problems, γ_{80}	-0.00	0.01	-0.00	0.01	-0.00	0.01
Attention deficit problems, γ_{90}	0.02	0.02	0.02	0.02	0.02	0.02
Oppositional problems, γ_{100}	0.05	0.02**	0.04	0.03	0.03	0.02
Delinquent peers, γ_{110}	0.06	0.03*	0.06	0.03*	0.06	0.03*
Family conflict, γ_{120}	0.07	0.04	0.07	0.04	0.07	0.04
Family member depressed, γ_{130}	0.42	0.17*	0.42	0.17*	0.41	0.17*
Family member anxiety, γ_{140}	-0.51	0.18**	-0.50	0.18**	-0.50	0.18**
Family member criminal, γ_{150}	0.37	0.15*	0.37	0.15*	0.38	0.15*
Parental maltreatment, γ_{160}	0.01	0.08	0.01	0.08	0.01	0.08
Poor friendships, γ_{170}	-0.05	0.04	-0.06	0.04	-0.06	0.04
Poor family relations, γ_{180}	0.67	0.34*	0.69	0.34*	0.68	0.34*
ODP * sex, γ_{190}	-0.01	0.02	--	--	--	--
ODP * race, γ_{190}	--	--	0.01	0.03	--	--
ODP * prior violence, γ_{190}	--	--	--	--	0.02	0.02
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.55	0.40	0.55	0.40	0.55	0.40
Anomie, γ_{02}	0.85	1.08	0.85	1.08	0.84	1.08
Social cohesion, γ_{03}	--	--	--	--	--	--
Perceived violence, γ_{04}	-0.22	0.38	-0.23	0.38	-0.22	0.38
Decline, γ_{05}	1.34	0.64*	1.33	0.64*	1.33	0.64*
Organizations, γ_{06}	0.36	0.18	0.36	0.18	0.36	0.18
<i>T</i>	0.28		0.28		0.28	
Reliability estimate	0.41		0.41		0.41	
Chi-square (<i>df</i>)	129.13(72)**		129.10(72)**		129.23(72)**	

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Table 11. (cont.)

	Model 12		Model 13		Model 14	
	Coefficient	se	Coefficient	se	Coefficient	se
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-6.58	2.45**	-6.60	2.46**	-6.58	2.46*
Sex (male), γ_{10}	0.64	0.14**	0.64	0.14**	0.64	0.14**
Age, γ_{20}	-0.09	0.05	-0.08	0.05	-0.08	0.05
SES (middle/low), γ_{30}	0.01	0.16	0.01	0.16	0.01	0.16
Race (non-white), γ_{40}	0.51	0.25*	0.52	0.25*	0.51	0.25*
Prior violence, γ_{50}	0.95	0.16**	0.95	0.16**	0.94	0.16**
Affective problems, γ_{60}	-0.03	0.01	-0.03	0.01	-0.02	0.01
Anxiety problems, γ_{70}	-0.00	0.01	-0.00	0.01	-0.00	0.01
Somatic problems, γ_{80}	-0.00	0.01	-0.00	0.01	-0.00	0.01
Attention deficit problems, γ_{90}	0.02	0.02	0.02	0.02	0.02	0.02
Oppositional problems, γ_{100}	0.03	0.05	0.05	0.01**	0.05	0.01**
Delinquent peers, γ_{110}	0.05	0.04	0.06	0.03*	0.06	0.03*
Family conflict, γ_{120}	0.07	0.04	0.07	0.04	0.07	0.04
Family member depressed, γ_{130}	0.42	0.17*	0.64	0.22**	0.42	0.17*
Family member anxiety, γ_{140}	-0.50	0.18**	-0.50	0.18**	-0.33	0.24
Family member criminal, γ_{150}	0.37	0.15*	0.36	0.15*	0.37	0.15*
Parental maltreatment, γ_{160}	0.01	0.08	0.01	0.08	0.01	0.08
Poor friendships, γ_{170}	-0.06	0.04	-0.06	0.04	-0.06	0.04
Poor family relations, γ_{180}	0.69	0.34*	0.67	0.34*	0.70	0.34*
ODP * delinquent peers, γ_{190}	0.00	0.00	--	--	--	--
ODP * family depression, γ_{190}	--	--	-0.03	0.02	--	--
ODP * family anxiety, γ_{190}	--	--	--	--	-0.02	0.02
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.55	0.40	0.55	0.40	0.55	0.40
Anomie, γ_{02}	0.85	1.08	0.83	1.08	0.84	1.08
Social cohesion, γ_{03}	--	--	--	--	--	--
Perceived violence, γ_{04}	-0.23	0.38	-0.22	0.38	-0.22	0.38
Decline, γ_{05}	1.33	0.64*	1.35	0.64*	1.33	0.64*
Organizations, γ_{06}	0.36	0.18	0.36	0.18	0.35	0.18
<i>T</i>	0.28		0.28		0.28	
Reliability estimate	0.41		0.42		0.41	
Chi-square (<i>df</i>)	129.06(72)**		129.35(72)**		129.57(72)**	

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Table 11. (cont.)

	Model 15		Model 16	
	Coefficient	se	Coefficient	se
<i>Individual-Level Variables:</i>				
Intercept, γ_{00}	-6.60	2.45**	-6.59	2.45**
Sex (male), γ_{10}	0.63	0.14**	0.63	0.14**
Age, γ_{20}	-0.08	0.05	-0.08	0.05
SES (middle/low), γ_{30}	0.00	0.16	0.00	0.16
Race (non-white), γ_{40}	0.51	0.25*	0.51	0.25*
Prior violence, γ_{50}	0.94	0.16**	0.95	0.16**
Affective problems, γ_{60}	-0.03	0.01	-0.02	0.01
Anxiety problems, γ_{70}	-0.00	0.01	-0.00	0.01
Somatic problems, γ_{80}	-0.00	0.01	-0.00	0.01
Attention deficit problems, γ_{90}	0.02	0.02	0.02	0.02
Oppositional problems, γ_{100}	0.05	0.01**	0.08	0.08
Delinquent peers, γ_{110}	0.06	0.03*	0.06	0.03*
Family conflict, γ_{120}	0.07	0.04	0.07	0.04
Family member depressed, γ_{130}	0.41	0.17*	0.41	0.17*
Family member anxiety, γ_{140}	-0.51	0.18**	-0.50	0.18**
Family member criminal, γ_{150}	0.47	0.20*	0.37	0.15*
Parental maltreatment, γ_{160}	0.01	0.08	0.01	0.08
Poor friendships, γ_{170}	-0.06	0.04	-0.06	0.04
Poor family relations, γ_{180}	0.69	0.34*	0.84	0.46
ODP * family criminal, γ_{190}	-0.01	0.02	--	--
ODP * poor family rel., γ_{190}	--	--	-0.02	0.04
<i>Neighborhood-Level Variables:</i>				
Neighborhood ties, γ_{01}	0.55	0.40	0.55	0.40
Anomie, γ_{02}	0.84	1.08	0.85	1.08
Social cohesion, γ_{03}	--	--	--	--
Perceived violence, γ_{04}	-0.22	0.38	-0.23	0.38
Decline, γ_{05}	1.34	0.64*	1.33	0.64*
Organizations, γ_{06}	0.36	0.18	0.36	0.18
<i>T</i>	0.28		0.28	
Reliability estimate	0.41		0.41	
Chi-square (<i>df</i>)	129.23(72)**		129.26(72)**	

Note: Interaction effects in bold. Model coefficients and standard errors are based on the population-average models. All individual-level variables are group centered. * $p < .05$; ** $p < .01$

Table 12 reveals the HLM regression results for the interactions between antisocial personality problems among youths administered the YASR and the three other significant predictors in the YASR model: sex, prior violence, and delinquent peer association. Like the YSR interactions, these interactions were estimated in separate regressions for social cohesion and perceived violence. Therefore, six interaction models were estimated for the YASR-based models. As seen in Table 12, none of the interaction effects for APP were significant. Antisocial personality problems increase the likelihood of future violence among PHDCN young adults (cohort 18), but do not depend on the sociodemographic or peer-related factors included in this study.

Finally, cross-level interaction effects were examined for neighborhood decline and ODP in the YSR fully specified multilevel models. As previously reported (see Table 9), the results of the HLM regression results for the YSR-based models indicated that youths who resided in neighborhoods where the residents had perceived a decline in the neighborhood conditions had an increased risk of future violence, and that youths who reported greater problems with oppositional defiance issues had increased risk of future violence. But this multilevel test did not indicate whether the individual-level DSM-oriented problem interacted with the community characteristic to affect future violence. That is, does neighborhood decline affect the within-level slope associated with ODP in predicting violence, such that youths who have greater ODP issues and reside in neighborhoods with greater decline have increased risk of future violence?

To address this question another multilevel model was estimated that multiplied the slope of the ODP coefficient by the neighborhood decline coefficient, known as a cross-level interaction effect. Table 13 reports the results the cross-level interaction

Table 12. Interaction Effects for Antisocial Personality Problems for YASR Youth Informant.

	Model 1		Model 2		Model 3	
	Coefficient	se	Coefficient	se	Coefficient	se
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-9.88	5.31	-9.94	5.32	-9.95	5.33
Sex (male), γ_{10}	1.06	0.31**	1.06	0.31**	0.86	0.43*
Age, γ_{20}	0.39	0.28	0.39	0.82	0.41	0.28
SES (middle/low), γ_{30}	-0.11	0.42	-0.11	0.42	-0.12	0.42
Race (non-white), γ_{40}	0.51	0.45	0.51	0.45	0.51	0.45
Prior violence, γ_{50}	0.97	0.34**	1.03	0.44*	0.99	0.34**
Depressive problems, γ_{60}	0.02	0.03	0.02	0.03	0.02	0.03
Anxiety problems, γ_{70}	-0.01	0.04	-0.01	0.4	-0.01	0.04
Somatic problems, γ_{80}	-0.01	0.02	-0.01	0.02	-0.01	0.02
Attention deficit problems, γ_{90}	--	--	--	--	--	--
Antisocial problems, γ_{100}	0.05	0.14	0.08	0.05	0.05	0.04
Delinquent peers, γ_{110}	0.12	0.08	0.13	0.06*	0.13	0.06*
Family conflict, γ_{120}	0.09	0.07	0.09	0.07	0.09	0.07
Family member depressed, γ_{130}	0.23	0.35	0.24	0.35	0.23	0.35
Family member anxiety, γ_{140}	0.12	0.40	0.13	0.41	0.12	0.40
Family member criminal, γ_{150}	-0.32	0.30	-0.32	0.30	-0.34	0.30
Parental maltreatment, γ_{160}	--	--	--	--	--	--
Poor friendships, γ_{170}	-0.10	0.07	-0.10	0.08	-0.11	0.08
Poor family relations, γ_{180}	0.22	0.61	0.23	0.61	0.25	0.61
APP * delinquent peers, γ_{190}	0.00	0.01	--	--	--	--
APP * prior violence, γ_{190}	--	--	-0.01	0.06	--	--
APP * sex, γ_{190}	--	--	--	--	0.04	0.06
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.05	0.79	0.05	0.79	0.05	0.79
Anomie, γ_{02}	2.35	1.74	2.36	1.74	2.35	1.75
Social cohesion, γ_{03}	0.48	0.81	0.49	0.81	0.49	0.82
Perceived violence, γ_{04}	--	--	--	--	--	--
Decline, γ_{05}	0.72	1.02	0.72	1.02	0.75	1.02
Organizations, γ_{06}	0.22	0.28	0.22	0.28	0.22	0.28
T	0.31		0.31		0.31	
Reliability estimate	0.21		0.21		0.21	
Chi-square (<i>df</i>)	88.03(68)		88.16(68)		88.21(68)	

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Table 12. (cont.)

	Model 4		Model 5		Model 6	
	Coefficient	se	Coefficient	se	Coefficient	se
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-7.59	3.77*	-7.61	3.77*	-7.62	3.77*
Sex (male), γ_{10}	1.06	0.31**	1.06	0.31**	0.86	0.43*
Age, γ_{20}	0.39	0.28	0.38	0.28	0.40	0.28
SES (middle/low), γ_{30}	-0.12	0.42	-0.11	0.42	-0.12	0.42
Race (non-white), γ_{40}	0.50	0.45	0.50	0.45	0.50	0.45
Prior violence, γ_{50}	0.98	0.34**	1.03	0.43*	0.99	0.34**
Depressive problems, γ_{60}	0.02	0.03	0.02	0.03	0.02	0.03
Anxiety problems, γ_{70}	-0.01	0.04	-0.01	0.04	-0.01	0.04
Somatic problems, γ_{80}	-0.01	0.02	-0.01	0.02	-0.01	0.02
Attention deficit problems, γ_{90}	--	--	--	--	--	--
Antisocial problems, γ_{100}	0.05	0.14	0.08	0.05	0.05	0.04
Delinquent peers, γ_{110}	0.12	0.08	0.13	0.06*	0.13	0.06*
Family conflict, γ_{120}	0.09	0.07	0.09	0.07	0.09	0.07
Family member depressed, γ_{130}	0.23	0.35	0.24	0.35	0.23	0.35
Family member anxiety, γ_{140}	0.13	0.40	0.13	0.40	0.13	0.40
Family member criminal, γ_{150}	-0.32	0.30	-0.33	0.30	-0.34	0.30
Parental maltreatment, γ_{160}	--	--	--	--	--	--
Poor friendships, γ_{170}	-0.10	0.07	-0.10	0.08	-0.11	0.08
Poor family relations, γ_{180}	0.22	0.61	0.23	0.61	0.25	0.61
APP * delinquent peers, γ_{190}	0.00	0.01	--	--	--	--
APP * prior violence, γ_{200}	--	--	-0.01	0.06	--	--
APP * sex, γ_{210}	--	--	--	--	0.04	0.06
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.39	0.65	0.39	0.65	0.39	0.66
Anomie, γ_{02}	1.48	1.71	1.48	1.71	1.47	1.71
Social cohesion, γ_{03}	--	--	--	--	--	--
Perceived violence, γ_{04}	0.10	0.55	0.10	0.55	0.10	0.55
Decline, γ_{05}	0.84	1.04	0.84	1.04	0.87	1.04
Organizations, γ_{06}	0.20	0.29	0.21	0.29	0.21	0.29
T	0.32		0.32		0.33	
Reliability estimate	0.21		0.21		0.21	
Chi-square (df)	88.43(68)*		88.57(68)*		88.62(68)*	

Note: Model coefficients and standard errors are based on the population-average models. All individual-level variables are group centered. * $p < .05$;

** $p < .01$

Table 13. Cross-Level Interaction Effect for Oppositional Defiant Problems in YSR Youth Informant.

	Model 1			Model 2		
	Coefficient	se	Odds Ratio	Coefficient	se	Odds Ratio
<i>Individual-Level Variables:</i>						
Intercept, γ_{00}	-9.39	3.49**	0.00	-6.63	2.45**	0.00
Sex (male), γ_{10}	0.64	0.14**	1.90	0.64	0.14**	1.89
Age, γ_{20}	-0.09	0.05	0.92	-0.09	0.05	0.92
SES (middle/low), γ_{30}	0.00	0.16	1.00	0.00	0.16	1.00
Race (non-white), γ_{40}	0.51	0.25*	1.67	0.51	0.24*	1.67
Prior violence, γ_{50}	0.95	0.16**	2.58	0.95	0.16**	2.58
Affective problems, γ_{60}	-0.02	0.01	0.98	-0.02	0.01	0.98
Anxiety problems, γ_{70}	-0.00	0.01	1.00	-0.00	0.01	1.00
Somatic problems, γ_{80}	-0.00	0.01	1.00	-0.00	0.01	1.00
Attention deficit problems, γ_{90}	0.02	0.02	1.02	0.02	0.02	1.02
Oppositional problems, γ_{100}	0.11	0.11	1.12	0.11	0.11	1.11
Delinquent peers, γ_{110}	0.06	0.03*	1.06	0.06	0.03*	1.06
Family conflict, γ_{120}	0.07	0.04	1.07	0.07	0.04	1.07
Family member depressed, γ_{130}	0.42	0.17*	1.53	0.42	0.17*	1.52
Family member anxiety, γ_{140}	-0.51	0.18**	0.60	-0.51	0.18**	0.60
Family member criminal, γ_{150}	0.37	0.15*	1.45	0.37	0.15*	1.45
Parental maltreatment, γ_{160}	0.00	0.08	1.00	0.00	0.08	1.00
Poor friendships, γ_{170}	-0.06	0.04	0.94	-0.06	0.04	0.94
Poor family relations, γ_{180}	0.68	0.34*	1.97	0.68	0.34*	1.97
	<i>N</i> =	1,201		<i>N</i> =	1,201	
<i>Neighborhood-Level Variables:</i>						
Neighborhood ties, γ_{01}	0.25	0.48	1.29	0.55	0.40	1.73
Anomie, γ_{02}	1.27	1.07	3.57	0.84	1.08	2.32
Social cohesion, γ_{03}	0.65	0.54	1.92	--	--	--
Perceived violence, γ_{04}	--	--	--	-0.22	0.38	0.80
Decline, γ_{05}	1.35	0.63*	3.84	1.36	0.64*	3.89
Organizations, γ_{06}	0.33	0.18	1.39	0.36	0.18	1.43
	<i>N</i> =	78		<i>N</i> =	78	
<i>Cross-Level Interaction:</i>						
Oppositional problems, γ_{101}	-0.03	0.06	0.97	-0.03	0.06	0.97
<i>T</i>	0.26			0.28		
Reliability estimate	0.40			0.41		
Chi-square (<i>df</i>)	126.47(72)**			129.10(72)**		

Note: Model coefficients and standard errors are based on the population-average models. All individual-level variables are group centered. * $p < .05$; ** $p < .01$

between ODP and neighborhood decline. As illustrated, the interaction between ODP and neighborhood decline was not significant. Therefore, the effect of ODP appears to be independent of the effect of neighborhood decline.

Discussion and Conclusions

Summary of Research Findings

When considering issues of critical concern in our schools and communities, the development of serious mental health issues in childhood, as well as their damaging consequences and how to treat them, is a prominent topic for parents, educators, practitioners, policymakers, and social scientists alike (Farrington & Welsh, 2007). Besides the social costs of violence and other poor life outcomes that appear to be related to the onset of mental health dysfunction, there are also significant long-term economic costs that can be traced to these problems (Cohen, 1998). Determining the etiology of various forms of serious psychopathology is a key public health objective, with an executive summary report commissioned by the National Institute of Mental Health (2001) estimating that “childhood neuropsychiatric disorders will rise by over 50% internationally to become one of the five most common causes of morbidity, mortality, and disability among children” (p. 1). Our research supports the current dominant philosophy for national funding and policy strategies that seeks to identify and investigate various types of behavioral and emotional dysfunction that lead to negative life-course outcomes for children and adolescents (Patel et al., 2007; U.S. Department of Health and Human Services, 1999). Few issues are more central from a public policy and health perspective than the genesis of violent behaviors and their relationship to risk factors that emerge in childhood and adolescence (Farrington, 2005).

Despite a rather impressive body of research on covariates of mental health problems, there is still much to be understood about how these pieces fit into the larger puzzle of risk factors associated with negative life outcomes. The current project sought

to complement and extend previous works on this topic to provide a more comprehensive, multi-tiered, and nuanced understanding of specific mental health problems associated with violence. Unlike the majority of studies, which have examined the mental health-offending link among strictly forensic samples or with adolescent or adult samples, our study utilized a non-forensic sample of male and female children and adolescents in different age cohorts over time.

The results garnered from our study largely corroborate the existing body of research on mental health and violence that has primarily focused on clinical populations to examine the link between ODP and violence (see Connor, 2002). The longitudinal nature of our study also serves to validate “causal” models that have relied on cross-sectional datasets. Perhaps more importantly from a public policy perspective, the multidimensional component of our study has important practical and policy-oriented implications for intervention and prevention methods calling for more holistic treatment strategies. In conjunction with other studies, our work contributes insights into which mental health difficulties may be most problematic among urban youth, how other individual, family, and neighborhood risk factors affect the magnitude of mental health consequences of violence, and which components play a greater part in violent behavior across various developmental stages. The continuity and desistance of problem behaviors over time is a main focus of developmental studies and theoretically informs the current study (see Fabio et al., 2006; Farrington, 1991; Loeber & Stouthamer-Loeber, 1987). Elucidating violence pathways is a vital step in identifying relationships between problem behaviors that are the theoretical foundation of effective intervention and prevention programming efforts (Loeber et al., 1998).

Objective 1 of this study called for an examination of the role of specific DSM-oriented scales as they may explain youth violence, measured primarily as a simple assaultive behavior, when controlling for a host of individual-level (i.e., sociodemographics, peer, and family factors) and community-level variables that may contribute to antisocial youth outcomes. When summarizing the key findings across the multilevel models presented here, age emerged as a significant predictor of violence, but only for the parent models of the DSM-oriented measures (refer to Table 8). Recall that within the CBCL models, youth ages at Wave 1 ranged from 7 years to 16 years old (for cohorts 9, 12, and 15). The YSR models included youth ages that ranged from 10 to 16 years (for cohorts 12 and 15). Since only the CBCL contained cohort 9, the significant age effects found in the CBCL models suggest potential developmental differences between childhood and adolescence. These results are displayed in Model 1 within Table 8, with ODP effects disappearing once family- and community-level measures are included in the model. We see no age effects for the youth-self report models that contain the older adolescents in either the YSR or YASR models.

These results concur with previous individual-level analyses of the DSM-oriented scales recently conducted by the joint authors. For instance, in Boots and Wareham (2009), the relationship of various DSM-oriented measures were examined across different developmental age chunks (i.e., ages 7 to 9, ages 10 to 12, and ages 13 to 16), revealing that parental informants reported significant DSM-oriented problems effects for children ages 7 to 9, but not for any older youths. In other words, parents seem to be significant informants of problem behaviors for younger children in community-based samples, but not necessarily for older youths. Additively, these findings across individual and multilevel studies suggest that informant type matters when examining

problem behaviors and that these reports may be age sensitive. Such a proposition is supported by recent studies that posit that different informants are more valid than others in various situations and at different youth ages. In particular, Smith (2007) argued that for younger youths with psychopathology, parents were better informants than child or alternate sources. In contrast, for older youths, self-reports were ranked as the best sources of child dysfunction for internalizing and externalizing behaviors for community samples (as compared to outpatient or clinical settings). Future studies should further examine this issue since our study was limited by the multilevel design. That is, due to the nested nature of the data and method of analysis (individuals nested within families nested within neighborhood clusters), and the resulting smaller sample size within the respective age cohorts, we were unable to examine all developmental age differences in DSM-oriented effects in detail because of concerns with statistical power across the levels.

When comparing the findings in Table 8 to Table 9, Model 4, some of the most intriguing findings materialize, which highlight key similarities and differences between the parental (CBCL) and youth self-reported (YSR/YASR) models. First, several consistent findings across all models are reported, with males, those persons who had committed previous violence, and youngsters associating with deviant peers more likely to commit violence over time when controlling for other variables. For the YSR model in particular (see Table 9), which is predominantly comprised of cohorts 12 and 15, there are substantial differences when comparing it to the CBCL and YASR findings that should also be noted here. Family problems in general increased the chances of violence inasmuch as kids with family members who were depressed, were criminally involved,

or who had poor general family relations were all significantly more likely to self-report violent behaviors.

While the findings regarding the significance of family factors was not unexpected, it was somewhat surprising to see so many of these measures remain statistically significant in the fully specified model in light of the large numbers of items included in these more complex multilevel models. The significant impact of family-related factors influencing mental health and violence pathways is well established across the literature. A meta-analysis found that children with depressed parents were 2.7 times more likely than kids with healthy parents to develop a form of mental illness (Lapalme, Hodgins, & La Roche, 1997). In a comparative study of violent and homicidal youngsters, Shumaker and McGee (2001) explored a number of sociodemographic, clinical and familial characteristics. More than half of the violent and homicidal youths in the study reported one or more close family members with a psychiatric condition. These findings are consistent with a host of studies that have reported elevated levels of family mental illness and abuse histories in juvenile killers (see Bailey, 1996; Corder et al., 1976; Lewis et al., 1988; Lewis, 2000). Likewise, Dolan and Smith (2001) found that young killers had higher rates of parental psychopathology than did a control group of youthful fire-setters. That is, killers' families were typically characterized as having both paternal (4%) and maternal (20%) mental illness, paternal (24%) and maternal (7%) alcohol abuse, paternal criminality (17%) and maternal personality disorders (4%). Studies have also reported higher rates of parental psychopathology in violent youth when compared to the children of healthy adults as well (Cantwell & Baker, 1984). These works contradict Moffitt (1987), who reported a weak and consistent relationship between parental psychiatric history and violent behaviors in children. It is also

noteworthy that our study found no significant effects between child maltreatment and youth violence, which was somewhat unanticipated given the robust empirical evidence of this relationship (see e.g., Widom, 1989a, 1989b).

Interestingly, adolescents with family members who reported anxiety problems were significantly less likely to commit violence over time. In other words, the presence of anxiety within the family became a protective factor for youth's self-reported violence. It is speculated that the worrying and concern of a family member translates into closer supervision, monitoring, and contact with the child that may keep youngsters from having opportunities to participate in risky behaviors. There is research to support this contention. For instance, Dubrow and Garbarino (1989) reported that mothers living in lower socioeconomic neighborhoods with high rates of violence developed a number of strategies to protect their children from the dangers lurking within their communities: 1) they informed their children about the places in their communities with the greatest dangers, 2) they enforced and developed household rules for their children to avoid problems and get assistance when necessary, and, most relevant to our findings, 3) these mothers provided close guardianship and supervision of their children.

With regard to the community-level variables across the YSR and YASR, again the YSR models had some distinctive findings, with neighborhood decline increasing the odds of adolescent violence over time. This measure was the strongest predictor in the full model and increased the odds of future violent behavior by nearly 4 times compared to youths living in neighborhood clusters with less neighborhood decline problems. No other community-level variables reached statistical significance in the multilevel models analyzed, regardless of informant source. Recall that the neighborhood decline measure included items regarding personal safety, the appearance of the community, the types of

people living in the community, and the level of police protection. In essence, these measures picked up on social control and disorganization indicators that mirrored resident perceptions of decay within their communities. The strength of this measure might be interpreted as a signal of the initial weakening of social bonds and social cohesion in these communities, which may lead to a breakdown of trust and social ties, which in turn may fuel youth violence outcomes (Hirschfield & Bowers, 1997; Morenoff, Sampson, & Raudenbush, 2001; Sampson et al., 1997).

While we did not find as many community-level effects as we might have expected from the outset of this study due to the robust community-level findings found in previous studies off the PHDCN, our findings regarding neighborhood decline are intriguing in light of the voluminous body of research related to social ecology produced since the 1990s that has debated how neighborhood social processes and mechanisms may facilitate life outcomes such as crime (see Sorensen, 1998; also Sharkey, 2006). In a comprehensive review across studies that have utilized neighborhood and community measures, Sampson, Morenoff, and Gannon-Rowley (2002) found the strongest indicators linked neighborhood processes to criminal activities. Our findings are therefore generally supported by previous studies that have shown community disorder and a lack of neighborhood cohesion to be associated with poor mental health outcomes (Ross, 2000; see also Silver, 2000).

Other empirical research has shown related macro-level community factors to have a significant impact on mental health outcomes (see Drukker, Kaplan, Feron, & van Os, 2003), with positive social capital (defined as the additive total of family and neighbor relationships that act as a protective factor against negative environmental forces) acting as a catalyst to reinforce mental health within communities via

mechanisms of adult supervision and close care of youngsters (see Stevenson, 1998).

Other researchers have argued that social capital is more related to social cohesion, or a lack of social conflict combined with the development of strong bonds and feelings of trust (Kawachi & Berkman, 2000). Not all research supports this contention, however. In one recent study in Baltimore, youngsters living within higher SES neighborhoods with lower levels of reported maternal attachment to community had more behavioral and mental health problems when compared to residents from lower SES neighborhoods with weaker neighborhood bonds (Caughy, O'Campo, & Muntaner, 2003). It was suggested that lower SES residents have better health and behavioral outcomes *because* their community bonds were weakened. Caughy and her colleagues (2003) utilized census tracts as a proxy for neighborhood for their cross-sectional study and their findings lie in contrast to a number of other related studies that argue for a positive impact of neighborhood-related measures on health outcomes. That is, some other studies have focused more on the positive community-building potential of investing in social capital and neighborhood cohesion (see Berkman & Syme, 1979; Sampson, 2003).

For instance, Moffitt and members of the Environmental-Risk study (Moffitt & E-Risk Study Team, 2002) longitudinally examined mental health histories, symptoms of antisocial personality disorder, and maternal depression and their relationship with neighborhood-level indicators such as social cohesion, trust, and informal social controls. They found that younger mothers with less community supports had children with greater behavioral and personality problems and offered suggestions for policies that provide better mental health and community-related services for such at-risk families. Beyers and her co-authors (2003) also explored how structural disadvantage

and instability within communities might longitudinally influence externalizing behaviors in youth across three geographical sites when controlling for individual- and familial-level factors. Although they did not find any direct neighborhood-level relationships with externalizing issues in youth, the authors posited that community plays a role via the moderating effects of socialization vis-à-vis parental monitoring.

Coleman (1990) encapsulated several different ways that social capital might influence health outcomes via: 1) reciprocal obligations that neighbors call upon when favors are needed, 2) exchanged information about community resources that might be beneficial or otherwise costly to be uninformed about, 3) intergenerational closure that occurs when families know each other and develop supports and rules for child raising, and 4) voluntary associations that create stronger ties and foster community action and collectivity. In sum, while our findings here regarding the negative impact of neighborhood decline on youth violence are in keeping with a good number of other studies that have reported similar neighborhood effects, the inability to develop a fully-specified model with the more detailed indicators of crime and socioeconomic factors related to neighborhood limits our understanding of how such variables specifically influence youth violence (while simultaneously considering the effects of family and individual measures). The restricted PHDCN data that were available to the authors here do not offer detailed measures to control for specific crime and sociodemographic variables that might contribute to these complex temporal relationships. As mentioned earlier, such temporal examinations empirically validate criminological theory and impact prevention efforts and should be further explored with data that allow for such detailed examinations (Fabio et al., 2006).

When considering our overall findings regarding Objective 1, then, our results support the theoretical underpinnings related to the development of life-course persistent offenders posited by Moffitt (1993). Under this framework, the developmental of oppositional behaviors of intrinsically-vulnerable youth (or those young persons having mental health issues) are fueled early on in the life-course by criminogenic and otherwise antisocial family and community environments, which over time evolve into persistent patterns of violent and more serious offending behaviors as these at-risk youth progress into adolescence (see Fergusson, Lynskey, & Horwood, 1996; Moffitt & Lynam, 1994; Vermeiren, 2003). In particular, the continuity of oppositional behaviors in ODP and APP across the developmental ages observed here are in congruence with Moffitt's theory of youth who have neurologically-related deficits contributing to antisocial outcomes. Moreover, studies have persuasively argued that the relative influence of environmental factors increases with the age of onset (see e.g., Taylor, Iacono, & McGue, 2000). Thus, our study appears to be supported by the empirical developmental literature that argues for a number of influential characteristics that span across individual, familial, and community domains and which uniquely contribute toward violence pathways for children and adolescents at various stages of development.

With the significance of ODP and APP shown in this first stage of the project, Objective 2 sought to determine the relative magnitude of DSM-oriented problem effects sizes when controlling for other multilevel indicators. The lone consistent DSM-oriented problem found to predict youth violence across the models was oppositional (ODP) and antisocial personality (APP) problems. Without a doubt, our results indicate that the presence of ODP/APP matters in the etiology of violence in youngsters, even

when controlling for a host of other variables. We included a large number of family and community variables that have been theoretically linked to violence and these forms of oppositional and antisocial mental health problems remained significant across the self-reported models. The magnitude of this effect, however, was consistently quite small.

The small magnitude of these effects may be due in part to the continuous nature of the DSM scales utilized here versus selecting categorical indicators of psychopathology. The increased variability that is inherent with continuous scales may serve to reduce the size of coefficient effects. This is not to say that continuous indicators of DSM-oriented problems such as those used here have no utility. To the contrary, in a recent study, Boots and Wareham (2009) demonstrated the utility of using continuous DSM-oriented problem indicators to examine predicted probabilities for violence in normal, borderline, and clinical thresholds of childhood mental health problems. The practical utility of these scales was also illustrated in the present report in Figure 1 to 4, where it was shown that youths with zero to few ODP problems relatively little risk of future violence compared to those with many ODP issues. For older youths or young adults, the risk of future violence is much greater, regardless of the level of these problems. Therefore, consideration of a continuous indicator of mental health problems that captures borderline problems areas, may be particularly important for certain types of mental health issues and certain developmental ages. Such findings highlight the salience of borderline and subclinical scores that are ignored in categorical testing. Moreover, our cumulative research suggests that the use of common categorical indicators when examining mental health problems may serve to inflate the effect size of these issues on offending. Still, some caution should be used

when considering the findings presented here, as they require replication with other datasets and populations.

It could also be that our coefficient sizes are not large in magnitude because they come from a community-based sample that comprises these PHDCN data. With a large proportion of the extant literature dealing with forensic or clinically-referred populations, the effects reported here are not equivalent to many other studies and thus may render our effect sizes small in comparison. Such considerations should be kept in mind when looking across the findings presented in the models.

For Objective 3, we examined the interaction effects between the significant DSM-oriented measures and other significant measures across the models. This was done to explore the dependent nature of DSM-oriented problems on sociodemographic, peer, family, and neighborhood factors. A large number of models were run with regard to this objective. The individual-level and cross-level interactions indicated no dependence of DSM-oriented problems on any variables included in the models. Essentially, this finding indicates that the presence of ODP and APP behaviors predicted self-reported youth violence independently when considering the significant measures included in the models. Future research should consider other risk and protective factors not included in the present study to expand the knowledge on this topic.

Implications for Policy and Practice

The amelioration of problem behaviors that lead to serious offending behaviors in children and adolescents is a critical public health concern that crosses academic, social service, and government circles (Dahlberg & Potter, 2001). When looking across the study findings as they relate to policy and practice, we generally see that community-level variables matter less and family- and individual-level factors influence youth

violence more significantly. These results were somewhat surprising due to the large number of well-validated and replicated neighborhood-level variables that we included in our models. However, our findings related to the link between neighborhood decline and serious mental health problems such as ODP are consistent with a large body of research that spans health and social ecology. For example, in a recent meta-analysis conducted by Almedom (2005, see also Almedom & Glandon, 2008) on the role of community-level measures such as social capital and its impact on mental health, the authors argue persuasively for the inclusion of community-building initiatives in any reforms to public health policy. “Very little is known about how to build social capital in a society, although we know that high levels of social capital require social stability. The current basis for prevention must consequently be to use the social capital already available” (Almedom & Glandon, 2008, p. 230).

Our findings overall provide further empirical support for the relevance of developmental perspectives, as results suggest that the age of the child may be quite relevant when considering the most appropriate informant and domain from which to gauge problem behaviors. Our findings also do not lend support toward a single problem solution focused solely on mental health solutions, but rather to a more holistic, multi-systemic treatment model that considers the role of numerous individual, familial, and neighborhood factors that may cumulatively contribute to offending pathways for youth. While our research does not suggest that *only* mental health should receive increased resources at the exclusion of other social problems that also appear to contribute to violence, public policies and community initiatives that ignore the salient role of mental illness are argued to fall short of holistic treatment needed to ameliorate youth violence. Mental illness, and the prevalence of specific forms of psychopathology

at various points in childhood and adolescence, is therefore argued here to be a critical component in effective treatment that should be part of best practices in youth violence reduction efforts, especially in urban centers with persistent and severe economic disadvantage (Offord, Lipman, & Daku, 2001).

Our results also point to the need to examine and include the family, especially in adolescence with regard to the familial effects reported on cohorts 12 and 15. These findings fly in the face of a bounty of social science research that suggests that peers are the greater influence in offending decisions at this developmental stage. Indeed, quite unexpectedly, our study suggests that family influences violent offending more than delinquent peers during adolescence based on both the magnitude and number of family variables that reached statistical significance. Despite the robustness of these effects reported across the YSR models, some caution may be warranted here without further examination. In particular, Dana Haynie and her colleagues (Haynie, 2001; Haynie & Osgood, 2005) recently have argued that youth self-reported measures of delinquent peers overestimate the role of normative peer influence on antisocial outcomes. Toward this end, Haynie argues that a more accurate measure would be to utilize independent peer assessments (not available in the PHDCN) and, most relevant to our findings, that peer influence does not independently mediate the influence of family, age, or gender. In a recent study, Haynie, Silver, and Teasdale (2006) found that neighborhood disadvantage indirectly influenced adolescent youth violence by providing opportunities to get involved in violent peer networks. Since the delinquent peer indicator used here is a self-nominated measure with potential selection biases, Haynie's research suggests that it may be possible that PHDCN youth have inflated or exaggerated their peers' delinquent involvement and influence, thereby rendering the robustness of this effect

somewhat questionable. More research clearly needs to tease out the role of friends and delinquent peer networks as they relate to mental health with these measurement issues in mind.

From an ethical standpoint, there is also considerable controversy when discussions regarding early identification and testing for serious mental health problems are raised for young children. Toward this end, great care should be taken when youngsters are clinically assessed for serious psychopathology in either private care or public health settings, as there are potential labeling effects that may occur in various domains (i.e., neighborhoods, families, and schools) that can be damaging to both the child and the family (Boots, 2008). For youth and their families in already socially-disadvantaged settings, this harm may have a cumulative effect because of the scarcity of community-based mental health resources (Drukker, Driessen, Krabbedam, & van Os, 2004).

With these caveats in mind, there are a number of programs that offer hope for youth with behavioral problems. Research shows that children who are treated for one type of trauma or behavioral problems have positive outcomes for other co-occurring mental health issues as well (Cohen, Mannarino, Murray, & Igelman, 2006). In addition, positive youth development programs have recently been advocated as catalysts of youth change when combined with constructive adult involvement in dealing with multiple problem and at-risk populations (Bauldry, 2006; Bond & Compas, 1989; Heide, 1999; Larson, 2006; Lewin-Bizan, Bowers, & Lerner, 2010). Again, holistic and multi-systemic programs that positively incorporate the family into the treatment plans have been targeted as more effective than those solely focusing on individual change. Other researchers have suggested behavioral monitoring and multidisciplinary

mental health teams (Cauce, Comer, & Schwartz, 1987) or structured activities that offer prosocial opportunities and environments to stymie antisocial behaviors such as youth violence (Catalano, Arthur, Hawkins, Berglund, & Olson, 1998).

When looking across the findings of the DSM-oriented scales, oppositional defiant problems show a consistently significant effect on youth violence, although the magnitude of the effect size is quite small. So what does such a finding mean on a practical level? While our study is not conclusive on this issue, we believe it makes an important contribution to the literature on mental health and offending since it incorporates a comorbid model. This type of model, which investigates the unique ability of differing mental health problems across the five DSM-oriented scale problems, is significantly more nuanced and detailed with regards to prevention than alternative studies that have adopted more general scales that compare internalizing versus externalizing behaviors, for instance (see Beyers et al., 2003; Caughy et al., 2003). With regard to treatment and prevention, our findings suggest what matters in influencing youth violence outcomes is the presence of continuous oppositional problems in childhood and adolescence. With these findings comes an argument for further exploring the problem of youth violence with sensitivity to the specialization of specific mental health problems versus looking at more ubiquitous and generalized types of psychopathology. With the availability and common usage in the Achenbach instruments, the practical utility and robustness of the predicted probabilities found in previous studies, combined with the fascinating multilevel findings reported here, we are frankly quite surprised that more researchers have not adopted these scales into social science investigations on youth violence origins. Perhaps the low magnitude of the effect sizes we have reported here deters other researchers; we challenge researchers

to look at the value of these scales beyond these coefficient sizes and to explore the ability of these continuous measures to explain antisocial behaviors in different ways. Indeed, even when conservatively excluding items in the APP scales that were tautological in nature, we find a continuity of oppositional problems that may be quite relevant to intervention and prevention efforts. The community-based nature of these PHDCN data makes our findings even more intriguing, as we would expect low levels of psychopathology and serious violence in this type of population.

Limitations and Directions for Future Research

This study has a number of limitations worth mention. Namely, we were limited to using only those measures that were available with the Community Survey rather than the crime and census measures that are available to the principal research team. The restricted data measures did not allow for a fully-specified model which considers variables such as crime rates, poverty, racial segregation, and residential mobility that might be significantly related to youth violence. Because the restricted data we had access to for the current study did not allow for the examination of crime or census indicators, we are unable to explore neighborhood decline as it may uniquely contribute to violence. Thus, it is possible that our findings are picking up on the neighborhood clusters that have higher crime rates and concentrated disadvantage issues. With the limited information we have available to us with the publicly available restricted data from Chicago neighborhoods, it is also unclear as to what temporal stage and level of disorder or decline these particular neighborhoods are in.

The addition of these items would be theoretically relevant to the models presented here and may account for some of the variance in youth violence. In addition, the large number of variables within this multilevel study limited the study design from

fully investigating the age-related effects that appear in regard to informant type, especially with respect to the younger cohorts.

Recall that the community-based measures utilized here were indicators created by the scientific directors of the PHDCN using Empirical Bayes (EB) estimation and based on the distribution of the neighborhood cluster level derived from individual responses. Although these measures have been tested and validated extensively in previous studies off the PHDCN data (Sampson, 1997), we found few statistically significant factors in the full models reported here. As an alternate strategy for future analyses, we might create some new additive community-level measures off individual items to further explore multilevel effects at the neighborhood level.

An additional limitation is the measurement of the dependent variable. Recall the violence outcome was a dichotomous indicator of whether respondents self-reported having committed eight specific behaviors over the past year. The operationalization of this measure limits the findings from this study in at least two ways. First, the measure was inflated by behaviors with higher prevalence rates. As such, this indicator represented simple assaultive behavior more than serious violent behavior, like aggravated assault and robbery. Therefore, findings for this study should be interpreted with regard to aggression and less severe violent behavior. Second, some scholars have expressed reservations about collapsing data into binary groups when compared to categorical measures, with critics citing issues regarding lower correlations and the loss of potentially valuable information (Mertler & Vannatta, 2005). Other scholars have strongly critiqued self-report data as questionable, with a recent study by David Kirk (2006) showing kids with official arrest data claiming no criminal activity while other children reported official arrest actually had no criminal involvement. Future research

should explore using a poly-categorical outcome measure or one created using techniques such as item response theory (IRT), which would permit examination of greater variability and severity in violent offending. Further, future research should consider utilizing both self-reported and official offending measures as a more valid indicator of antisocial behavior.

Although the focus on DSM-oriented scales in particular allowed for an innovative method of exploring mental health issues, these measures were unable to account for other forms of serious psychopathology that have been empirically linked to aggression and violence. For example, a large body of literature has explored dual diagnoses, with co-occurring alcohol and substance abuse and use issues emerging as one of the most common findings in forensic and referred samples (e.g., Dembo et al., 1990; Loeber et al., 1998). Future works should examine the impact that additional co-morbid indicators would have on violence while controlling for potential issues with tautology and spuriousness that have plagued past studies on mental health and violence (Link et al., 1992; Hiday, 2006). Additional research should consider other risk and protective factors that may be contributing on an individual-, peer-, family-, and community-level that were not included in the present study to expand the knowledge on this topic and determine whether oppositional behaviors maintain their predictive ability in other complex multilevel models. The rising field of biosocial criminology offers a perspective of genetic liability that warrants inclusion and further investigation within the context of the role of heritability in neighborhood studies of crime since vulnerable families may become concentrated in poorer geographical areas (see Caspi et al., 2000, for example). These types of complex interdisciplinary and multilevel studies are critical for best practices and effective public policies to be developed for

communities that suffer from extreme disadvantage, high levels of violence exposure and domestic violence, and neighborhood disorder. It is therefore important for studies of these types to remain sensitive to the institutional resources and community services that are available to residents.

Moreover, the continuity and magnitude of different forms of mental illness should continue to be a key component of social science inquiries into this phenomenon. Along these lines, Silver and his colleagues (2008) reasoned that “mental illness is a causal factor in deviant behavior, some of which involves violence, and that the more deviant the behavior, the greater the effect of mental illness” (p. 423). Investigations regarding the salience of the specialization of offending behaviors for persons with mental illness, the role of mental health in predicting future violence in youth, and the continuity and desistance of risky behaviors over various stages of the life-course will remain high priorities for academics, practitioners, and policymakers alike. With the latest wave of extant research on mental health problems and antisocial behaviors reporting that some of the most serious crimes (e.g., sexual assault and assaultive violence) are related to the onset of severe mental health problems, unraveling the links between psychopathology and violence should remain a top concern for developmental researchers in the field for years to come.

APPENDIX A

List of Acronyms

ADHP	Attention Deficit/Hyperactivity Problems
APD	Antisocial Personality Disorder
APP	Antisocial Personality Problems
CBCL	Child Behavior Checklist - the mental health instrument administered to primary caregivers/parents about their children's behavior for Cohorts 9, 12, and 15 in this study
DSM	<i>Diagnostic and Statistical Manual of Mental Disorders</i> - the manual used by clinicians to diagnose mental health disorders
EB	Empirical Bayes estimation
FES	Family Environment Scale
HLM	Hierarchical Linear Modeling - multilevel statistical analysis
MDO	Mentally Disordered Offender - individuals who have been treated for both mental disorders and criminality
ODP	Oppositional Defiant Problems
PHDCN	Project on Human Development in Chicago Neighborhoods
SES	Socioeconomic status
YASR	Young Adult Self Report - the mental health instrument administered to young adults about their self-reported behavior for Cohort 18 in this study
YSR	Youth Self Report - the mental health instrument administered to youths about their self-reported behavior for Cohorts 9, 12, and 15 in this study

APPENDIX B

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Dissemination of Research Findings

Boots, D. P., and Wareham, J. 2011. Examining the Impact of Mental Health Problems on Antisocial Behavior among PHDCN Youth: Multi-level Considerations. Paper presented at the Academy of Criminal Justice Sciences annual meeting. Toronto, Canada, March.

Boots, D. P., and Wareham, J. 2011. Examining the Role of Mental Health Problems on Antisocial Behavior among PHDCN Youth: A Consideration of Multi-level Factors. Paper presented at the Evelyn M. Duvall Family Studies Conference, Sarasota, Florida, February.