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Diagnostic Profiles among Urban Adolescents with Unmet Treatment Needs: Comorbidity and Perceived Need for Treatment

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Abstract

The goal of this study was to document comorbidity profiles of psychiatric disorder and perceived need for treatment among urban adolescents with unmet behavioral health needs. Participants were 303 community-referred adolescents and their primary caregivers. Adolescents included both boys (54%) and girls and were primarily Hispanic (58%), African American (23%), and multiracial (13%). Home-based interviews with both adolescents and caregivers were used to assess DSM-IV diagnoses and perceived treatment needs. Most adolescents (80%) were diagnosed with multiple disorders and most families (66%) reported a need to treat more than one disorder. Latent class analysis of endorsed DSM-IV disorders identified five distinct diagnostic profiles: Parental Concern, Adolescent Distress, Basic Externalizers, Severely Distressed, and Comorbid Externalizers. Diagnostic profiles were compared on perceived treatment need and related psychosocial risk characteristics. Implications for behavioral health care policy and practice for youth with unmet treatment needs are discussed.

Keywords

Comorbidity; Diagnostic and Statistical Manual; adolescents; unmet treatment needs; perceived treatment needs

Comorbidity among Adolescents Engaged in Treatment

Adolescents who enter the behavioral healthcare system for mental health or substance use treatment typically present a high degree of diagnostic complexity in the form of comorbidity among psychiatric disorders and heterogeneity in psychological symptoms. For example, a survey of treatment programs funded by the Substance Abuse and Mental Health Services Administration (Turner et al., 2004) found that among the 18,000+ adolescents participating in mental health programs, 17% had a co-occurring substance use disorder (SUD); among the 4,000+ adolescents participating in SUD programs, 74% presented with at least one mental health disorder (MHD) and 44% had multiple MHDs. Similarly high rates of comorbidity—multiple MHDs, or MHD + SUD (Piotrowski, 2007)—are routinely documented in mental health settings (e.g., Staller, 2006), addiction treatment centers (e.g., Jaycox, Morral, & Juvonen, 2003; Tims et al., 2002), and government-funded systems such as juvenile justice and child welfare (e.g., Teplin et al., 2005). There is now compelling evidence that diagnostic complexity is the rule rather than the exception among clinic-referred teens. As a result, treatment system reforms aimed at creating more flexible,

comprehensive, and integrated assessment and treatment services for adolescents have gained considerable momentum (Institute of Medicine, 2006; McLellan & Meyers, 2004).

Comorbidity and Unmet Needs among Adolescents Not Engaged in Treatment

Much less is known about diagnostic complexity among adolescents with emotional and behavioral disorders who are not already enrolled in treatment programs. The current study focuses on this “unmet need” population: adolescents with mental health disorders or other significant behavioral health impairments who are not involved in the treatment system (Institute of Medicine, 2006). Understanding the mental health needs of adolescents with behavioral problems who do not cross the treatment threshold is critically important for designing inclusive and responsive behavioral care. A growing number of studies have investigated the diagnostic profiles of adolescents who experience severe psychological symptoms but do not engage in treatment services. In general, three types of sampling methodologies have been used to document behavioral problems and unmet treatment needs among non-clinic youth: national probability studies, regional studies of community youth, and studies of youth involved in government systems. National probability studies (e.g., Roberts, Roberts, & Xing, 2007; Swendsen et al., 2010; Wu et al., 2002) have revealed sizeable prevalence rates for a multitude of MHDs and SUDs in adolescents, rates that clearly justify efforts to enhance behavioral care options. These studies also reveal alarmingly high levels of unmet treatment needs, with recent estimates suggesting that only 5–30% of adolescents with diagnosable MHDs/SUDs received appropriate care in the prior year (see Jones, Heflinger, & Saunders, 2007; Kataoka, Zhang, & Wells, 2002; SAMHSA, 2008).

A few regional studies have conducted multidimensional assessments of behavioral problems among community youth. The Great Smoky Mountains Study (Angold et al., 2000; Sterba et al., 2010) found that 59% of youth residents in a rural, economically depressed region were in need of mental health services based on meeting standardized diagnostic criteria or reporting behavioral symptoms that caused significant impairment. Of those youth with demonstrated need, only 37% had previously received some form of outpatient behavioral care. The four-community Methods for the Epidemiology of Child and Adolescent Mental Disorders study also revealed high rates of co-occurring risk behaviors and psychiatric disorders (Flisher et al., 2000; Kandel et al., 1999) and unmet service needs (Leaf et al., 1996). Finally, similar results have been reported for children involved in government systems of care. A city-wide study of children and adolescents enrolled in at least one public care sector in San Diego (MH treatment, SUD treatment, juvenile justice, child welfare, special education) found that public sectors were mostly serving youth with ADHD and disruptive behavior disorders (Garland, Hough, McCabe, Yeh, Wood, & Aarons, 2001) and that youth with SUD only had the highest levels of unmet need for services (Garland, Aarons, Brown, Wood, & Hough, 2003). Specific to adolescents, an evaluation of teens enrolled in a state-funded Medicaid program (Heflinger & Hinshaw, 2010; Heflinger & Hoffman, 2008) also documented widespread behavioral problems in multiple areas and low utilization of available treatment services.

Innovations of the Current Study

The current study addresses five gaps in the literature on diagnostic profiles and unmet treatment needs among adolescents not enrolled MHD/SUD treatment. First, this study adopted an innovative sampling strategy in which adolescents with potential behavioral health needs were recruited directly from a network of community-based referral sources (e.g., high schools, family agencies, youth programs) rather than winnowed out of larger

probability samples (e.g., Kataoka et al., 2002), public care sectors (e.g., Yeh et al., 2003), or administrative databases (e.g., Heflinger & Hoffman, 2008). The study created an “unmet need” pipeline, whereby referred adolescents were judged by referral sources to be exhibiting behavior problems appropriate for outpatient services, but no adolescent was currently enrolled in treatment, and only a small percentage were involved in juvenile justice or child welfare.

Second, the study sampled ethnic minority youth living in inner-city areas of a large city. This underserved population faces a multitude of individual and family stressors that threaten psychological well-being (Wadsworth & DeCarlo Santiago, 2008), and it typically experiences multiple barriers to treatment that portend high rates of failed engagement and treatment dropout (McKay & Bannon, 2004). Yet, little is known about their problem identification and help-seeking characteristics (Cauce et al., 2002; but see Yeh et al., 2005).

Third, data on psychiatric disorders and need for treatment were collected from both adolescents and their primary caregivers. Because youths and caregivers typically show weak agreement on the nature and severity of psychological symptoms leading to clinic referral (e.g., Comer & Kendall, 2004; Yeh & Weisz, 2001), family-based assessment is essential for capturing a complete picture of treatment needs (Yeh et al., 2003).

Fourth, over and above documenting rates of various psychiatric disorders within the sample, this study used a person-centered analytic approach to distill profiles of co-occurring disorders. We conducted a latent class analysis (LCA) of DSM-IV disorders (Diagnostic and Statistical Manual of Mental Disorders—4th Edition; American Psychiatric Association, 1994) reported by adolescents and caregivers. LCA is a cross-sectional analytic strategy designed to identify classes of individuals with similar phenotypic profiles on categorical variables (McCutcheon, 1987). Previous studies have utilized LCA to describe DSM-based profiles of youth psychiatric symptoms in a variety of samples, including subtypes of attention-deficit/hyperactivity disorder in an international twin and sibling study (Volk, Todorov, Hay, & Todd, 2009), depression among clinic-referred adolescents (Herman et al., 2007), problem drinking in a community teen sample (Reboussin et al., 2006), and lifetime symptoms of conduct disorder in a national comorbidity survey (Nock, Kazdin, Hiripi, & Kessler, 2006). This study is one of the very first to identify latent profiles across multiple DSM disorders rather than across multiple behavioral symptoms associated with a single disorder.

Fifth, this study directly assessed the family’s perceived need for treatment beliefs using a multidimensional, disorder-specific index. Perceived need for treatment is one key element of overall treatment motivation, alongside multiple related elements such as perceived barriers to participation, readiness to change, and attitudes about counseling and the treatment system (Heflinger & Hinshaw, 2010; McKay & Bannon, 2004; Neff & Zule, 2000; Yeh et al., 2003). Several studies have demonstrated that caregiver perceived need predicts youth participation in mental health services (e.g., Angold et al., 1998; Shin & Brown, 2009; Yeh et al., 2005), although few have assessed adolescent-perceived need (Logan & King, 2001) or focused on minority youth (Cauce et al., 2002; Kataoka et al., 2002). And rather than asking global question(s) about treatment needs, we utilized a multidimensional index of disorder-specific perceived need (based on Shen, McLellan, & Merrill, 2000) that was anchored to full DSM-IV criteria for MHDs/SUDs.

Main Study Goal

The main goal of this study was to document diagnostic profiles and perceived treatment needs among community-referred urban adolescents and their families not currently

involved in behavioral care. LCA was used to derive diagnostic profiles of eight DSM-IV Axis I disorders that were most prevalent in the sample. Diagnostic profiles were then compared to one another on demographic, psychosocial, and perceived need variables to confirm their validity and deepen their description. Although separate analyses by gender or age group would avail a fuller developmental understanding of adolescent comorbidity, sample sizes within these subgroups were too small to support this line of inquiry. Note that previous studies found mostly negligible gender differences in DSM comorbidity rates in both community (e.g., Armstrong & Costello, 2002; Sterba et al., 2010) and clinical samples (e.g., Turner et al., 2004).

Method

Participants

Study participants were $N = 303$ adolescents and one primary caregiver per teen. Participants included both males (54%) and females (46%) and averaged 15.7 years of age ($SD = 1.4$). Self-reported ethnicities were Hispanic (58%), African American (23%), multiracial (13%), White (3%), and other (3%). Households were headed by single parents (67%), two parents (25%), or grandparents (6%). Among caregivers, 61% graduated high school and 59% worked full- or part-time. Also, 52% earned less than \$15K per year, 21% received public assistance, 53% reported a history of child welfare involvement, 31% reported at least one household member had ever used illegal drugs regularly, and 17% reported at least one member had been involved in illegal activities. Adolescents were referred primarily from schools (78%) but also from community-based family service agencies (10%), juvenile justice or child welfare sources (7%), and other sources (5%). No gender differences were found for any of these variables.

Study Recruitment, Participation Rates, and Procedures

Study recruitment procedures were designed to identify adolescents with untreated MHDs or SUDs and offer to assist enrolling them in available treatment services. To recruit adolescents with unmet treatment needs, research staff developed a referral network of high schools, family service agencies, and youth programs in inner-city areas within a large northeastern city. Staff made regular on-site visits and phone calls to referral partners to maintain communication about current and potential cases. There were five study referral criteria: (1) target adolescent was between 12–18 years old; (2) adolescent lived with an adult family member who acted as primary caregiver; (3) adolescent was observed or suspected by referral source to have significant behavioral problems that impaired functioning; (4) adolescent problems were deemed beyond the scope of routine services available at the referral site (e.g., guidance/counseling services in schools, case management in family agencies); (5) adolescent was not currently enrolled in behavioral treatment nor involved in any program intake procedures. Network partners made referrals to research staff during site visits and also by phone and confidential email. Staff then contacted referred families by phone and offered them an opportunity to participate in a home-based family research interview to assess the reason for study referral and discuss current developmental challenges.

A total of 605 adolescents were referred by network partners at the time of this study. Of these, 226 (37%) could not be recruited by research staff because the contact information was invalid or because the family did not respond to repeated voice messages. The contacted sample differed from the uncontacted sample in age (uncontacted had a higher proportion of referrals 15 years or older; $\chi^2(1) = 7.7, p < .01$) and referral source (uncontacted had a higher proportion referred by schools; $\chi^2(1) = 5.1, p < .05$). Of the 379 cases (63% of all referrals) who were successfully contacted, 303 (80%) completed a home-based family

interview, whereas 76 (20%) refused due to disinterest (86%) or lack of time (14%). The refuser group had a higher proportion of female referrals than the acceptor group ($\chi^2(1) = 4.6, p < .05$).

Interviews were conducted by research staff primarily in the home but also in other locations upon request. Caregivers and teens were consented and interviewed separately; caregivers consented for themselves and their adolescents, and adolescents assented for themselves. Participants were informed that a federal Certificate of Confidentiality from the National Institutes of Health was obtained to protect their confidentiality. Assessment measures consisted of structured clinical interviews and audio computer-assisted measures. Caregiver assessments were administered in the preferred language: 77% English, 23% Spanish. Caregivers and teens each received \$35 in vouchers for completing the interview. After interview completion, interested families were linked to appropriate services by research staff using intensive family-based engagement strategies (McKay & Bannon, 2004). The study was conducted under approval by the governing Internal Review Board.

Measures

DSM-IV Diagnoses—DSM-IV diagnoses were assessed using the Mini International Neuropsychiatric Interview (MINI) (Version 5.0) (Sheehan et al., 1998). The MINI is a brief structured diagnostic interview that assesses DSM-IV diagnoses in adolescent and adult populations. The MINI has demonstrated solid interrater and test-retest reliability on two international samples of psychiatric and non-psychiatric patients (Lecrubier et al., 1997), and has shown excellent convergent validity with both the SCID and the CIDI (Lecrubier et al., 1997; Sheehan et al., 1997; 1998). The MINI is specifically designed to be administered by lay interviewers. This study analyzed data on the eight DSM-IV categories most commonly reported in the sample: major depressive disorder and dysthymia (combined into one depressive disorder category: DEP); generalized anxiety disorder (GAD); posttraumatic stress disorder (PTSD); alcohol abuse/dependence and substance abuse/dependence (combined into one category: SUD); conduct disorder (CD); oppositional defiant disorder (ODD); attention-deficit/hyperactivity disorder (ADHD) Inattentive subtype (ADHD-I); and ADHD Combined subtype (ADHD-C), which includes symptoms of both inattention and hyperactivity/impulsivity (very few teens met criteria for the ADHD-HI subtype, which includes hyperactivity/impulsivity symptoms without inattention symptoms). Adolescent and caregiver reports were collected for CD, ODD, ADHD-I, and ADHD-C; diagnoses of DEP, GAD, PTSD, and SUD were based on adolescent reports only.

Demographic and Psychosocial Characteristics—The Comprehensive Addiction Severity Index for Adolescents (CASI-A: Meyers, McLellan, Jaeger, & Pettinati, 1995) is a semi-structured clinical interview that yields information about the severity of risk factors, concomitant symptoms, and consequences of substance use in multiple domains of functioning. The CASI-A has demonstrated strong reliability and validity with clinical chart reviews of adolescents receiving inpatient psychiatric or substance abuse treatment (Meyers et al., 1995) and with other diagnostic interviews such as the CIDI and DISC (Meyers et al., 1999). The CASI-A was used to assess (1) demographics: gender, ethnicity, age, caregiver education and employment, family composition, household member drug use and illegal activities; (2) school issues: presence of past year academic problems (failing grades or difficulty learning/paying attention), participation in individualized education programs (IEPs), educational interventions (regular meetings with a school psychologist, guidance counselor, or social worker), attendance problems (regularly skipped school or arrived late/left early), detentions/rules violations, and suspensions/expulsions; (3) legal issues: adolescent picked up by police or on probation or parole during previous year. Both

adolescents and caregivers reported on IEPs and probation/parole (a positive response by either reporter was counted as positive overall); all other items were adolescent report only.

The Services Assessment for Children and Adolescents (SACA; Hoagwood et al., 2000) is a parent-report structured interview that was used to assess past year attendance in outpatient treatment services, which included MHD or SUD treatment services delivered by a public clinic, private professional, or in-home provider. The SACA has demonstrated strong validity, test-retest reliability, and reliability between parent and child reports (Hoagwood et al., 2000; Stiffman et al., 2000). Due to low numbers of adolescents receiving any single type of treatment, all types were collapsed into a single category reflecting any outpatient treatment and coded dichotomously (yes/no).

The Adolescent Semi-Structured Assessment for the Genetics of Alcoholism II-Parent Form (Bucholz et al., 1994), developed for use in a national study of the genetics of alcohol dependence, was used to assess caregiver suspicion of adolescent substance use. Instrument reliability and validity are strong (Bucholz et al., 1994; Hesselbrock et al., 1999). Caregivers reported on whether they suspected their adolescent had ever had a whole alcoholic drink and/or tried marijuana, with responses combined into a single dichotomous variable (yes/no). Caregiver symptomatology was measured with the widely used Brief Symptom Inventory (Derogatis, 1993), a 53-item assessment of global psychological distress during the previous week. Internal consistency in this sample was high (Cronbach's $\alpha = .96$). Adolescent psychopathy was assessed using the Inventory of Callous-Unemotional Traits (Essau, Sasagawa, & Frick, 2006), a 24-item parent-report measure with strong validity associations with aggression, delinquency, personality traits, emotional reactivity, and psychosocial impairment in adolescents (Essau et al., 2006; Kimonis et al., 2008). Internal consistency in this sample was high ($\alpha = .89$).

Perceived Need for Treatment—To assess perceived need for treatment (PNT), we adopted two items from the Addiction Severity Index supported by strong reliability and validity data (McLellan et al., 1992; Shen, et al., 2000). The following two questions were asked whenever either an adolescent or caregiver reported symptoms that met full criteria for a DSM diagnosis: “*During the past month, how much have you been troubled or bothered by [fill in the endorsed DSM symptoms]?*.” Participants responded Not at all (0), A little (1), or A lot (2). If participants reported a score of 1 or 2, they were then asked: “*Is treatment in this area important to you, and if so, how much?*” and given the same response choices: Not at all (0), A little (1), or A lot (2). Scores were averaged across all positive diagnoses. The final PNT score was computed by summing the mean *troubled and bothered* score with the mean *treatment importance* score (summed scores had psychometric properties that were slightly favorable compared to multiplicative scores). PNT scores were calculated separately for adolescent and caregivers.

Statistical Analyses

Data analyses included both caregiver and adolescent reports of externalizing disorders: ODD, CD, and both ADHD subtypes (see Table 1). Empirical justification for incorporating multiple reporting sources for childhood symptomatology is widespread (Achenbach, McConaughy, & Howell, 1987; Yeh & Weisz, 2001). Modest parent-child agreement is particularly apparent in diagnoses of externalizing disorders (e.g., Hope et al., 1999), indicating that youth and caregivers provide distinct information. In the current sample there was only moderate agreement between adolescents and caregivers for diagnoses of ODD (Both No = 23%; Caregiver Only Yes = 20%; Adolescent Only Yes = 20%; Both Yes = 39%), CD (Both No = 54%; Caregiver Only Yes = 11%; Adolescent Only Yes = 18%; Both Yes = 17%), ADHD-I (Both No = 48%; Caregiver Only Yes = 31%; Adolescent Only Yes =

10%; Both Yes = 11%), and ADHD-C (Both No = 75%; Caregiver Only Yes = 12%; Adolescent Only Yes = 10%; Both Yes = 3%). These data support the use of assessment information on externalizing disorders from both reporters in study analyses. Note that we did not collect caregiver-report data on other disorders based on previous research indicating that parents are not sufficiently reliable judges of unobservable behaviors such as internalizing symptoms (e.g., Comer & Kendall, 2004; Duhig, Renk, Epstein, & Phares, 2000) or substance use (e.g., Dillon, Turner, Robbins, & Szapocznik, 2005).

For descriptive purposes, gender differences on diagnostic and psychosocial variables were tested using the chi-square statistic for categorical variables and one-way analysis of variance for continuous variables. Latent class analysis (McCutcheon, 1987) was used to create subgroups of adolescents with similar DSM profiles. The central assumption of LCA is that correlations among the observed indicators can be explained by a set of underlying latent classes plus error (Muthen, 2004). Model parameters estimated in LCA include conditional latent class probabilities, which refer to the average probabilities of endorsing each response category of each observed indicator, given membership in a particular latent class. These probabilities are analogous to factor loadings in factor analysis and are used to define and label the latent classes.

LCA models were specified using Mplus version 6 (Muthen & Muthen, 1998–2010). For all models, multiple sets of random starting values were used to prevent local solutions and maximize model stability (Muthen, 2004). Beginning with a two-class model, successive models were fit with an increasing number of classes until the best-fitting model was found. Model fit was evaluated on the basis of the log-likelihood value, AIC, BIC, and the Lo-Mendell-Rubin test (Nylund, Asparouhov, & Muthen, 2007). Entropy, a summary index of classification quality, was also considered when evaluating model fit, with values closer to 1.0 indicating better fit. Following the selection of the best fitting model, individuals were assigned to classes based on their highest conditional probability of membership. Then, differences among latent classes on psychosocial characteristics were examined using chi-square analyses for categorical variables and *F*-tests for continuous variables. This post-hoc method of examining predictors of class membership is limited because it does not account for the uncertainty inherent in latent class membership (Muthen, 2004). Still, previous studies have used similar methods (e.g., Morgenstern et al., 2008; Reboussin et al., 2006), and given the high classification quality of the derived LCA model, such bias is likely to be minimal. To follow-up the LCA results reported here, we attempted to conduct LCA analyses separately on male and female subgroups, but analyses did not converge due to insufficient subsample sizes.

Results

Psychiatric and Psychosocial Characteristics, Gender Differences, and Perceived Need

Proportional rates for DSM-IV diagnoses and psychosocial characteristics are reported in Table 1; gender differences were examined using chi-square tests. Of the 303 adolescents, 291 (96%) were diagnosed with at least one DSM-IV disorder, using the conventional “Or” principle of counting either adolescent or parent report (see Valo & Tannock, 2010). Overall diagnosis rates were as follows: ODD = 77%, ADHD-I = 51%, CD = 46%, DEP = 40%, ADHD-C = 25%, SUD = 25%, GAD = 17%, PTSD = 16%. Moreover, 245 (81%) were diagnosed with more than one disorder; of these comorbid cases, 13 (5%) met criteria for ODD + CD only, with the remaining 232 (95%) showing some other comorbidity profile. As expected for a primarily school-referred sample, the highest rates were found for academic problems (67%) and school attendance problems (59%), along with caregiver and adolescent reports of ODD (59% and 57%). About one-fifth of teens had previously been in outpatient behavioral treatment during the past year. Regarding gender differences, girls had higher

rates of PTSD ($\chi^2(1) = 18.1, p < .001$), depressive disorders ($\chi^2(1) = 21.6, p < .001$), adolescent-reported ODD ($\chi^2(1) = 9.6, p < .01$), and GAD ($\chi^2(1) = 4.0, p < .05$). Boys were higher in caregiver-reported ADHD-Inattentive ($\chi^2(1) = 4.3, p < .05$). Surprisingly, rates of SUD and CD did not differ by gender. Also, girls were more likely to have school attendance problems ($\chi^2(1) = 7.1, p < .01$), whereas boys were somewhat more likely to have been picked up by police ($\chi^2(1) = 3.2, p < .10$).

Of the 303 families, 272 (90%) reported some degree of treatment need (PNT score > 0), including 219 caregivers (72%) and 179 adolescents (59%). Moreover, 201 families (either caregiver or teen: 66%) reported a need to treat more than one clinical disorder, including 136 caregivers (45%) and 130 teens (43%). Caregivers ($M = 3.3$; $SD = 1.1$) reported significantly higher PNT scores than adolescents ($M = 1.8$; $SD = 1.3$; $t(175) = -11.7, p < .001$). Also, girls ($M = 2.2$; $SD = 1.1$) reported greater need for services than boys ($M = 1.4$; $SD = 1.2$; $t(228) = -5.6, p < .001$). There was no difference in caregiver reports of PNT based on adolescent gender.

Latent Class Analysis of Psychiatric Diagnosis Variables

LCA was conducted on the eight adolescent and four caregiver reports of DSM-IV diagnoses. Two-, three-, four-, and five-class models were run, and the five-class model was selected as providing the best statistical and substantive fit to the data. The five-class model had a lower LL (1809.893) and AIC (3747.786) than the three-class model ($LL = 1867.367$; $AIC = 3810.735$) and four-class model ($LL = 1838.903$; $AIC = 3779.807$). Although the BIC for the five-class model (3985.465) was slightly higher than for the four-class model (3969.207), it was more clinically resonant than all others. Classification quality for the five-class model was adequate, with an entropy value of .80 and average probabilities of .84, .87, .88, .91, and .90 for the five classes respectively. Estimated conditional probabilities for each of the five classes are displayed in Table 2.

Class 1, named “Basic Externalizers” ($N = 58$; 19% of the sample), included adolescents characterized by conduct problems of various kinds. Adolescents in this class reported high rates of both ODD (84%) and CD (73%), and most caregivers also reported ODD (75%), though substantially fewer reported more severe problems constituting CD (37%). Interestingly, whereas 53% of caregivers described symptoms that met criteria for ADHD-I, less than 6% of adolescents themselves complained of attention problems. This class presented the second highest percentage of SUD (30%).

Class 2, “Comorbid Externalizers” ($N = 29$; 10% of sample) included adolescents with high rates of conduct problems combined with substantial impulsivity and depression symptoms. Like Class 1, members of Class 2 showed high levels of adolescent-reported ODD (76%) and CD (63%) and caregiver-reported ODD (95%); caregiver reports of CD were prevalent as well (78%). In addition, according to caregivers, every adolescent in this class met criteria for ADHD-C (impulsivity along with poor attention), and 27% of adolescents themselves reported ADHD-I (poor attention). Also, 37% of these teens presented clinically significant mood problems.

Class 3, “Adolescent Distress” ($N = 80$; 26% of sample) contained adolescents who felt beset by oppositionality, internalizing symptoms, and attention difficulties. Specifically, 79% of class members reported symptoms that met criteria for ODD, 69% for major depression/dysthymia, and 59% for ADHD-I. A sizable proportion also met criteria for GAD (39%) and PTSD (29%). Caregivers of teens in this class rarely had concerns about severe conduct problems in the form of CD (17%) and ADHD-C (4%), but they did recount substantial rates of both ODD (49%) and ADHD-I (49%).

Class 4, “Severely Distressed” (N = 35, 12% of sample) contained adolescents with elevated rates of virtually every diagnosis. Every member of this class self-reported both ODD and depressive disorder, and most also self-reported CD (74%), ADHD-C (66%), and SUD (51%). In addition nearly half met criteria for each anxiety disorder, PTSD (47%) and GAD (44%). Caregivers also identified behavior problems in multiple areas, notably ODD (67%), CD (44%), and ADHD-I (36%).

Class 5, “Parental Concern” (N = 101, 33% of sample) was the largest class in the sample. Adolescents in this class did not report a high level of any diagnosis. Caregivers were primarily concerned about oppositionality (ODD = 46%) and poor attention (ADHD-I = 43%), with only a limited number reporting severe conduct problems (CD = 14%) or hyperactivity/impulsivity (ADHD-C = 11%).

Comparison of Latent Classes on Demographic and Psychosocial Characteristics

Demographic, family, educational, and behavioral comparisons of the latent classes were conducted using chi-square tests for categorical variables and *F*-tests for continuous variables. Results are presented in Table 3. Regarding demographic and family variables, gender distinguished among the classes ($\chi^2(4) = 30.6, p < .001$). Basic Externalizers (71% boys) and Parental Concern (66% boys) had mostly male members and featured oppositionality and conduct problems, whereas Severely Distressed (74% girls) and Adolescent Distress (60% girls) were mostly female and shared a relatively high level of internalizing symptoms (depression and anxiety disorders) among members. There were also age differences ($\chi^2(4) = 11.1, p < .05$), with Comorbid Externalizers containing a larger percentage of younger adolescents (58% under 15) than the other four classes. Also, Parental Concern had the fewest reports of household substance use (20%; [$\chi^2(4) = 9.5, p < .05$]). Classes were also compared on adolescent and caregiver perceived need for treatment. Classes differed significantly on adolescent PNT only ($F(4, 230) = 15.0, p < .001$). As expected, post hoc comparisons revealed higher levels of PNT among adolescents in the Adolescent Distress and Severely Distressed classes compared to the Basic Externalizers class. The Adolescent Distress class also had a higher adolescent PNT score than the Parental Concern class.

Regarding educational variables, three classes shared a profile of elevated suspensions/expulsions ($\chi^2(4) = 32.5, p < .001$) and detentions/rules violations ($\chi^2(4) = 14.6, p < .01$): Comorbid Externalizers (62% and 54%), Severely Distressed (51% and 51%), and Basic Externalizers (58% and 46%). Comorbid Externalizers and Severely Distressed also shared a relatively high rate of school attendance problems (73% and 83% respectively; [$\chi^2(4) = 13.5, p < .01$]) and assignment to IEPs (48% and 46%; [$\chi^2(4) = 1.7, p < .05$]); in contrast, Basic Externalizers had the lowest prevalence of academic problems (53%) among all four classes ($\chi^2(4) = 8.2, p < .10$). Also, whereas roughly three-quarters of adolescents in most classes were referred by schools, an even higher percentage of Adolescent Distress members (90%) were school-referred ($\chi^2(4) = 16.0, p < .05$). Regarding behavioral problem indicators outside school, once again Comorbid Externalizers, Severely Distressed, and Basic Externalizers shared an elevated profile of police contacts ($\chi^2(4) = 14.3, p < .01$) and parental suspicion of substance use by the teen ($\chi^2(4) = 18.3, p < .01$), with roughly half of each class reporting these two problems. Finally, Comorbid Externalizers demonstrated the highest levels of adolescent psychopathy characteristics ($F(4, 259) = 4.8, p < .01$) and caregiver psychological symptoms ($F(4, 2033) = 2.3, p < .10$) (see Table 3), as well as the most involvement in recent outpatient treatment (37%; [$\chi^2(4) = 9.3, p < .10$]).

Discussion

Study results demonstrate that this sample of community-referred urban adolescents not involved in the behavioral health treatment system was nevertheless characterized by high rates of psychiatric comorbidity and perceived need for services. Virtually every adolescent met criteria for a DSM-IV diagnosis, and four out of five were diagnosed with multiple disorders. The vast majority of families reported a need for behavioral treatment, and two-thirds reported treatment needs for multiple disorders. Not surprisingly, rates of psychiatric disorder and comorbidity in this sample are higher than those reported in regional studies of community youth (e.g., Angold et al., 2000; Flisher et al., 2000) and on par with rates found in clinic-referred youth (e.g., Turner et al., 2004). This study also identified five specific profiles of psychiatric disorders with varying degrees of severity and complexity: Parental Concern, Adolescent Distress, Basic Externalizers, Severely Distressed, and Comorbid Externalizers. These results are among the first to define diagnostic profiles and treatment needs for ethnically diverse adolescents not already participating in treatment services or another system of care. As detailed below, the patterns of co-occurring disorders observed in this study have implications for both individual treatment planning and behavioral healthcare policy.

The two most common profiles, Parental Concern and Adolescent Distress, together constituted more than half the sample. Adolescents in the Parental Concern class reported virtually no significant clinical problems, and only about half of the caregivers reported clinical-level symptoms of oppositionality and inattention. This profile, which was mostly boys, presented with the least involvement in educational interventions and least amount of household substance use. Similarly, the Adolescent Distress profile presented moderate caregiver concerns about oppositionality and inattention but very few participants with severe conduct problems or impulsivity. However, the hallmark of the Adolescent Distress class was elevated levels of depression and anxiety, in addition to adolescent concerns about their own oppositionality and inability to focus. This class, along with Severely Distressed, reported the highest level of perceived need for treatment. It also contained the highest proportion of school referrals, which fits the profile of teens with internalized distress whose moderate behavior problems draw attention from school guidance personnel but less often command external system involvement (Teplin et al., 2005; Tims et al., 2002). Note that although depression and anxiety were highly prevalent in both the Adolescent Distress and Severely Distressed classes, this study did not identify a class of “pure internalizers” who were absent significant levels of behavior or attention problems. This may reflect the fact that all study referrals were generated by third parties, who are more likely to be activated by disruptive behaviors or school failure and who cannot easily observe internalizing symptoms that are unreported by teens.

The other three classes all presented with conduct problems reported by both adolescents and caregivers: Basic Externalizers, Comorbid Externalizers, and Severely Distressed. These classes also shared a common profile of serious externalizing problems in several domains: high rates of school detentions and rule violations, school suspensions and expulsions, contact with police, and parental suspicion of substance use. Nevertheless, these classes were quite distinct from one another with regard to the type and severity of co-occurring clinical problems. The Basic Externalizers class, which represented one-fifth of the sample, demonstrated the lowest level of academic problems among the four profiles and comparatively few school attendance problems or IEP enrollment. Thus this group showed less evidence of impaired academic achievement than the other two externalizing profiles, and caregivers but not adolescents reported concerns about impaired attention.

Comorbid Externalizers, which represented one-tenth of the sample, were distinguished by caregiver reports of inattention and hyperactivity/impulsivity for every member. Over a third of teens in this class also reported clinical levels of depression symptoms. Additionally this profile featured several adjustment problems indicative of emotional volatility: highest degree of callous-unemotional traits, increased involvement in IEPs (whose participants often carry the institutional label “emotionally disturbed”), and largest proportion involved in outpatient mental health treatment during the previous year. Last, this class contained the youngest participants and the highest amount of caregiver symptomatology, potentially indicative of difficult family environments and relatively early onset of alarming adolescent symptoms.

The Severely Distressed, also about one-tenth of the sample, presented virtually every clinical disorder in large numbers, including the highest rates by far of substance use, adolescent-reported inattention combined with impulsivity, and especially depressive disorder, which was reported by every person in this class. In addition to severe behavioral, mood, self-regulation, and substance use problems, this group had school achievement and engagement difficulties. The Severely Distressed profile differs from Comorbid Externalizers primarily based on elevated rates of internalizing and substance use problems, which suggests that these adolescents are gravely emotionally distressed in addition to exhibiting conduct problems and poor self-regulation. Not surprisingly, they reported a high level of perceived need for treatment.

As expected girls reported greater internalizing problems than boys in the form of anxiety and mood disorders, as well as greater perceived need for services. But girls also reported more school attendance problems and a higher rate of oppositional behavior than boys, and they were equivalent in both conduct disorder and substance use. By these yardsticks, girls in this sample were more than a match for boys in behavior problems, an indication that teenage girls who act out similarly to boys are equally likely to draw attention from school guidance personnel and other referral agents (Bradshaw, Buckley, & Iaolongo, 2008).

Study Strengths and Limitations

This study has several methodological strengths, including an innovative sampling strategy that directly recruited youth with significant behavioral problems yet dubious prospects for engaging in outpatient care; multidimensional assessment of a hard-to-engage, urban, ethnic minority adolescent sample; and collection of diagnostic and perceived need data from both adolescents and caregivers. This sample qualifies as having “unmet needs” in several ways: almost every participant reported significant emotional and/or behavioral problems, but none was involved in MHD or SUD treatment; four-fifths had no contact in the previous year with treatment services of any kind; and home-based interviewing procedures were required to recruit and engage families. Thus we believe that study findings are generalizable to the larger population of urban minority youth with unmet treatment needs, which encompasses the vast majority of inner-city teens with clinical disorders.

The sample demographics are highly representative of populations from which referrals were solicited, even given selection biases involving uncontacted and refuser families that skewed the sample toward being younger, non-school-referred, and male. Nevertheless, the sizable percentage of referred families who were uncontacted (37%) and contacted families who refused to be interviewed (20%) constitutes an important limitation of the study. Although uncontacted and refuser families may have been similar to the interviewed sample with regard to demographics, they are likely to have had more serious behavioral health problems and comparatively less social capital. Another limitation is that the study excluded adolescents not living with an adult primary caretaker, so that youth in highly vulnerable

living situations (homeless, group homes, unstable placement with friends/relatives) are not represented.

The assignment of individuals to latent classes based on conditional probability values is a limitation because it does not account for classification error. Nevertheless, this method is supported in this sample by the high classification quality obtained in the LCA model. Assessment data on psychiatric diagnoses were collected by research staff during home-based interviews; assessment results may have been somewhat different if interviews had been conducted in mental health settings using a team-based diagnostic approach (see Faraone et al., 2000), but potential community-clinic discrepancies are hard to determine for samples who do not seek treatment. Also, although perceived *barriers* to treatment are an essential dimension of treatment engagement among urban minority families (McKay & Bannon, 2004; Yeh et al., 2003), this issue was beyond the scope of the current study.

The specific composition of the five diagnostic profiles may be particular to ethnic minority adolescents living in urban areas; replication of study findings in both similar and dissimilar communities, and perhaps in a nationally representative sample, is needed to shed light on the stability and cross-sample generalizability of derived profiles. In addition, caregiver-reported concerns about adolescent symptoms may be overrepresented in those profiles containing a larger proportion of teens with externalizing disorders; future studies of non-clinic youth may yield somewhat different profiles if they elect to include caregiver reports of internalizing disorders. Finally, although robust taxonomic evidence supports the basic distinction between ADHD-I and ADHD-C subtypes (Nigg, Tannock, & Rohde, 2010), the temporal stability and validity of these subtypes for adolescents specifically is not yet well established.

Implications for Treatment Policy and Practice

Study findings argue for increased emphasis on behavioral health policies designed to identify and engage urban minority teens with unmet treatment needs who are not actively seeking services (McKay & Bannon, 2004). This policy emphasis is in line with health promotion and community-based prevention frameworks intended to create a wider mental health safety net for at-risk youth and forestall their entry into costly and restrictive systems of care (Tolan & Dodge, 2008). The most efficient means to this end is building stronger partnerships between schools and behavioral health providers, for three reasons. First, schools contain an alarming number of teens with serious, comorbid psychiatric disorders who are not crossing the treatment threshold. The current study found that almost 40% of a primarily school-referred sample presented with severe behavioral problems—CD, SUD, and ADHD-Combined—that are typical of adolescents enrolled in mental health and substance use clinics, the bulk of whom arrive there via systems of care that exert considerable social leverage, such as juvenile justice, child welfare, and residential placements (SAMHSA, 2008; Tims et al., 2002; Turner et al., 2004). School guidance programs are not generally designed to meet the mental health needs of this impaired group, nor are most equipped to undertake the intensive treatment referral and follow-up activities required to ensure linkage to outside care.

Second, a large segment of non-clinic families harbor substantial parental concerns about oppositional behavior and poor attention, and many adolescents are themselves distressed by depression, anxiety, and inattention symptoms (Yeh et al., 2005). In the absence of mandates from external systems, such families are often hard-pressed to overcome multiple barriers to engaging in treatment (Nock & Kazdin, 2005). Secure partnerships between schools and behavioral health entities, in the form of school-based health clinics (Frazier, Capella, & Atkins, 2007) or family-centered referral and linking procedures (Tolan & Dodge, 2005), appear essential for successfully ushering needy families through the treatment door.

Intensive, family-centered treatment linking strategies (e.g., Liddle, 1995; Szapocznik et al., 1988) are especially important for Hispanic and African American families, who may be less prone to seeking mental health services (Atkins et al., 2006; Cauce et al., 2002) and more likely to face multiple severe barriers to treatment engagement (Kerkorian, Bannon, & McKay, 2006; Yeh et al., 2003) than Anglo families.

Third, if the specific comorbidity profiles defined in this study are replicated, they can be used as templates for counseling and mental health workers to identify adolescents with various configurations of behavioral health needs, assist teens and families in understanding the nature and severity of these needs, and focus efforts to educate and motivate families to enroll in appropriate services. Although a large array of treatment models have strong empirical bases for addressing one or more of the disorders within the derived profiles, several points merit particular consideration. Manualized family-based treatments have proven robust in treating both conduct problems and substance use among adolescents, including urban minority teens (e.g., Alexander, Robbins, & Sexton, 2000; Glisson et al., 2010; Hogue & Liddle, 2009; Santisteban et al., 1997; Waldron & Turner, 2008). Moreover, family therapy can successfully treat both externalizing and internalizing problems among teens with co-occurring symptoms (Hogue & Liddle, 2009), and family-based services are becoming better integrated into routine MH care (Hoagwood, 2005). Unfortunately much less is known about treating ADHD in adolescents, although stimulant medications are considered promising for ameliorating attentional and perhaps behavioral symptoms (e.g., Wilens et al., 2006) and may be effectively combined with parent management and behavioral self-regulation strategies (e.g., Robin, 2006; Smith, Waschbusch, Willoughby, & Evans, 2000).

Finally, study findings underscore the importance of routinely assessing multiple behavioral domains when preparing treatment plans for adolescents. In particular, significant externalizing problems were part of three distinct diagnostic profiles with correspondingly distinct treatment needs, and this was true of boys and girls equally. Even the best treatment practices can be undermined if providers are naïve to co-occurring conditions or otherwise fail to implement multidimensional interventions for comorbid clients (Kendall & Drabick, 2010).

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Table 1

Diagnostic and Psychosocial Characteristics and Gender Differences in the Sample

	Total Sample N = 303	Boys N = 163	Girls N = 140
	N (%)	N (%)	N (%)
AD ODD **	170 (57%)	77 (49%)	93 (67%)
CG ODD	177 (59%)	94 (59%)	83 (59%)
AD CD	102 (35%)	51 (32%)	51 (37%)
CG CD	85 (28%)	41 (26%)	44 (32%)
AD ADHD-I	61 (21%)	29 (18%)	32 (23%)
CG ADHD-I *	126 (42%)	76 (48%)	50 (36%)
AD ADHD-C	39 (13%)	16 (10%)	23 (17%)
CG ADHD-C	48 (16%)	23 (14%)	25 (18%)
SUD	73 (25%)	38 (24%)	35 (26%)
PTSD ***	48 (16%)	12 (8%)	36 (26%)
GAD *	50 (17%)	20 (13%)	30 (22%)
DEP ***	118 (40%)	43 (27%)	75 (54%)
Academic Problems	198 (67%)	103 (65%)	95 (69%)
IEP	92 (30%)	54 (33%)	38 (27%)
Educational Intervention	124 (42%)	63 (40%)	61 (45%)
Attendance Problems **	174 (59%)	82 (52%)	92 (67%)
Detentions/Rule Violations	109 (37%)	65 (41%)	44 (32%)
Suspended/Expelled	114 (39%)	66 (42%)	48 (35%)
Picked up by police Ψ	97 (33%)	59 (38%)	38 (28%)
On probation/parole	27 (9%)	18 (11%)	9 (6%)
Past year outpatient treatment	61 (21%)	31 (20%)	30 (23%)

Note.

 $\Psi p < .10$,* $p < .05$,** $p < .01$,*** $p < .001$

AD = Adolescent report; CG = Caregiver report; ODD = Oppositional Defiant Disorder; CD = Conduct Disorder; ADHD-I = Attention-Deficit/Hyperactivity Disorder—Inattentive subtype; ADHD-C = Attention-Deficit/Hyperactivity Disorder—Combined subtype; SUD = Substance Use Disorder; PTSD = Posttraumatic Stress Disorder; GAD = Generalized Anxiety Disorder; DEP = Depressive disorder (Major Depression and/or Dysthymia); IEP = Individualized Education Program

Table 2
Estimated conditional probabilities by latent class for diagnostic variables (N = 303)

	Basic Externalizers	Comorbid Externalizers	Adolescent Distress	Severely Distressed	Parental Concern
N (%)	58 (19%)	29 (10%)	80 (26%)	35 (12%)	101 (33%)
DEP	.053	.367	.689	1.00	.142
PTSD	.000	.216	.294	.472	.027
GAD	.046	.000	.385	.441	.009
SUD	.303	.133	.197	.507	.199
AD ADHD-C	.149	.139	.000	.659	.042
AD ADHD-I	.057	.269	.592	.000	.031
AD CD	.726	.633	.215	.736	.023
AD ODD	.837	.758	.785	1.00	.055
CG ADHD-C	.000	1.00	.044	.199	.108
CG ADHD-I	.531	.000	.493	.361	.429
CG CD	.369	.779	.173	.439	.138
CG ODD	.747	.949	.492	.665	.455

Note. Fit statistics for the five-class model were: log likelihood (LL) = -1809.893; AIC = 3747.786; BIC = 3985.465; Entropy = .80; LMR p = ns. Models with more than five classes were not substantively interpretable. DEP = Depressive disorder (Major Depression and/or Dysthymia); PTSD = Posttraumatic Stress Disorder; GAD = Generalized Anxiety Disorder; SUD = Substance Use Disorder; AD = Adolescent report; CG = Caregiver report; ADHD-I = Attention-Deficit/Hyperactivity Disorder—Inattentive subtype; ADHD-C = Attention-Deficit/Hyperactivity Disorder—Combined subtype; CD = Conduct Disorder; ODD = Oppositional Defiant Disorder

Table 3

Comparison of latent classes on demographic, family, and psychosocial variables

	Basic Externalizers	Comorbid Externalizers	Adolescent Distress	Severely Distressed	Parental Concern
N	58	29	80	35	101
Gender ^{***}					
Male	71%	48%	40%	26%	66%
Female	29%	52%	60%	74%	34%
Ethnicity					
African American	25%	19%	27%	20%	20%
Hispanic American	49%	65%	58%	51%	62%
Other	26%	15%	15%	29%	17%
Age [*]					
12–14	34%	58%	24%	26%	29%
15+	66%	42%	76%	74%	71%
Caregiver Employed	66%	44%	52%	66%	63%
Caregiver Education					
Less than high school	46%	37%	36%	34%	40%
More than high school	55%	63%	64%	66%	60%
Family Composition					
Two-parent	30%	19%	27%	17%	25%
Single parent	59%	78%	64%	74%	67%
Other	11%	4%	9%	9%	8%
Household member ever used substances [*]	41%	39%	34%	31%	20%
Household member ever illegal activities	24%	27%	16%	11%	15%
Referral Source [*]					
School	72%	72%	90%	77%	73%
System	17%	28%	9%	20%	20%
Other	10%	0%	1%	3%	7%
Academic Problems [†]	53%	73%	65%	77%	71%

	Basic Externalizers	Comorbid Externalizers	Adolescent Distress	Severely Distressed	Parental Concern
IEP *	31%	48%	23%	46%	26%
Educational Intervention ψ	46%	46%	53%	32%	34%
Attendance Problems **	51%	73%	57%	83%	53%
Detentions/Rules Violations **	46%	54%	24%	51%	32%
Suspended/Expelled ***	58%	62%	18%	51%	33%
Picked up by police **	45%	50%	22%	43%	27%
On probation/parole	16%	10%	4%	11%	8%
BSI Total Score ψ 1	.51 (.66)	.82 (.64)	.53 (.61)	.44 (.47)	.37 (.56)
ICU Total Score **2	32.8 (13.4)	40.2 (12.2)	28.6 (12.4)	34.7 (10.4)	31.3 (10.5)
Parent suspects ASU **	50%	52%	23%	53%	28%
Past year outpatient treatment ψ	25%	37%	13%	29%	18%
Perceived need for treatment: Adolescent	1.2 (1.2)	1.7 (1.3)	2.3 (1.0)	2.4 (0.8)	1.1 (1.3)
Perceived need for treatment: Caregiver	3.3 (1.0)	3.7 (0.5)	3.2 (1.2)	3.5 (1.0)	3.1 (1.3)

Note.

ψ $p < .10$,

* $p < .05$,

** $p < .01$,

*** $p < .001$

IEP = Individualized Education Program; BSI = Brief Symptom Inventory; ICU = Inventory of Callous- Unemotional Traits; ASU = Adolescent Substance Use

¹ Comorbid Externalizers>Parental Concern

² Comorbid Externalizers>Adolescent Distress; Parental Concern