

IDENTIFYING AND MEETING THE NEEDS OF MALTREATED CHILDREN WITH
MENTAL HEALTH PROBLEMS

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ABSTRACT

JULIE S. MCCRAE: Identifying and meeting the needs of maltreated children with mental health problems
(Under the direction of Richard P. Barth)

This research addresses three topics related to improving child welfare and mental health services for children involved with child welfare: need, identification, and service-symptom relationships. Each study in this series uses data from the National Survey of Child and Adolescent Well-being (NSCAW), the first nationally-representative sample of children investigated for maltreatment.

Results show that 62% of children experience clinical-level emotional-behavioral problems at some point over three years following a maltreatment investigation. One-fifth of children report clinical-level depression and 19% report clinical-level posttraumatic stress. Thought and attention problems are among the most prevalent and persistent types of problems reported by children's caregivers, as are externalizing behavior problems. Children appear to experience heightened symptoms at the time of the investigation, but also experience symptom discontinuity over time, suggesting the need for services that target multiple symptom-areas.

At least 470,000 children nationally may not be recognized by child welfare workers as having mental health symptoms at the conclusion of a maltreatment investigation, according to this research. Using risk assessment and investigative information to identify children with symptoms correctly classifies 75 to 80% of children and therefore could serve

as a first-level screen. This would reduce the number of children who are provided a standardized psychological measure, having the potential for benefit and cost-avoidance.

Analysis of the relationship between mental health services and changes in children's symptoms over time failed to demonstrate a positive service-symptom relationship. That is, children who receive mental health services have significantly higher levels of symptoms compared with children who do not receive services. Children typically receive school-based counseling services and less often receive in-home counseling, suggesting the need for more family-focused approaches to their mental health. Children may receive services prompted by their "acting-out" behaviors, at the same time that their family is experiencing substantial problems. This may give children the message that their behavior is the primary problem rather than the family circumstances that led to their child welfare involvement. Clearly, maltreatment is associated with mental health problems, and our current state of knowledge and practice appears insufficient to make measurable differences in children's level of risk for such problems.

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CHAPTER 1

INTRODUCTION

Many child welfare agencies are in the process of developing strategies to better address children's mental health service needs. Following the first round of Child and Family Service Reviews, agencies indicated goals such as improving the identification of children in need, monitoring child and family outcomes related to mental health, collaborating to provide adequate services, and ensuring that services meet children's unique psychological and maltreatment-related needs (McCarthy, Marshall, Irvine, & Jay, 2004). That maltreated children are at increased risk for developing mental health problems is well-known, but until recently, child welfare agencies were not formally responsible for addressing children's mental health. The nearly exclusive focus of child welfare services on investigative and safety-monitoring activities in the past has likely contributed to the problem that many children's psychological and developmental needs are overlooked (Cicchetti, 2004). The result is a system that may be generally ill-prepared, and entrenched with patterns of service delivery that do not result in optimal care for children.

In particular, young children, neglected children, and African-American children are consistently underserved when it comes to their mental health (Burns et al., 2004; Hurlburt et al., 2004). Nearly one-third of child welfare agencies nationally (32%) have no policies concerning mental health assessments for children entering foster care, and one-fifth of agencies limit mental health assessments to subgroups of children—such as those with substantiated maltreatment, or documented substance abuse problems (Leslie et al., 2003;

Martin, Peters, & Glisson, 1998). Lack of identification of children who need mental health services is one of the most pressing concerns in the child welfare-mental health arena. It is unclear which children, if not all, involved with child welfare services should be screened for mental health problems, whether this ought to also include developmental assessments, or to what extent local communities will be able to provide mental health services to meet any increases in demand. Beyond agreement that the current methods are inadequate, there is little consensus about the best way to guide agencies making decisions about mental health screening.

Ensuring that children receive individualized, quality mental health care is also a primary issue. While there are a number of interventions with demonstrated effectiveness in treating children with emotional or behavioral problems (Burns, Hoagwood, & Mrazek, 1999), when studies of typical community-based or “usual care” mental health care are undertaken, results are often less favorable (Weisz, Donenberg, Han, & Weiss, 1995). Large-scale evaluations of systems-of-care strategies in children’s mental health have failed to show that services improve children’s outcomes (Bickman, Lambert, Andrade, & Penaloza, 2000; Bickman, Noser, & Summerfelt, 1999). Explanations for such findings are that children do not receive evidence-based services, may not receive such services in an adequate amount to make a difference, or may not receive services that are targeted to their individual needs (Hoagwood & Burns, 2005; Walrath, Sheehan, Holden, Hernandez, & Blau, 2006).

Child welfare agencies will be challenged to meet new federal standards that children receive adequate mental health care if services are not provided in a fashion that clearly benefits children. Little is known, however, about how children involved with child welfare services experience their mental health care. While there are guidelines for the psychosocial

treatment of physically and sexually abused children (Saunders, Berliner, & Hanson, 2001), and other treatments that have shown effective for specific disorders that are common among child welfare-involved children (Weisz, Hawley, & Doss, 2004), whether child welfare agencies are able to tap into such resources in local communities, or whether such effective services are available at all, is largely unknown.

Study aims

This research aims to contribute to the knowledge-base about how child welfare and mental health agencies may better meet the needs of maltreated children with mental health problems. Three individual studies undergird this work and are presented in Chapters 2, 3, and 4. Chapter 2 is a study of the prevalence and persistence of mental health problems among child welfare-involved children. Chapter 3 investigates the question of whether child welfare risk assessment and investigative information can be used to aid the identification of children with mental health problems at child welfare intake. Chapter 4 is a study that uses propensity score matching and hierarchical linear modeling to view the relationship between children's receipt of mental health services and changes in their emotional-behavioral symptoms over three years. Chapter 5 concludes the paper with a summary of the primary findings and implications for child welfare and mental health services.

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CHAPTER 2

PREVALENCE OF MENTAL HEALTH PROBLEMS AMONG CHILDREN INVESTIGATED FOR MALTREATMENT

Planning child welfare services to ensure that children receive adequate mental health care requires a clear understanding of children's psychological needs. To date, the few studies that report the prevalence of mental health problems among children involved with child welfare services are limited to specific subgroups of children, primarily children in foster care (dosReis, Zito, Safer, & Soeken, 2001; Garland et al., 2001), older children and adolescents (Angold et al., 2002), and abused, rather than neglected, children (Kendall-Tackett, Williams, & Finkelhor, 1993). The National Survey of Child and Adolescent Well-being (NSCAW) offers the first opportunity to estimate the national prevalence of mental health problems among the larger group of children involved with child welfare services. NSCAW is a nationally-representative survey of over 5,000 children whose caregivers have been investigated for maltreatment. To date, three waves of data have been collected from children, their caregivers, and child welfare workers. This study uses information from both caregivers and children to estimate the prevalence of clinical-level emotional-behavioral problems, depression, and posttraumatic stress over three years.

The study aims to provide new information about the specific nature of children's problems and the extent to which these problems persist over time. While other NSCAW studies report rates of emotional or behavioral problems (Burns et al., 2004; Kolko et al., 2005), no study to date has provided detailed information about the syndrome scales of the

Child Behavior Checklist (CBCL; Achenbach, 1991), in particular, nor about rates of change in particular problems over time. We do not know, for example, if somatic complaints are a primary concern among children with internalizing types of symptoms, or what drives the stability of total problem behavior reported in other NSCAW reports. Such information is important to planning interventions. Research shows that among the two broad dimensions of behavior measured by the CBCL, externalizing types of problems are more persistent than internalizing problems (Achenbach, McConaughy, & Howell, 1987), but without data from the child welfare sector itself, we do not know whether this pattern holds true for child welfare-involved children. This study aims to address these gaps. Prevalence and rates of change are reported for the nine syndrome constructs and broader behavioral dimensions of the CBCL, and for self-reported depression and posttraumatic stress measured by the Children's Depression Inventory (CDI; Kovacs, 1992) and the Trauma Symptom Checklist for Children (TSCC; Briere, 1996).

Rates of behavior problems among child welfare, clinical, and nonclinical groups

The Child Behavior Checklist (Achenbach, 1991) is commonly used to identify children who may need mental health services because of behavioral indications that resemble children who receive such services. Caregivers report on the frequency of child behaviors such as being nervous or tense, having difficulty paying attention, or hearing or seeing things that aren't there. Although the CBCL is not meant to substitute for assessment by a mental health professional or to discriminate diagnoses, its association with psychiatric disorders and other poor outcomes in children is well-established (Cosentino, Meyer-Bahlburg, Alpert, Weinberg, & Gaines, 1995; Faraone, Althoff, Hudziak, Monuteaux, & Biederman, 2005; Ferdinand et al., 2004; Hudziak, Copeland, Stanger, & Wadsworth, 2004;

Rishel, Greeno, Marcus, Shear, & Anderson, 2005). Aggressive problems measured by the CBCL, for example, have been associated with oppositional defiant disorder and conduct disorder (Hudziak et al., 2004), and social problems have been associated with children's subsequent use of inpatient and outpatient mental health services (Ferdinand et al., 2004). The CBCL was normed on two samples of children: 2,110 who were referred for mental health services (clinically-referred) and another 2,110, matched for demographic characteristics, who were not referred for mental health services (nonreferred or normative).

Existing reports from the NSCAW study show that children involved with child welfare services have much higher rates of behavioral problems than would be expected among children in the general population. Up to one-half of children (48%) who are investigated for maltreatment score in the clinical-range of total problem behaviors measured by the CBCL at intake to child welfare (Burns et al., 2004; U.S. DHHS, 2005), while this rate is less than one-fifth of children (18%) in the CBCL normative group (Achenbach, 1991). Rates were similar among children in the CBCL normative group for internalizing (18%) and externalizing (17%) types of problems (Achenbach, 1991), while more child welfare-involved children show problems with externalizing (43%) rather than internalizing (32%) behaviors (U.S. DHHS, 2005). Rates of externalizing and internalizing behavior problems among child welfare-involved children are roughly double the rates observed among children in the CBCL normative group. Children referred to child welfare do not, however, show rates of problem behavior that are as high as rates among clinically-referred children, wherein 60% exhibit internalizing problems and 68% exhibit externalizing problems (Achenbach, 1991). Table 2.1 presents a comparison of prevalence rates found in select studies using the CBCL.

Table 2.1. Comparison of prevalence rates among select studies using the Child Behavior Checklist (CBCL): Proportion of children in the clinical-range

Scale	Study (% of children in the clinical-range)					
	Achenbach (1992) Clinically-referred group n=2,110	Achenbach (1992) Non-referred group n=2,110	Clausen et al. (1998) In foster care in California ^a n=267	Armsden et al. (2000) Entering long-term foster care in 13 states n=362	Heflinger et al. (2000) Children in state custody in Tennessee n=254	Zima et al. (2000) Children in foster care in Los Angeles ^b n=302
Withdrawn	30	5	8-10	6	9	8
Somatic	20	6	0-7	3	8	2
Anxious/dep	34	5	3-10	9	8	6
Social	34	5	10-20	9	8	11
Thought	28	4	13-17	5	9	6
Attention	43	5	13-23	10	8	19
Sexual	14	3	7-22	11	--	8
Delinquent	40	6	13-23	15	9	14
Aggressive	36	5	19-23	11	11	14
Internalizing	60	18	23-30	20	19	20
Externalizing	60	17	30-36	28	23	25
Total	68	18	37-38	30	23	27
Any	75	22	43-50	--	--	--

^a In three different communities

^b Children ages 6 to 12

Studies of children in foster care show that problem behavior is more prevalent among this group than among children in the general population, but less common than would be expected among children who are referred for mental health services. Among 267 children in foster care in California, 23-30% exhibited clinical-level internalizing problems, 30-36% exhibited clinical-level externalizing problems, and 37-38% exhibited clinical-level total behavior problems (Clausen, Landsverk, Ganger, Chadwick, & Litrownik, 1998). Two other studies show slightly lower rates. Of 362 children entering long-term foster care, 20% exhibited clinical-level internalizing problems, 28% exhibited clinical-level externalizing problems, and 30% exhibited clinical-level total problem behavior (Armsden, Pecora, Payne, & Szatkiewicz, 2000). Yet another study of 302 school-aged children in foster care found that rates were 20% for internalizing problems, 25% for externalizing problems, and 27% for

total behavior problems in the clinical-range (Zima et al., 2000). The lowest rates were regarding 254 children in state custody in Tennessee, wherein 19% exhibited clinical-level internalizing problems and 23% (each) exhibited clinical-level externalizing and total problem behavior (Heflinger, Simpkins, & Combs-Orme, 2000), rates that are just slightly higher than those observed in the CBCL normative group. The differences in rates reported in these studies is likely due to differences in the group of children selected for the study and the reporting source. The latter study, for example, included children whose foster caregiver had known them for at least 2 months, while the study by Armsden and colleagues (2000) included children at entry to foster care using reports from the adult closest to the child.

Regarding the nine syndrome dimensions of the CBCL, 3 to 6% of children in the general population are expected to have clinical-level problems, while 14 to 43% of children in the clinically-referred population are expected to have clinical-level problems (Achenbach, 1991). Regardless of clinical grouping, children most frequently show problems with delinquent and aggressive behavior, and attention problems. Clinical-level aggressive behavior was found among 36% of children in the CBCL clinically-referred group, and 5% of children in the CBCL normative group (Achenbach, 1991). Delinquent behavior in the clinical-range was found among 40% of children in the referred group, and 6% of children in the normative group (Achenbach, 1991). Rates of these problems among children in foster care are again higher than would be expected among children in the general population, but lower than what would be expected among children who are referred for services. Up to 23% of children in foster care show clinical-level aggressive and delinquent behavior problems (Clausen et al., 1998), with rates among the studies reviewed generally in the range of 10 to 15% of children (Armsden et al., 2000; Heflinger et al., 2000; Zima et al., 2000). Attention

problems in the clinical-range were observed among 43% of children in the CBCL clinically-referred group and 5% of children in the non-referred group, while rates average 15% among children in foster care (Achenbach, 1992; Armsden et al., 2000; Clausen et al., 1998; Heflinger et al., 2000; Zima et al., 2000). Overall, children in foster care experience clinical-level aggressive, delinquent, and attention problems at rates that are about three times as high as rates observed among children in the general population.

Somatic complaints in the clinical-range were among the most commonly reported symptoms among children in the CBCL normative group (6%), while anxious/depressed behavior and social behavior problems in the clinical-range (34% each) were among the most commonly reported among children referred for mental health services (Achenbach, 1991). In comparison, studies show that children in foster care infrequently score in the clinical-range of somatic complaints, with rates ranging from 0 to 8% of children, while more commonly experience problems with clinical-level sexual behavior, ranging from 7 to 22% of children (Armsden et al., 2000; Clausen et al., 1998; Heflinger et al., 2000; Zima et al., 2000). Rates of sexual behavior problems among children in the CBCL normative group are just 3%, and 14% among children in the clinically-referred group (Achenbach, 1991). Unlike children who are referred for mental health services, anxious/depressed behavior and social problem behavior in the clinical-range are less commonly reported among children in foster care, with rates averaging 8% and 12% of children, respectively, compared with the two-thirds of children in the CBCL clinically-referred group (Armsden et al., 2000; Clausen et al., 1998; Heflinger et al., 2000; Zima et al., 2000). About 5% of children in the general population are expected to score in the clinical-range of these problems (Achenbach, 1991).

Prevalence of depression and posttraumatic stress

The Children's Depression Inventory (CDI) is a self-rated symptom scale designed to discriminate children with the psychiatric diagnoses of major depressive or dysthymic disorder (Kovacs, 1992). Based on a sample of 1,266 public school students ages 7 to 16, 10% of children in the general population would be expected to show clinical-level symptoms of depression or dysthymia (Kovacs, 1992). Initial reports from the NSCAW study show that 15% of 7 to 14-year-olds who are investigated for maltreatment score in the clinical-range of depression or dysthymia measured by the CDI at intake (U.S. DHHS, 2005). When children are assessed by clinical interview, rates of depressive problems are much lower. Among children receiving services in five public sectors of care, 5% had some type of mood disorder, including major depression, dysthymia, mania, and hypomania (Garland et al., 2001). Another general population sample showed that 2% of youths ages 9 to 16 had a depressive disorder as per clinical interviews with parents and children (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Rates of clinical-level symptoms measured by the CDI are expected to be higher among girls, and to increase slightly with age (Chartier & Lassen, 1994; Kovacs, 1992).

The Trauma Symptom Checklist for Children (TSCC) is a self-report measure designed to evaluate psychological symptomatology in children who have experienced traumatic events (Briere, 1996). Initial reports from the NSCAW study show that 12% of children ages 8 to 14 show clinical-level posttraumatic stress at intake to child welfare services (Kolko et al., 2005). Normative rates of posttraumatic stress have been cited as in the range of 3 to 6% of adolescents (DeBellis & VanDillen, 2005), although it is mostly unclear what an expected rate of clinical-level posttraumatic stress is among children who experience maltreatment, or among children in the general population. Existing research has

used a wide range of instruments, and has typically focused on children who have been exposed to a particular type of traumatic experience. The prevalence reported among a community-based sample of 6 to 12-year-olds using a diagnostic interview was 15%, but was 25% among children in the same study who were exposed to a traumatic event, including domestic violence and caregiver-reported child abuse (McCloskey & Walker, 2000). A study of sexually abused, physically abused, and nonabused children found rates of posttraumatic stress disorder (PTSD) to be 21%, 7%, and 10%, respectively (Deblinger, McLeer, Atkins, Ralphe, & Foa, 1989), while another study of trauma-exposed adolescent girls found rates of full PTSD to be 14% and partial PTSD to be 12% (Lipschitz, Rasmusson, Anyan, Cromwell, & Southwick, 2000). Yet, three additional studies show much wider variance in rates using diagnostic criteria, ranging from a low of 1% to 2% among general population and public care samples (Costello et al., 1996; Garland et al., 2001) to a high of 36% among 7 to 13-year-old children with substantiated physical or sexual abuse (Ackerman, Newton, McPherson, Jones, & Dykman, 1998). Studies do consistently show, however, that maltreated or otherwise trauma-exposed children exhibit higher rates of PTSD compared with other children, with sexually abused children typically exhibiting the most evidence of posttraumatic stress among maltreated groups.

Expected change in children's emotional and behavioral problems over time

Information about the extent to which children's symptoms or problems change over time is an indication of how well services provided to children and families have helped to alleviate children's distress, as well as how persistent a particular problem may be, regardless of intervention. Findings from the NSCAW study thus far show that children's emotional-behavioral problems measured by the CBCL tend to lessen over time. In a study of behavior

change among 3 to 10-year-olds who did, and did not, receive mental health services over 3 years following child welfare intake, children's level of problem behavior decreased by 1 to 3 points, with greater improvement observed among children with clinical-level problems at intake (McCrae, Guo, & Barth, 2005). Children in this group showed decreases in problem behavior of about 5 to 8 points between intake and 36 months (McCrae et al., 2005). Another NSCAW study examined behavior change among children who spent at least 75% of their time in kinship or foster care over the 12 months following child welfare intake (Barth, Green, Guo, & McCrae, 2005). Results showed that children in kinship care had CBCL score reductions of about 2 points, while children in foster care had scores that increased (worsened) by about 2.5 points.

Other research shows that children's psychological symptoms tend to decrease over time. Kendall-Tackett and colleagues' (1993) review of symptoms among sexually abused children found rates of symptom abatement ranging from 55-67% of children, with one study in the review reporting that 10-24% of children worsen. Scores on the CDI are expected to be lower at follow-up assessments (Kovacs, 1992). Change likely depends on a number of factors, including the extent and types of treatment that children receive, the type of primary problem, and child characteristics. In a study of mother-child interaction patterns, researchers found that 57% of conduct problem preschool girls improved in externalizing symptoms over one to two years compared with 20% of conduct problem preschool boys (Cole, Teti, & Zahn-Waxler, 2003). In a study of sexually abused girls receiving individual or group psychotherapy, decrease in clinical status (from disorder to no disorder at follow-up) ranged from 81% of girls with anxiety disorders, 69% of girls with depression, and 50% of girls with

separation anxiety disorder (Trowell et al., 2002). Comparatively few children in this study developed symptoms at follow-up (0-16%, depending on the measure).

Many studies also find that symptoms reduce over time regardless of treatment (Trowell et al., 2002; Weiss, Catron, & Harris, 2000). In a study of children served in public mental health, 40-70% of children achieved a successful outcome, defined as reduction in impairment from severe or moderate to mild, minimal, or none, with fewer children with pervasive problems at intake showing improvement compared with children showing problems in one emotional-behavioral domain (Xue, Hodges, & Wotring, 2004). A study of children served in a mental health system of care found that 15% of children remained with the same clinical-level status 6 months post-intake, 60% had improved in clinical status, and 25% had declined in clinical status (Walrath, Mandell, & Leaf, 2001). A final study of outcomes related to school-based mental health services among children with serious emotional disturbance showed that 47% of children improved over 9 months, with the greatest improvements seen among children with mood/anxiety disorders (50%) or other diagnoses (61%) compared with 41% of children with disruptive behavior disorders (Robinson & Rapport, 2002). In sum, a large number of children apparently improve their symptom status over time, with rates from studies of children receiving mental health services ranging from 40 to 70% of children. Comparatively few children are reported to worsen in clinical status (0 to 25%). Externalizing types of problems in children typically show less change over time than internalizing types of problems.

Methods

This study uses data from the National Survey of Child and Adolescent Well-being (NSCAW), a longitudinal study of children and families involved with child welfare services.

Data collection in the form of a panel study design began in 2001 with a sample of 5,501 children who were investigated for maltreatment and in 2005, 36 months of follow-up data were available. Interview completion rates at follow-up are 85% of caregivers and 80% of children at 18 months, and 84% of caregivers and 82% of children at 36 months. The current study includes children ages 2 to 14 at the time of the investigation that led to their inclusion in the NSCAW study (n=3,801).

Sample

Children were selected into the NSCAW study using a two-stage stratified sample design. The first stage involved selecting 92 Primary Sampling Units (PSUs) in 36 states. The PSUs are typically county child welfare agencies. The second stage involved selecting children, ages 0 to 14, from lists or files of children who were investigated for abuse or neglect within the sample PSUs from October 1999 through December 2000. Eligible children at the end of this stage were stratified into 8 domains according to child age, service status (e.g. open for child welfare services, placed in foster care), and maltreatment type. A random sample of children was then chosen from each domain. The purpose of the stratification was to obtain enough infants, children reported for sexual abuse, and cases receiving ongoing child welfare services to sufficiently analyze. Sampling weights are then used in statistical analyses to adjust for the unequal selection of subjects into the study, nonresponse, and undercoverage. The sampling weights allow for statistical inference to the national level of children investigated for maltreatment. The current study uses the sampling weight that corresponds with each time point (e.g. baseline weights were used for baseline estimates) and the 36-month sampling weight for estimates of prevalence over 3 years.

Measures

Child Behavior Checklist (CBCL). Behavior problems were assessed using the CBCL, a well-validated measure of child emotional and behavior problems (Achenbach, 1991). The CBCL was administered to caregivers of children ages 2 and older, with slightly different versions for 2 and 3-year-old children and children ages 4 and older. For the internalizing, externalizing, and total problem score dimensions, T-scores above 63 are considered clinical-level, scores of 60-63 are considered borderline-level, and scores below 60 are considered normal. For syndrome scores, such as withdrawn and aggressive behaviors, T-scores above 70 are considered clinical-level, scores between 67-70 are borderline-level, and scores below 67 are normal. In these analyses, normal and borderline classifications were collapsed. The CBCL shows moderate reliability ($\alpha = .50-.70$) among children in the NSCAW study.

Trauma Symptom Checklist for Children (TSCC). The posttraumatic stress (PTS) subscale of the TSCC was administered to children ages 8 years and older. T-scores at or above 65 are considered clinical-level, scores between 60 and 64 are borderline-level, and scores below 60 are normal-level. The PTS scale has high internal consistency ($\alpha = .85$ to $.87$ across standard and maltreatment samples), and the full TSCC shows construct validity in at least seven studies with regard to traumatic impact (Briere, 1996). Normal and borderline classifications were combined in this study.

Children's Depression Inventory (CDI). The CDI (Kovacs, 1992) is a child-reported measure of depressive symptoms. Children are considered depressed if they fall at or above the 91st percentile for their age and gender group. Internal consistency of the CDI is high among children in the NSCAW study, averaging $.81$ for 7- to 12-year-olds and $.87$ for 13- to 15-year-olds (U.S. DHHS, 2005).

Data analysis

Data were analyzed using SUDAAN[®] software, developed by Research Triangle Institute (RTI, 1997). SUDAAN[®] was designed to analyze data from complex sample surveys, including stratified, unequally weighted, and clustered samples. SUDAAN[®] takes in to account sampling effects to compute standard errors, means, regression coefficients, and other inferential statistics.

The crosstab procedure was used to estimate the proportion of children with each symptom at the three time points (baseline, 18, and 36 months) as well as over the total 36 months. Bivariate analysis using chi-square statistics were then used to test the difference in prevalence rates for each problem according to child age at baseline, gender, and race/ethnicity. Change in children's scores between baseline and 36 months was assessed using conditional probabilities tables. Conditional probabilities were used to describe changes in the proportion of children experiencing an outcome at 36 months conditioned on their status at baseline.

Results

Results are presented in three prevalence tables and one conditional probability table. Table 2.2 presents the prevalence of clinical-level behavior problems measured by the CBCL. All of the proportions represent cumulative prevalence (present at any time over 36 months), except for the totals reported for baseline, 18, and 36 months, which represent point estimates at each time. All figures are for the sample of children with complete data at all three time points (n=2,852), with some variation in the total number of children by measure, as noted in Table footnotes. All differences noted are significant at the level of $p < .05$.

Table 2.2. Prevalence of emotional-behavioral problems over 3 years among 2 to 14-year-old children at baseline, as measured by the Child Behavior Checklist (n=2852)^a

Child characteristic	Proportion of children with any clinical-level scores over 3 years (SE)											
	Anx/dep ^a	With-drawn	Somatic	Total INT ^b	Delin-quent ^c	Agg-ressive	Total EXT ^b	Social	Thought	Att-ention	Sexual	CBCL Total
Age at baseline												
2 to 5	11.7 (2.9)	11.3 (2.8)	6.7 (2.0)	28.5 (3.0)	17.3 (2.9)	15.5 (2.0)	40.1 (3.2)	14.0 (3.0)	26.8 (5.0)	17.8 (3.5)	8.4 (2.8)	41.8 (3.0)
6 to 10	12.0 (1.6)	10.1 (1.5)	4.5 (1.0)	31.5 (2.8)	17.3 (2.5)	18.0 (2.1)	39.8 (3.7)	15.0 (1.7)	22.2 (2.3)	18.4 (2.1)	9.9 (2.4)	46.9 (3.5)
11 to 14	16.1 (2.4)	13.7 (2.1)	13.0* (2.2)	41.0* (3.4)	23.9 (2.5)	30.3* (2.9)	61.6* (3.5)	12.7 (1.8)	28.4 (3.2)	17.9 (2.2)	--	58.3* (3.6)
Gender												
Male	17.5* (2.3)	15.7* (2.1)	9.4* (1.5)	39.8* (3.1)	17.6 (2.5)	20.0 (2.1)	43.7 (3.4)	15.3 (2.0)	28.9* (2.9)	20.5 (2.5)	10.8 (2.0)	48.8 (3.4)
Female	8.6 (1.2)	7.3 (1.1)	5.6 (1.1)	26.6 (2.2)	20.6 (2.0)	21.3 (2.1)	48.0 (2.6)	12.9 (1.4)	21.4 (1.9)	15.9 (1.7)	7.7 (2.5)	48.2 (2.4)
Race/ethnicity												
Black	11.3 (1.7)	12.4 (1.8)	6.8 (1.4)	32.1 (3.3)	20.2 (2.6)	22.4 (2.4)	49.5 (3.7)	14.3 (2.7)	24.9 (3.0)	17.4 (2.5)	2.9* (1.1)	49.3 (4.0)
White	14.6 (1.9)	11.3 (1.9)	7.7 (1.4)	36.0 (2.7)	19.1 (2.4)	22.3 (2.4)	46.8 (3.0)	14.5 (1.7)	26.1 (2.8)	20.7 (2.1)	10.1 (2.8)	50.6 (2.8)
Hispanic	8.6 (3.3)	8.9 (2.9)	7.0 (3.1)	26.7 (4.1)	19.4 (4.1)	16.2 (3.5)	40.8 (5.3)	12.0 (3.1)	22.4 (4.3)	11.9 (3.7)	12.8 (4.4)	42.9 (4.3)
Other	20.9 (5.8)	15.0 (3.9)	10.4 (3.5)	35.4 (6.7)	14.1 (4.2)	14.2 (3.8)	38.6 (7.0)	15.9 (4.9)	24.5 (6.8)	19.6 (5.2)	15.9 (7.6)	45.8 (7.6)
Total at baseline	7.2 (0.8)	5.6 (0.6)	4.2 (0.7)	20.7 (1.6)	10.9 (1.2)	13.1 (1.2)	31.2 (1.9)	7.8 (1.0)	14.0 (1.3)	11.6 (1.2)	7.2 (1.5)	33.9 (1.9)
Total at 18 months	5.5 (0.9)	4.6 (0.8)	3.0 (0.5)	18.0 (1.5)	9.0 (1.1)	11.6 (1.1)	27.7 (1.8)	6.6 (1.0)	12.4 (1.4)	9.7 (1.3)	4.2 (1.2)	29.6 (2.1)
Total at 36 months	5.0 (0.8)	4.9 (0.7)	2.8 (0.6)	16.3 (1.4)	7.8 (0.9)	10.8 (1.1)	26.7 (2.0)	6.8 (0.9)	10.3 (1.6)	8.3 (0.9)	3.0 (1.1)	26.6 (1.8)
TOTAL	13.0 (1.3)	11.4 (1.3)	7.5 (1.0)	33.2 (1.9)	19.1 (1.8)	20.6 (1.6)	45.9 (2.3)	14.1 (1.3)	25.0 (1.9)	18.1 (1.7)	9.4 (1.7)	48.5 (2.2)

Note. Figures are reported for the 2,852 children whose caregivers completed interviews at all three time points. The social, thought, and attention subscales apply to children ages 4 and older only (n=2388), and the sexual problems subscale applies to children ages 4 to 11 only (n=1164).

^aAnxious/depressed.

^bInternalizing and externalizing, respectively.

^c“Destructive” for children ages 2 to 3.

* $p < .05$.

As shown in Table 2.2, 49% of children scored in the clinical-range of total problem behavior at some point over the 36 months since intake to child welfare services. One-third of children (33%) showed clinical-level internalizing problems at some point over the 36 months, and almost one-half of children (46%) showed clinical-level externalizing problems at some point over 36 months. The proportion of children with clinical-level scores was highest at baseline across all syndrome dimensions. Rates of total problem behavior in the clinical-range dropped from 34% at baseline to 27% at 36 months, and for internalizing problems, dropped from 21% at baseline to 16% at 36 months. Similar decreases were noted with regard to externalizing problems, with 31% of children scoring in the clinical-range at baseline, and 28% and 27% scoring in the clinical-range at 18 and 36 months, respectively.

The most prevalent syndrome types measured by the CBCL included thought problems, delinquent and aggressive behavior, and attention problems. One-quarter of children scored in the clinical-range of thought problems at some point over the 36 months and about one-fifth of children scored in the clinical-range of delinquent (19%) or aggressive behaviors (21%) at some point over the 36 months. Attention problems were observed among 18% of children over three years. Within the internalizing dimension, rates were highest for clinical-level anxious/depressed behavior (13%) and withdrawn behavior (11%) over 36 months. Cumulative prevalence of somatic problems was 8%, and cumulative prevalence of social and sexual problems were 14% and 9%, respectively. Again, rates were highest at baseline across all syndrome types, with decreases ranging from <1 percentage point (withdrawn behavior) to 3.7 to 4.2 percentage points (thought problems and sexual problems, respectively) between baseline and 36 months.

Prevalence rates of clinical-level CBCL scores over 36 months tended to vary by children's age and gender, but not by their race/ethnicity. Age differences in prevalence rates were found for internalizing, externalizing, and total behavior problems, as well as for aggressive and somatic syndromes. A significantly higher proportion of 11 to 14-year-olds scored in the clinical-range of internalizing (41%), aggressive (30%), externalizing (62%), and total problem behaviors (58%) over 36 months compared with 2 to 5-year-olds (29%, 16%, 40%, and 42%, respectively) and 6 to 10-year-olds (32%, 18%, 40%, and 47%, respectively). Adolescents also showed significantly higher rates of somatic problems over 36 months (13%) compared with 6 to 10-year-olds (5%).

Gender differences in rates over 36 months were found for all of the internalizing syndromes, and for thought problems. A significantly higher proportion of boys scored in the clinical-range of anxious/depressed (18%), withdrawn (16%), somatic (9%), and total internalizing behavior (40%) compared with girls, where the rates were 9%, 7%, 6%, and 27%, respectively. Clinical-level thought problems at some point over 36 months were also more prevalent among boys (29%) compared with girls (21%). Boys and girls were similar in rates of all other syndrome or problem dimensions over 36 months.

The only significant difference in prevalence rates by children's race/ethnicity was for sexual behavior problems. A significantly higher proportion of White and Hispanic children scored in the clinical-range of sexual behavior problems at some point over 36 months (10% and 13%, respectively) compared with Black children (3%).

Table 2.3 presents the prevalence of children's self-report of clinical-level depression and posttraumatic stress measured by the CDI and TSCC. The figures again represent the proportion of children with any clinical-level score over 36 months, except for the rates

reported at baseline, 18, and 36 months, which are point estimates. The sample includes children ages 7 to 14 (depression) or ages 8 to 14 (posttraumatic stress) at baseline, who had complete data available at all three time points (n=1601 for depression and n=1243 for posttraumatic stress).

Table 2.3. Prevalence of clinical-level depression and posttraumatic stress over 3 years among children ages 7 to 14 at baseline (n=1243-1601)

Child characteristic	Depression	Posttraumatic stress
Age at baseline		
7 to 10	18.6 (2.4)	24.7 (3.2)*
11 to 14	20.6 (2.8)	12.8 (2.0)
Gender		
Male	10.6 (2.3)	21.0 (2.9)
Female	28.3 (2.8)*	16.7 (2.5)
Race/ethnicity		
Black	14.2 (2.7)	20.6 (4.5)
White	23.6 (2.8)*	21.3 (2.9)
Hispanic	20.9 (5.1)	11.0 (3.3)
Other	12.4 (5.1)	11.2 (4.9)
Total at baseline	15.7 (1.8)	12.8 (1.9)
Total at 18 months	6.4 (1.1)	5.9 (1.3)
Total at 36 months	5.8 (1.0)	4.9 (1.1)
TOTAL	19.5 (1.6)	18.8 (2.0)

Note. Figures represent the total number of children with complete interviews at all three time points (n=1601 and n=1243, respectively, for depression and posttraumatic stress). The posttraumatic stress measure applies to children ages 8 and older only.

*p<.05.

As shown in Table 2.3, 20% of children scored in the clinical-range of depression at some point over the 36 months, and 19% scored in the clinical-range of posttraumatic stress at some point over 36 months. At baseline, 16% of children reported clinical-level depression and 13% of children reported clinical-level posttraumatic stress. These rates decreased by about one-half by 18 months (6% for both), and remained relatively stable at 36 months (6% and 5%, respectively).

Clinical-level depression at some point over 36 months was roughly equally likely among 7 to 10-year-olds (19%) and 11 to 14-year-olds (21%), while posttraumatic stress was

significantly more common over 36 months among 7 to 10-year-olds (25%) compared with 11 to 14-year-olds (13%). Girls were significantly more likely than boys were to report clinical-level depression at some point over 36 months—rates were 28% of girls compared with 11% of boys—while posttraumatic stress was roughly equally prevalent among boys (21%) and girls (17%). With regard to race/ethnicity, a significantly higher proportion of White children reported clinical-level depression over 36 months (24%) compared with Black children (14%). Rates of posttraumatic stress were not significantly different by child race/ethnicity. About 21% each of White and Black children and 11% of Hispanic children and children of other race/ethnicities scored in the clinical range at some point over 36 months.

Table 2.4 presents the prevalence of any type of clinical-level problem over 36 months. Rates of any symptom or problem were much higher than rates for a particular type of symptom or problem. Over 36 months, 62% of children scored in the clinical-range on at least one measure. Rates were again highest at baseline, with 46% of children scoring in the clinical-range of at least one symptom, whereas at 18 and 36 months, the rates were 39% and 36%, respectively. Older children had significantly higher rates of symptoms than younger children did—63% of 6 to 10-year-olds and 74% of 11 to 14-year-olds scored in the clinical range of at least one symptom over 36 months, compared with 51% of 2 to 5-year-olds. This is likely partially attributable to having self-reports available among older children. No significant differences in rates of any clinical-level symptoms over 36 months were found by children’s gender or race/ethnicity.

Table 2.4. Prevalence of any mental health problem over three years among children involved with child welfare services (n=2852)

Child characteristic	Any clinical-level symptom
Age at baseline	

2 to 5	51.1 (3.3)
6 to 10	62.7 (3.1)*
11 to 14	73.6 (3.3)*
Gender	
Male	60.8 (3.0)
Female	63.6 (2.3)
Race/ethnicity	
Black	65.3 (3.5)
White	62.4 (2.8)
Hispanic	61.2 (3.7)
Other	51.1 (7.9)
Total at baseline	46.2 (2.2)
Total at 18 months	39.0 (1.9)
Total at 36 months	36.2 (2.1)
TOTAL	62.2 (2.0)

*p<.05

Change in children's clinical status between baseline and 36 months is presented in Table 2.5. Figures represent the probability of children's symptom status at 36 months conditioned on their status at baseline. On the CBCL internalizing dimension, as shown, 90% of children with normal or borderline-level scores at baseline scored in the normal or borderline-range 36 months later (just 10% of children with normal or borderline scores moved into the clinical-range at 36 months). Children with clinical-level internalizing at baseline showed less stability—58% moved into the normal or borderline-range at 36 months, while 42% remained in the clinical-range. Externalizing and total problem behavior showed similar patterns among children scoring in the normal or borderline-range at baseline (the large majority remained there; 86% for both), but also showed that many children with clinical-level scores remained in the clinical-range 36 months later. Over one-half of children with clinical-level externalizing and total problem behavior scores at baseline remained at the clinical-level 36 months later (55% and 51%, respectively).

Table 2.5. Probability of symptom status at 36 months conditioned on symptom status at baseline (n=2852)

Symptom status at baseline	Symptom at 36 Months		Total at Baseline
	Normal/borderline	Clinical	
Child Behavior Checklist			
Internalizing			
Normal/borderline	.90	.10	1.00
Clinical	.58	.42	1.00
Anxious/depressed			
Normal/borderline	.96	.04	1.00
Clinical	.79	.21	1.00
Withdrawn			
Normal/borderline	.96	.04	1.00
Clinical	.76	.24	1.00
Somatic			
Normal/borderline	.98	.02	1.00
Clinical	.78	.22	1.00
Externalizing			
Normal/borderline	.86	.14	1.00
Clinical	.45	.55	1.00
Delinquent			
Normal/borderline	.95	.05	1.00
Clinical	.71	.29	1.00
Aggressive			
Normal/borderline	.94	.06	1.00
Clinical	.58	.42	1.00
Social			
Normal/borderline	.96	.04	1.00
Clinical	.64	.36	1.00
Thought			
Normal/borderline	.93	.07	1.00
Clinical	.67	.33	1.00
Attention			
Normal/borderline	.95	.05	1.00
Clinical	.65	.35	1.00
Sexual problems			
Normal/borderline	.98	.02	1.00
Clinical	.83	.17	1.00
CBCL total score			
Normal/borderline	.86	.14	1.00
Clinical	.49	.51	1.00
Depression and PTS			
Depression			
Normal/borderline	.97	.03	1.00
Clinical	.81	.19	1.00
Posttraumatic stress			
Normal/borderline	.96	.04	1.00
Clinical	.91	.09	1.00
Any symptom	No	Yes	
No	.82	.18	1.00
Yes	.42	.58	1.00

Note. All analyses are on weighted data; Ns are unweighted.

Among specific syndromes measured by the CBCL, aggressive, social, thought, and attention problems in the clinical-range appear to have the most stability between baseline and 36 months. Of children with clinical-level aggressive problems at baseline, 42% exhibited such 36 months later. About one-third of children with clinical-level social, attention, and thought problems at baseline had the same 36 months later (36%, 35%, and 33%, respectively). Rates of clinical-level stability between baseline and 36 months were comparatively lower with regard to the three internalizing syndrome dimensions (anxious/depressed, withdrawn, and somatic), wherein 21-24% of children with clinical-level scores at baseline remained with clinical-level scores 36 months later. The large majority of children with normal or borderline-level scores at baseline, regardless of syndrome dimension, remained in the normal or borderline-range 36 months later, with rates of stability ranging from 93% (thought problems) to 98% (somatic and sexual problems).

With regard to self-reported depression and posttraumatic stress, the large majority of children who reported normal or borderline-levels at baseline also reported normal or borderline-levels 36 months later (97% for depression and 96% for posttraumatic stress). Clinical-level depression remained a problem for 19% of children between baseline and 36 months, while clinical-level posttraumatic stress remained a problem for 9% of children.

Finally, 82% of children with no clinical-level symptoms at baseline remained free of symptoms 36 months later, while 18% moved into the category of having clinical-level symptoms 36 months later. Among children with some type of symptom at baseline, the majority (58%) remained there 36 months later, while 42% moved into the category of having no symptoms. As such, the proportion of children transitioning from having some type of symptom at baseline to having no symptom at 36 months was over twice as great as

the proportion of children transitioning from having no clinical-level symptoms at baseline to having some type of symptom 36 months later. Taking all changes into account, 1,410 children (unweighted) had clinical-level symptoms at baseline and 1,225 children (unweighted) had clinical-level symptoms at 36 months, a reduction of 13%.

An important additional note about these results is warranted. Because all of the figures reported in this study reflect only children with three complete waves of data, it is possible that the “point prevalence” figures in the tables do not represent the actual prevalence of these problems among all children involved with child welfare services (one of the goals of the study). To test this possibility, the rates were re-analyzed using data from all children with available data on each respective measure at each time point. This captures children who may have missed one or more follow-up interviews, as well as children who “grew into” a particular measure, namely, self-reported depression and posttraumatic stress (wherein the baseline time point may be missing, for example). Results showed that the point prevalence rates for the CBCL reported in Table 2.2 (children with 3 waves of data only) are nearly identical to the point prevalence rates for the CBCL when including children regardless of the number of complete measurement points. Rates of each problem or syndrome in the re-analysis were well within the margin of error reported in Table 2.2.

Slight differences in rates in the re-analysis were found, however, with regard to depression and posttraumatic stress. When children were included regardless of having three complete measures, rates of clinical-level depression were: 15.4% at baseline, (n=2202; compared with 15.7%), 8.2% at 18 months (n=2179; compared with 6.4%), and 7.3% at 36 months (n=2464; compared with 5.8%). Rates of clinical-level posttraumatic stress in the re-analysis: 12.1% at baseline (n=1946; compared with 12.8%), 8.0% at 18 months (n=1940;

compared with 5.9%), and 7.3% at 36 months (n=2046; compared with 4.9%). To summarize, rates of clinical-level depression and posttraumatic stress were generally about 1 to 2% points higher at follow-up when including all children with available data at these points. Given the low rates to begin with, these changes are as large as 49% different (posttraumatic stress at 36 months). Bivariate analyses were used to test for differences between the original analysis group (complete data) and the new group (children with data at a given time point). Results showed no significant differences between the two groups by child race/ethnicity or gender, but significant differences between the groups by child age, pointing to the addition of children who “grew into” these measures at 18 and 36 months. Indeed, children with data at these time points only were significantly younger than children with complete data ($p<.001$). Among children with complete data on the PTS measure at all three time points, for example, 50% were ages 5 to 10 at baseline, while among the additional group of children with 36-month PTS data, 97% were ages 5 to 10 at baseline (the figures were 50% and 86%, respectively, for depression). Thus, the rate differences are due in large part to the addition of children reporting on these symptoms for the first time at 18 and 36 months, rather than to an actual increase in rates among all children when those with incomplete three-wave data are included.

Discussion

This study used nationally-representative data to estimate the prevalence of mental health problems among children involved with child welfare services. While a number of studies have reported the prevalence of such problems among children in foster care (e.g. Armsden et al., 2000; Clausen et al., 1998; Heflinger et al., 2000), and among children exposed to certain types of maltreatment or family problems (e.g. Kendall-Tackett et al.,

1993; McCloskey & Walker, 2000), no study to date has provided a comprehensive view of children's mental health among the larger group of children reported to child welfare services. Planning child welfare services to better address children's mental health requires a clear understanding of the number of children in need, and of the specific types of problems that children experience. This study reports the prevalence of clinical-level emotional-behavioral problems, depression, and posttraumatic stress immediately following children's investigation for maltreatment, and over three years, with the goal of identifying the most common types of problems and types of symptoms that may be the most concerning for children over time.

Results show that most children investigated for maltreatment will exhibit clinical-level symptomatology on at least one psychological measure at some point over three years (62%). Almost one-half of children score in the clinical-range of total behavior problems measured by the Child Behavior Checklist (CBCL; Achenbach, 1991) at some point over three years, with externalizing behavior problems more common (46%) than internalizing behavior problems (33%). The most prevalent types of problems or symptoms over three years include thought problems (25%), aggressive or delinquent behavior (21% and 20%, respectively), depression (20%), posttraumatic stress (19%) and attention problems (18%). Least common are clinical-level somatic complaints (8%), sexual behavior problems (9%), and withdrawn behavior (11%).

Rates of each of these problems, excepting somatic complaints, are higher among children reported to child welfare at entry compared with what would be expected among children in the general population. In the normative, non-clinical sample for the CBCL, rates of internalizing, externalizing, and total problem behavior are 18%, 17%, and 18%,

respectively (Achenbach, 1991), while rates among children in the current study at intake are 21%, 31%, and 34%, respectively. Three years following the investigation, maltreated children still have higher rates of externalizing and total problem behavior than would be expected among children in the general population (27% and 26%, respectively), while rates of internalizing problems are comparable to general population estimates (16%). Child welfare-involved children do not, however, exhibit clinical-level problem behavior at rates that are comparable to those observed among children who are referred for mental health services, wherein 60% of children exhibit clinical-level internalizing and externalizing problems, and 68% exhibit clinical-level total problem behavior (Achenbach, 1991). The pattern that externalizing types of problems are more persistent than internalizing types of problems (Achenbach et al., 1987; Robinson & Rapport, 2002) is supported in this study, with aggressive behavior problems showing the most stability.

Overall, the number of child welfare-involved children who continue to struggle with clinical-level emotional-behavioral problems diminishes over time, and with regard to certain problems or symptoms, to levels that are comparable to general population estimates. Rates of total problem behavior drop from 34% of 2 to 14-year-olds at intake to child welfare to 27% of these same children 36 months later. Depression is self-reported by 16% of 7 to 14-year-olds at child welfare intake compared with 6% of these same children three years later, and posttraumatic stress is reported by 13% of 8 to 14-year-olds at intake, but just 5% of these same children three years later. Normative rates of self-reported depression are 10% (Kovacs, 1992) while posttraumatic stress is expected among 3 to 6% of adolescents (DeBellis & VanDillen, 2005). These findings suggest that at least some children experience an emotional or behavioral reaction to the circumstances surrounding the maltreatment or the

investigation that does not necessarily precipitate long-term difficulties. This could also indicate that services received by children or families are effective in reducing children's level of emotional-behavioral distress. The 42% of children in the current study that improved their clinical status between intake and 36 months (from at least one clinical-level symptom to no clinical-level symptoms) is within the range of symptom abatement reported in other studies, typically 40-70% of children (Cole et al., 2003; Kendall-Tackett et al., 1993; Walrath et al., 2001; Xue et al., 2004). In turn, the 18% of children in this study who worsened in clinical status is within the range of the 0 to 25% of children reported to worsen in other studies (Kendall-Tackett et al., 1993; Trowell et al., 2002; Walrath et al., 2001).

That clinical-level posttraumatic stress (PTS) shows the highest probability of returning to a normal-level 36 months later—91% of children with initial clinical-level symptoms report normal-range scores 36 months later—lends support to the hypothesis that some children experience a heightened emotional reaction at the time of the investigation. Several authors have theorized that children entering foster care exhibit elevated psychological symptoms due to their pre-placement experiences and the trauma of being separated from their parents (Chernoff, Combs-Orme, Risley-Curtiss, & Heisler, 1994; Zima et al., 2000), but this may be the first study to document a similar pattern following a maltreatment investigation. Children may experience worry and anxiety about what might happen to them or their family, or have traumatic recollections of the abuse or neglect, if the maltreatment was severe and their sense of safety was compromised. This would also include situations where children have been removed from their homes and may reflect the elevated symptoms at foster care entry mentioned by other authors. The statistical explanation, “regression to the mean”, wherein individuals with extreme scores regress toward the mean

at a second measure, may explain some of the decrease in scores over time, but the finding that PTS is the most probable of all symptoms studied to abate over time strongly suggests an alternative explanation. Indeed, over 100,000 children nationally show elevated posttraumatic stress at child welfare entry, and for 10% of these children (over 9,000 children nationally), posttraumatic stress remains a problem three years later.

A few findings in this study were unexpected, including findings that: (1) boys show significantly higher rates of caregiver-reported internalizing problems compared with girls, (2) thought and attention problems are among the most prevalent and persistent types of problems reported in this study, and (3) rates of sexual behavior problems are significantly higher among White and Hispanic children compared with Black children.

Caregivers in this study report significantly higher rates of internalizing problems among boys (40%) compared with girls (27%) over three years. More boys than girls were rated in the clinical-range of each underlying internalizing dimension, including anxious/depressed behavior (18% vs. 9%), withdrawn behavior (16% vs. 7%), and somatic complaints (9% vs. 6%). In contrast, findings among children in the CBCL normative group show that girls score higher than boys on 16 of the 17 internalizing items (Achenbach, 1991), and other studies support the pattern that girls have higher rates of internalizing types of problems compared with boys (e.g. Garland et al., 2001). That a significantly higher proportion of girls in the current study self-reported clinical-level depression (28%) compared with boys (17%) suggests that the findings are related to either reporter source (caregiver versus child) or child age (increased prevalence among girls with age). Explanations include that: (1) maltreating caregivers do not recognize depressive symptoms in girls, or may over-rate the extent of these problems in boys, and (2) boys may be more

reticent to report these feelings than girls, or less aware of internal moods or cognitions tapped by the depression inventory (Kovacs, 1992). Regardless, this is a curious finding that warrants additional understanding. While gender differences in self-reported depression measured by the CDI are reportedly inconsistent (Kovacs, 1992), the current results are clear that girls report higher levels of depressive symptoms than boys, by almost 18%. Other studies have found that maltreating caregivers rate boys as more disturbed than girls using the CBCL (Ackerman et al., 1998) and tend to over-report externalizing problems overall (Lau, Valeri, McCarty, & Weisz, 2006). Current results suggest that similar research is needed along the internalizing dimension specifically, and regarding children referred to child welfare, in particular.

The second unexpected finding in this study is the high prevalence and consistency of thought and attention problems among the NSCAW children. Thought problems are the most common type of CBCL syndrome in the clinical-range at intake (14%), 18 months (12%), and at any point over 36 months (25%). One-third of children with clinical-level thought problems at intake scored in the clinical-range 36 months later, representing higher stability than many other problems, including delinquent behavior, depression, and posttraumatic stress. Rates of thought problems among children in the normative sample of non-referred children are just 4% (Achenbach, 1991), and other studies of children in foster care show rates of thought problems between 5 to 17% (Armsden et al., 2000; Heflinger et al., 2000). That children involved with child welfare services show increased rates of thought problems is concerning because this includes behaviors that are suggestive of psychosis, schizophrenia, and schizotypal personality disorder (Achenbach, 1991). Thought problems have also been predictive of anxious/depressed behavior and social problems, particularly among younger

males (Stanger, MacDonald, McConaughy, & Achenbach, 1996). In practice, child welfare workers may need to be vigilant of thought problems among the children they serve, and be abreast of resources in the community that may help children who suffer thought-related disorders.

Attention problems in the clinical-range were also found to be among the most prevalent and persistent of all the particular types of symptoms measured in this study, with 18% of children scoring in the clinical-range at some point over 36 months, and 8 to 12% scoring in the clinical-range at each of the three time points. Over one-third of children with clinical-level attention problems at intake remained with clinical-level problems 36 months later (35%), stability that is surpassed only by aggressive behavior problems (51%) and social problems (36%). Rates of attention problems in the CBCL normative group of children are 5%, and 43% among children in the clinically-referred sample (Achenbach, 1991). Rates of attention problems among studies of children in foster care range from 8-23% (Armsden et al., 2000; Clausen et al., 1998; Heflinger et al., 2000; Zima et al., 2000). Although the current rates are within the expected range for children involved with child welfare services, that many children continue to experience attention problems suggests that services may not sufficiently target these symptoms and children's learning and psychosocial functioning may be compromised as a result. Behaviors included in the attention problems syndrome of the CBCL are similar to the criteria for Attention Deficit Hyperactivity Disorder (ADHD), and scores have been found to relate to ADHD diagnoses (Edelbrock & Costello, 1988; Hudziak, Copeland, Stanger, & Wadsworth, 2004). In addition, attention and hyperactivity problems have been linked with conduct and delinquent behavior problems (Ferdinand et al., 2004; Shaw, Lacourse, & Nagin, 2005), depression and anxiety (Leech, Larkby, Day, & Day,

2006), and pediatric bipolar disorder (Faraone, Althoff, Hudziak, Monuteaux, & Biederman, 2005). Maltreated children may have difficulty concentrating because of preoccupation with their home situation, or from not having adequate sleep or nutrition, contributing to poor functioning in school. While this is conjecture, recognition of attention and hyperactivity problems among children involved with child welfare services may be important to recognizing their risk for a number of other mental and psychosocial problems.

The final unexpected finding in this study is that rates of sexual behavior problems are significantly different among White and Hispanic children (10% and 13%, respectively, over three years) compared with Black children (3% over three years). Just one group of studies was located that compared rates of sexualized behavior problems by children's race/ethnicity, each using the Child Sexual Behavior Inventory with slightly different samples of children, and no significant differences were found (Friedrich, Davies, Feher, & Wright, 2003; Friedrich, Fisher, Broughton, Houston, & Shafran, 1998; Friedrich et al., 1992). Overall, rates of sexualized behavior reported among abused children in other studies are highly variable. In one study, rates of sexualized behavior among sexually abused and physically abused children ranged from 10-62%, and just over 3% of nonabused children (Deblinger et al., 1989), while in a comprehensive review of symptoms among sexually abused children, the weighted average prevalence rate was 28-38% (Kendall-Tackett et al., 1993). Current findings suggest that sexualized behavior is predominantly a problem among White and Hispanic children involved with child welfare services, and that treatment and prevention services ought to target these groups. In turn, this is important because other child welfare-involved children, such as those living in foster care or group settings, may be most at risk for sexual victimization by children in these groups.

Conclusions

This study confirmed a number of details and raised new information about the mental health of children involved with child welfare that can be used to inform child welfare and mental health services planning. Like other studies, externalizing types of problems continue to be a primary concern among children involved with child welfare services, not only because these are the most prevalent and persistent types of problems, but also because these behaviors categorically include violating the rights of others, breaking the law and other societal conventions, and being involved in situations that are likely to be dangerous to oneself. Two of the other more prevalent problems among children in this study—attention and thought problems—have been linked with aggressive and delinquent behavior, suggesting that there may be a high co-occurrence of these problems among children involved with child welfare services. Rates of improvement in specific symptoms over time among children involved with child welfare are generally within the range reported in other studies, but in concert with the finding that 58% of children show at least one clinical-level symptom at both intake and three years later, suggests that more children than not continue to experience problems, and that services ought to strive for improvement in multiple symptom areas.

Child welfare and mental health workers may also need to attend to caregivers' perceptions of children's emotional-behavioral problems, which may relate to their parenting approaches, and boys' self-described internalizing symptoms. Because caregivers rated boys as having more problems than girls, whereas girls self-reported more problems than boys (at least in the areas of depression and posttraumatic stress), there are concerns that either caregivers perceive boys' behavior as more problematic than it actually is, or that boys are reticent to share feelings or symptoms of depression and posttraumatic stress, even in the

context of a confidential research interview. Workers may need to be more active in eliciting internalizing types in symptoms in boys, and attentive to how caregivers assess their children's behavior. A third possibility is that the measures used in the study do not adequately capture internalizing types of problems in boys compared with girls, although this is unlikely considering that these are well-validated measures.

Limitations

Limitations to this study are that many of the symptoms or problems discussed have been reported by children's caregivers, rather than children themselves. While this is the only option, apart from professional assessment, for very young children, several findings could have also been reported from children's perspectives; namely, externalizing types of problems, and the social, thought, attention, and sexual behavior problem syndromes of the CBCL. This may have compromised the accuracy of the prevalence rates. In addition, different caregivers may have been interviewed at follow-up, since some children would have experienced foster care or other out-of-home placement over the study period. While this is not expected to impact a large number of children (at 18 months, 75% of caregivers interviewed in this study were also interviewed at baseline), it does introduce the possibility of a rater confound—that changes in symptoms over time (using the CBCL) are due to having different raters rather than to changes in the children themselves. At the same time, results are strengthened by the use of data spanning three years, wherein caregivers would need to consistently report clinical-level problems to demonstrate their persistence or stability. Since this would include situations where the rater changed, references in the study that describe problems as “stable” or “persistent” are likely to be quite reliable. Also, most types of problems that were reported by caregivers (only) in this study are extrinsic in nature,

rather than intrinsic, wherein children's reports are likely to be the most valuable.

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CHAPTER 3

CHILD WELFARE RISK ASSESSMENT AS AN INDICATOR OF CHILD MENTAL HEALTH PROBLEMS

Child welfare workers tend to make decisions about mental health care for children based on child welfare-related variables, such as maltreatment type, referral source, and reports about parents' behavior, more than on information about children's actual clinical needs (Leslie et al., 2003; Martin, Peters, & Glisson, 1998). In a study of case manager recommendations concerning children entering state custody, investigators found that children's psychosocial functioning (as reported by parents and teachers) explained no variance in the level and types of mental health care recommended by the workers, while information that the child was a "substance abuser" or had problems with delinquency or unruly behavior was predictive of mental health service recommendations (Martin et al., 1998). A number of studies indicate that children are provided mental health services based on maltreatment type—abused children, particularly sexually abused children, are more likely to receive mental health care compared with neglected children (Garland, Landsverk, Hough, & Ellis-MacLeod, 1996; Kinard, 1995; Kolko, Seleyo, & Brown, 1999). Garland and colleagues (1996) found that sexual abuse more often leads to mental health services than other maltreatment among children in foster care, regardless of children's identified needs.

Standardized mental health screening has been proposed as one step toward alleviating the concern that maltreated children receive mental health services based on

factors other than their clinical need, a pattern that may leave some children overlooked (Burns et al., 2004; Leslie et al., 2000). The American Academy of Child and Adolescent Psychiatry (AACAP) and the Child Welfare League of America (CWLA) issued a joint policy statement that all children entering foster care be screened for mental health problems within 24 hours and be provided a comprehensive assessment within 60 days. The majority of states are in the process of developing strategies to improve the identification of child and family mental health needs (McCarthy, Marshall, Irvine, & Jay, 2004), and at least one state has implemented standardized mental health screening for all children receiving child welfare services (Minnesota Department of Health and Human Services, 2004). Screening is meant to reduce the possibility that factors such as maltreatment type and children's pathways into child welfare services play a primary role in which children are offered mental health services, in addition to providing an empirically-based method of identifying children's level of symptoms.

Yet, it is not clear that information about children's exposure to maltreatment and other risks cannot help inform mental health decisionmaking in child welfare services. That is, no study has tested whether information about the "whole picture" of children's risk for developing mental health problems is adequate to classify children who do exhibit psychological symptoms. It appears that workers may give greater weight to particular variables in children's lives when making service decisions (e.g. maltreatment type), when perhaps a cumulative model of risk may be more appropriate. Indeed, a number of problems to which children are typically exposed have been associated with mental health problems. The details of their maltreatment, in particular, the frequency, continuity, and age at onset, has been consistently linked with the development of mental health problems (English,

Graham, Litrownik, Everson, & Bangdiwala, 2005; Kendall-Tackett, Williams, & Finkelhor, 1993; Thornberry, Ireland, & Smith, 2001). The basis of posttraumatic stress disorder is exposure to trauma, which would include within-family events that threaten children's sense of safety, such as witnessing domestic violence between adults. Children whose caregiver has mental illness are at increased risk for developing mental health problems (Black et al., 2002). If one of the goals of mental health screening is to detect disorders before clinical signs appear (Streiner, 2003) and if child mental health services ought to move away from treatment-focused services to prevention-focused services (Bazelon Center, 2001; Black & Krishnakumar, 1998; Orland, 1999), then using information about children's maltreatment experiences and exposure to other family problems to make decisions about which children need services is a logical strategy.

Research in the area of child welfare and mental health services has not adequately shown that the identification of children in need is the primary reason for disparities in which children actually receive mental health services. Most studies have focused on service receipt, rather than worker identification or referrals, wherein a number of other factors may play a role. Regardless of workers' acknowledgement, for example, perhaps caregivers of sexually abused children are more likely to ensure that their children receive mental health care compared with caregivers of neglected children. The pattern that White children more often receive mental health services compared with African American children has been shown to dissipate in communities with greater integration between child welfare and mental health agencies (Hurlburt et al., 2004). Several studies on mental health service use and worker identification or referrals have also centered on children in foster care specifically (e.g. Garland et al., 1996; Martin et al., 1998), wherein resources expended to families are

likely to be much different compared with the larger group of child welfare-involved children, and children's problems more severe. The only study to directly compare worker ratings of child behavior problems at child welfare intake with an independent measure of child behavior problems, using the Child Behavior Checklist (CBCL; Achenbach, 1992), found no significant association between CBCL-indicated problems and workers' ratings of such problems (English & Graham, 2000), suggesting that identification is a primary concern. This study was based on a select sample of very young children (ages birth to four), however, calling into question its generalizability to other settings and children.

This study aims to address some of these limitations and to contribute to discussions about the need for universal mental health screening in child welfare services. The study tests the feasibility of using information about children's maltreatment experiences and other family problems in the form of a cumulative risk score to determine which children may need mental health services. If the full context of information that is available to child welfare workers can be used to predict children's need for mental health services, then standardized screening may be an unnecessary step, at least at the point of the investigation. The study tests the predictive value and validity of a cumulative risk score in relation to caregiver and child reports of psychological problems using standardized measures. The study further addresses the question of whether caregiver self-reports of certain risks, namely substance abuse, depression, and domestic violence experiences, aid the identification of children with mental health problems. The need for improved assessment or screening for each of these caregiver problems has been discussed in child welfare services (Burns et al., 2005; Gibbons, Barth, & Martin, under review; Kohl, Barth, Hazen, & Landsverk, 2005) and perhaps such

changes could serve the dual purpose of helping to identify children with mental health concerns.

The Link Between Child Welfare Investigative Information and Children's Mental Health

The function of a child welfare investigation is to determine whether a child has been maltreated or is likely to be maltreated, and if services are needed to ensure the child will not be harmed in the future (Schene, 1998; U.S. DHHS, 2003). Child welfare workers typically interview a number of individuals to find out about the nature of the specific incident, including details of the specific act, the individuals involved, severity of the maltreatment, and whether immediate action ought to be taken to protect the child. According to a review of child welfare services (CWS) practice (U.S. DHHS, 2003), the majority of agencies (63%) require an assessment of risk for additional maltreatment and also consider family's need for services in making decisions at the conclusion of the investigation (57%). Nearly three-quarters of agencies have guidelines for establishing risk or safety (74%) and 37-47% use a structured decisionmaking model, safety assessment instrument, or risk assessment instrument (U.S. DHHS, 2003). A very small number of agencies use standardized assessments of caregiver substance abuse, domestic violence, and parenting skills or supports (10-15%), but rather may rely on worker judgments of these characteristics based on the circumstances of the maltreatment or prior knowledge of these problems in the family. Most agencies (89%) include a review of prior CWS records as part of the investigation.

Risk assessment is meant to identify factors that increase the probability that a child will be maltreated in the future. Previous CWS records include a number of details that relate to maltreatment recurrence or that provide insight into the severity of maltreatment experienced by children, including the family's length and types of involvement with child

welfare services, the number of prior investigations and injuries, whether children in the family have ever been placed in foster care, and the types of maltreatment for which the family or a specific child has been reported before. Additional areas of inquiry during risk assessment include child, caregiver, and household characteristics related to maltreatment recurrence. Child characteristics may include age, presence of any physical or developmental disabilities, positive toxicology results at birth, and presence of mental health or behavioral problems (Shlonsky & Wagner, 2005). Caregiver characteristics may include own abuse as a child, unrealistic expectations about children's behavior, mental illness, cognitive or physical impairments, level of cooperation, and current or past substance abuse, domestic violence, and criminal justice involvement (English, Marshall, Coghlan, Brummel, & Orme, 2002). Household factors may include degree of poverty, caregiver age, employment status, and the number of adults or children in the household (English et al., 2002).

A number of these factors have been linked with the development of mental disorders. Maltreatment type, although criticized as a primary factor in mental health service decisionmaking, has been linked with different types and rates of psychosocial symptoms among children, adolescents, and adults. In the National Comorbidity Study, adults who reported child sexual abuse were more likely to experience the subsequent onset of 14 mood, anxiety, and substance use disorders, even when other childhood adversities were taken into account, including verbal and physical abuse, mother-father interpersonal violence, caregiver mental illness, substance abuse, and antisocial behavior (Molnar, Buka, & Kessler, 2001). In another study of young adult psychological diagnoses, while experiences of childhood neglect, physical abuse, and sexual abuse each predicted problems, individuals who experienced sexual abuse showed the most consistently elevated symptoms (Cohen, Brown,

& Smailes, 2001). The neglect subtype, *failure to supervise or lack of supervision*, was the only maltreatment type in another study not directly associated with children's psychological outcomes at age 8 (English et al., 2005). This study included details about every official maltreatment record up to age 8, finding that maltreatment type was the most consistent predictor of different types of psychosocial outcomes that included internalizing and externalizing behavior problems, anger, posttraumatic stress, depression, daily living skills, and socialization. The findings provide strong support for the argument that maltreatment type is predictive of mental health problems.

Other dimensions of maltreatment have been linked with the risk of developing mental disorders. A relatively new research direction involves teasing apart the relationships between maltreatment chronicity and frequency, developmental stages of onset, perpetrator-child relationships, multi-type maltreatment and children's outcomes. While there are no definitive answers as to how these dimensions interact, there are some notable patterns. Several studies have found that multi-type maltreatment is an important consideration. In a study using data from the National Survey of Adolescents, children who experienced both childhood physical and sexual abuse were likely to be more depressed and to have the highest rates of posttraumatic stress disorder compared to children who experienced physical abuse or sexual abuse alone (Danielson, de Arellano, Kilpatrick, Saunders, & Resnick, 2005). Sexual abuse and neglect, compared with either type of maltreatment alone or exposure to harsh parenting, was linked with higher levels of self-reported internalizing problems in another study of 9 to 13-year-old children (Bolger & Patterson, 2001). Greater maladaptation was found in a study among children who experienced both physical abuse and sexual abuse compared with children who were not maltreated or who experienced sexual abuse only

(Manly, Kim, Rogosch, & Cicchetti, 2001). This study also found that the combination of physical neglect and emotional maltreatment was linked with aggressive behavior and internalizing symptoms.

A recent series of studies using data from the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) focused on maltreatment dimensions and children's behavioral and emotional functioning. Again, multi-type maltreatment was a robust predictor of outcomes, but with indications that classifying the predominant type (e.g. active over passive forms of maltreatment) in cases of multi-type maltreatment was also useful in predicting child outcomes (Lau et al., 2005). Including the severity of each type of maltreatment was found to be important in another study, as was age of onset indicated by children's first maltreatment report and the interaction between severity and maltreatment type (English et al., 2005). Another LONGSCAN analysis found that the substantiation status of the case was not predictive of child psychological outcomes (Hussey et al., 2005). Finally, an examination of different definitions of maltreatment "chronicity" suggested that both the extent of maltreatment (greater number of developmental periods in which maltreatment is experienced) and continuity of maltreatment (fewer gaps in maltreatment reported over time) related to poorer social and psychological outcomes (English et al., 2005). A primary finding in this study, however, was also that chronicity, however defined, explained significant, yet small, differences in children's outcomes.

Other family problems that are often recorded by workers in case files during an investigation may also aid the identification of children at risk for developing mental health problems. Caregiver psychopathology, particularly depression, has been found to relate to child psychological problems in a number of studies (Dubowitz et al., 2001; Dubowitz,

Papas, Black, & Starr, 2002; Liaw & Brooks-Gunn, 1994; Nelson, Hammen, Brennan, & Ullman, 2003). Dubowitz and colleagues (2001; 2002) found a direct relationship between mother's depression and child behavior problems in two longitudinal studies of high-risk families, generally characterized as low-income, young maternal age, and the presence of medical and psychosocial risk factors. Liaw & Brooks-Gunn (1994) found that mother's depression, verbal ability, stress, and young maternal age (<18 years) predicted behavior problems among a sample of low-birthweight infants followed over three years, as did the cumulative effect of multiple risks—as the number of risk factors increased, mother's reported more child behavior problems. A study of adolescent behavior at 15 years based on six indicators of maternal depressive symptoms (e.g. severity, duration of symptoms) showed that mother's depression was directly related to all measures of children's symptomatology, including internalizing and externalizing behavior problems and functional impairment (Nelson et al., 2003). This study also found that at least part of these effects were related to high maternal criticism of their child. Other studies have found that maternal mental illness was not related to attachment patterns or social competence in very young children over 1 year, while the presence of multiple contextual risks, such as poor quality of the home environment and low affection between family members, provided the best indication of child outcomes, albeit children's social competence primarily (Seifer et al., 1996).

Poverty has also been tested in association with other family characteristics and child and adolescent emotional or behavioral problems, with the general finding that poverty alone is not likely to account for poor psychological outcomes. Liaw and Brooks-Gunn (1994) show that poverty was not directly related to child behavior problems over three years, nor related to such outcomes in combination with minority ethnicity and maternal verbal ability.

Part of the effects of poverty on child behavior problems is related to other characteristics in the home environment, particularly mother's depression, education, and presence of a caregiving partner (National Institute of Child Health and Human Development Early Child Care Research Network, 2005). Poverty may, then, be a weak but useful proxy for mental health problems when other direct measures are not available.

Two other family problems that may be noted in child welfare risk assessments—caregiver substance abuse and interpersonal violence—have also been associated with the development of mental health problems, but similar to poverty, may be more indirectly, rather than directly, related to children's mental health. In a study that examined the relationship between family violence and child behavior in the context of other family problems, such as reported child maltreatment and caregiver depression, caregiver domestic violence was significantly related to child outcomes at ages 4 and 6 using bivariate correlations, but the effects dissipated when using multivariate modeling (English, Marshall, & Stewart, 2003). The total number of child welfare referrals, caregiver depression, caregiver verbal aggression toward the child, and level of family health and competence were significantly related to child behavior problems at either or both 4 and 6 years, even after controlling for other variables. Dubowitz and colleagues (2001) also investigated the type and timing of mothers' victimization on mother and child outcomes, finding a cumulative effect of mothers' childhood and adult victimization, and experiences of physical and sexual victimization, on child internalizing and externalizing problems at age 6, but a moderate effect of victimization in either period on child outcomes.

Parental substance abuse may also be related to children's mental health primarily through the likelihood that there are also other substantial family problems. At least two

studies have found that the effect of parental alcoholism on children's behavior problems is mediated by parental conflict, parent-child conflict, and parental depression (El-Sheikh & Flanagan, 2001; Loukas, Fitzgerald, Zucker, & von Eye, 2001). Internalizing disorders among a sample of 7 to 18-year-olds were more strongly related to a family history of mood and anxiety disorders than to a family history of alcohol use disorders in another study (Preuss, Schuckit, Smith, Barnow, & Danko, 2002). Data from the Adverse Childhood Experiences study show that depression among adult children of alcoholics was largely attributable to the association between having an alcoholic parent and having experienced multiple other childhood adversities, rather than to having an alcoholic parent alone (Anda et al., 2002).

In sum, a host of information is available during a maltreatment investigation that may point to which children are at risk for having mental health problems. Capitalizing on this information may help child welfare workers make more accurate decisions about which children need mental health services. This study tests this possibility.

Methods

Data are from the National Survey of Child and Adolescent Well-being (NSCAW), a longitudinal study of 5,501 children, ages 0 to 14, investigated for maltreatment. To date, interviews have been conducted with children, their caregivers, and child welfare workers at baseline, 18, and 36 months following the initial investigation. This study uses weighted data from the baseline interviews and includes children ages 2 to 14 whose primary maltreatment type was physical abuse, sexual abuse, neglect-failure to provide, or neglect-failure to supervise (unweighted $n=3,022$). Analyses are conducted for the total sample, as well as for

children ages 2 to 6 (unweighted n=1194) and 7 to 14 (unweighted n=1828), in the interest of determining whether different factors contribute to symptom status according to child age.

Sample

Children were selected into the NSCAW sample using a two-stage stratified sample design. The first stage involved selecting 92 Primary Sampling Units (PSUs) in 36 states. The PSUs are typically county child welfare agencies. The second stage involved selecting children, ages 0 to 14, from lists or files of children who were investigated for abuse or neglect within the sample PSUs from October 1999 through December 2000. Eligible children at the end of this stage were stratified into 8 domains according to child age, service status (e.g. open for CWS, placed in foster care), and maltreatment type. A random sample of children was then chosen from each domain. The purpose of the stratification was to obtain enough infants, children reported for sexual abuse, and cases receiving ongoing child welfare services to sufficiently analyze. Sampling weights are used in all statistical analyses to adjust for the unequal selection of subjects into the study, initial nonresponse and nonresponse at follow-up, and undercoverage specific to unsubstantiated cases. The sampling weights allow for statistical inference to the national level of children investigated for maltreatment.

Measures

Measures are reported in the order of those used to capture child emotional and behavioral problems, characteristics of the initial maltreatment, child welfare-reported risks during the investigation, and caregiver-reported risks measured during the baseline interview.

Child Behavior Checklist (CBCL) and Youth Self-report (YSR). The CBCL and YSR are well-validated measures of child emotional/behavioral problems (Achenbach, 1991). The CBCL was administered to caregivers of children ages 2 and older (with different forms for 2

to 3- and 4 to 14-year-olds) and the YSR was administered to children ages 11 and older. Items on the CBCL and YSR are measured on a 3-point scale, with a value of “0” indicating behavior that never occurs, “1” to indicating behavior that sometimes occurs, and “2” indicating behavior that occurs often. Clinical-level problems on the total scale and the internalizing and externalizing broad-band scales are indicated by T-scores above 63. Borderline-level problems are indicated by a T-score of 60-63, and normal-level scores are those below 60. In the current study, borderline and clinical-level categories were combined. The CBCL shows moderate reliability ($\alpha = .50-.70$) and the YSR shows moderate to high reliability ($\alpha > .70$) among the NSCAW children.

Trauma Symptom Checklist for Children (TSCC). The posttraumatic stress (PTS) scale of the TSCC was administered to children ages 8 years and older. The TSCC evaluates psychological symptomatology in children who have experienced traumatic events (Briere, 1996). T-scores at or above 65 are considered clinical-level, scores between 60 and 65 are borderline-level, and scores below 60 are normal-level. In this study, borderline and clinical-level categories were combined. The PTS scale has high internal consistency ($\alpha = .85$ to $.87$ across standard and maltreatment samples), and the full TSCC shows construct validity in at least seven studies with regard to traumatic impact (Briere, 1996).

Children's Depression Inventory (CDI). The CDI (Kovacs, 1992) is a child-reported measure of depressive symptoms for children ages 7 and older. Children are considered depressed (“clinical”) if they fall at or above the 91st percentile for their age and gender group. In the NSCAW sample, internal consistency of the CDI is high, averaging $.81$ for 7- to 12-year-olds and $.87$ for 13-to 15-year-olds (U.S. DHHS, 2005).

These three clinical measures, the CBCL/YSR, TSCC, and CDI, were combined to create one dichotomous indicator of children's status at intake (presence or absence of symptoms).

Maltreatment characteristics. Child welfare workers described the index maltreatment report using a modification of the Maltreatment Classification System (MCS: Barnett, Manly, & Cicchetti, 1993). Workers indicated the number of maltreatment types reported, and the type they thought the most serious. Follow-up questions were asked with regard to the most serious types of physical abuse, sexual abuse, physical neglect, and supervisory neglect. Details included: duration, frequency, perpetrator, and severity. Severity was rated on scales with descriptive anchors (Barnett et al., 1993). The severity scales were modified for the NSCAW analyses into 5-point scales ranging from least (value of 1) to most (value of 5) severe, and further modified in this study to 4-point scales, with the two most severe categories combined.

Duration was measured in days and the distribution divided into quartiles to indicate duration of 1 day, 2 to 90 days, 91 to 364 days, and 365 days and longer. Additional variables that were created using the MCS were: multi-type maltreatment, active (versus passive) maltreatment, any sexual abuse, any emotional abuse, and biological perpetrator (all yes/no).

Risk assessment. A project-developed risk assessment was used to measure the presence of 21 family risks. Child welfare workers indicated whether each risk was present during the investigation. Risks included in this study were: prior reports, investigations, and substantiations, prior CWS history, primary caregiver substance abuse, history of abuse and neglect as a child, use of excessive discipline, primary caregiver mental illness, cognitive impairment, physical impairment, high family stress, unrealistic child expectations, recent

arrests, active or history of domestic violence, trouble paying for basic necessities, low social support, low cooperation, poor parenting skills, child special needs or behavior problems, and poor ability to self-protect.

Caregiver-reported depression and substance dependence. The Composite International Diagnostic Interview Short-Form (CIDI-SF) was used to measure caregiver-reported major depression and substance dependence in the 12 months prior to intake. The CIDI-SF is a set of screening scales developed from the full-length CIDI, a structured diagnostic measure of adult psychiatric disorders designed to correspond with the Diagnostic and Statistical Manual of Mental Disorders, 3rd and 4th editions (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). Classification accuracy of the CIDI-SF with the CIDI on these scales ranges from 93-98% (Kessler et al., 1998). Two dichotomous variables were created to indicate caregiver mental illness and substance abuse, as per both worker and caregiver reports.

Caregiver-reported interpersonal violence. Caregivers reported their interpersonal violence experiences with an intimate partner using the Conflict Tactics Scale (CTS; Strauss, 1990). The CTS was administered in the NSCAW study using computer-assisted audio techniques. The two physical violence subscales indicating minor or less severe violence and severe violence were combined to create a dichotomous measure of *any domestic violence*.

Demographic characteristics. The analyses also included caregiver age at the time that the study child was born and level of education, along with child age, gender, and race/ethnicity.

Data analysis

Data analysis proceeded in three steps. Risk assessment and investigative variables were first grouped by substantive content: child and caregiver characteristics, family characteristics, characteristics of the current maltreatment, and maltreatment history. Bivariate analyses (chi-square statistics) were used to test the relationship between the presence of each risk or characteristic and children's symptom status (any versus no symptoms).

Next, items were summed to create 5 domain scores and 2 total scores. Risk presence was given a value of 1 and risk absence was given a value of 0. The two variables with multiple categories—maltreatment severity and duration—were tested in relation to symptom status using various configurations, from 4-category to 2-category variables. Each was retained with 4 categories based on the analysis that showed significant distinctions in symptom status using 4 levels. The variable, “active maltreatment” (including physical or sexual abuse) was used in the scores rather than the variable “any sexual abuse” because of its significant relation to symptom status. For the child and caregiver characteristics domain and the total score, two separate scores were created to reflect child welfare worker reports (only) and both worker and caregiver reports concerning caregiver substance abuse, mental illness, and domestic violence. The range of possible scores by substantive domain was as follows: child and caregiver characteristics (0 to 14), family characteristics (0 to 4), characteristics of the current maltreatment (0 to 12), and maltreatment history (0 to 4). The total score ranged from 0 to 34. Bivariate t-tests were used to test the relationship between mean scores on these domains and children's symptom status.

After the scores were tested in bivariate analyses, logistic regression was used to model children's symptom status conditioned on the domain and total scores. Child age,

race/ethnicity, and gender were used in the models as control variables. Four models were tested per age group and for the total sample. The first two models (A and B) included the four domain scores as independent variables, excluding the total score because of the correlation between the total and domain scores. The second two models (C and D) included the total scores as independent variables, excluding the domain scores. Models A and C included worker reports (only) of child and caregiver characteristics, and Models B and D included both worker and caregiver reports.

Finally, children's most probable symptom status generated by the logistic regression modeling was compared to children's observed symptom status as measured by the clinical criterion (any versus no symptoms as per the CBCL, CDI, and PTS). Validity was assessed by calculating the percent agreement between the model classification and actual (clinical) classification, sensitivity, and specificity. Each was calculated using a variety of thresholds of predicted probabilities based on the results of the logistic regression analyses. A threshold of .50 was tested first—that is, children with a predicted probability of “caseness” (having symptoms) of .50 or greater were classified as having symptoms based on the model. This threshold was then adjusted in .05 increments and the validity estimates were re-calculated. These analyses used unweighted data and were completed for the models using the total score only.

Percent agreement was calculated as the ratio of the number of correct classifications to the number in the total sample for each analysis. Sensitivity and specificity were calculated as: *Sensitivity* = true positive/(true positive+false negative); *Specificity* = true negative/(true negative+false positive). Sensitivity measures a tool's ability to accurately identify children with the characteristic of interest, while specificity measures a tool's ability

to accurately identify children without the characteristic (Bergman, 2004). True positives are cases accurately identified by the tool as having the characteristic or problem, while false positives are mis-identifications that the problem exists. True negatives are cases accurately identified as not having the characteristic or problem, while false negatives are missed positives. Standards of 70 to 80% sensitivity and specificity have been proposed for acceptable psychological measures (American Academy of Pediatrics, 2001; Glascoe, 2000).

Results

Table 3.1 presents the results of bivariate analyses of the relationship between individual risk assessment or investigative items and children's symptom status. Figures represent the proportion of children with borderline or clinical-level symptoms according to whether each characteristic was present or absent during the investigation. Among 2 to 6-year-olds, for example, 67.7% of children whose child welfare worker indicated they had special needs or behavior problems exhibited borderline or clinical-level symptoms using the clinical measures (the CBCL in this instance). In contrast, 42.5% of children whose worker reported that the child did not have special needs or behavior problems exhibited borderline or clinical-level symptoms using the clinical measure ($p<.001$). The total proportion of children who scored in the borderline or clinical-range on at least one psychological measure was 57%. The figure was 46% among 2 to 6-year-olds and 64% among 7 to 14-year-olds.

Several variables were significantly related to symptom status for children ages 2 to 6, children ages 7-14, and the total sample of children. These included: workers' indication that the child has special needs or behavior problems ($p<.001$ for each group), caregiver mental illness as reported by workers and caregivers ($p<.01$ for 2 to 6- and 7 to 14-year-olds; $p<.001$ for the total sample), having prior maltreatment reports ($p<.05$, $p<.01$, and $p<.001$,

respectively), prior investigations ($p < .01$, $p < .05$, and $p < .001$, respectively), and prior child welfare services ($p < .01$, $p < .05$, and $p < .001$, respectively). Children with these risks were significantly more likely to score in the borderline or clinical-level range on at least one psychological measure.

Table 3.1. Proportion of children with risks present at intake and results of bivariate analysis of symptom status by risk presence or absence

Individual items	% of children with symptoms (SE) according to risks present at intake						Total (n=3022)
	Ages 2 to 6 (n=1194)		Ages 7 to 14 (n=1828)		Total sample (n=3022)		
	Risk present	Not present	Risk present	Not present	Risk present	Not present	
Child characteristics							
Special needs/behavior problems	67.7 (4.9)***	42.5 (2.7)	84.1 (3.0)***	56.2 (3.0)	80.7 (2.6)***	50.0 (2.0)	22.2 (1.7)
Poor ability to self-protect	45.0 (2.5)	50.5 (8.0)	61.5 (5.3)	66.0 (2.9)	51.0 (2.3)***	64.0 (2.5)	54.2 (2.2)
Caregiver characteristics							
Birth (study child) at <19 years	48.2 (8.6)	47.1 (3.1)	60.4 (7.7)	66.0 (2.9)	55.4 (6.0)	58.2 (2.1)	14.1 (1.4)
<High school education	50.5 (5.5)	44.4 (2.9)	69.4 (3.3)*	62.2 (3.0)	62.2 (2.8)*	55.0 (2.2)	28.5 (2.3)
Abuse/neglect as a child	54.5 (6.1)	41.4 (3.0)	70.5 (5.8)	63.2 (2.7)	64.3 (4.0)*	54.5 (2.0)	20.8 (1.7)
Substance abuse-worker report	54.0 (7.1)	43.6 (2.9)	64.5 (5.7)	64.8 (2.8)	59.9 (4.7)	56.5 (1.9)	12.2 (1.3)
Substance abuse-worker or caregiver report	55.4 (6.3)	43.5 (2.9)	65.5 (5.0)	64.1 (2.9)	61.0 (4.1)	56.1 (2.1)	14.2 (1.3)
Excessive discipline	37.2 (8.3)	45.9 (2.8)	75.9 (4.9)	63.4 (3.2)	66.6 (5.2)	56.2 (2.1)	8.2 (0.8)
Mental illness-worker report	51.5 (7.0)	43.6 (3.0)	70.7 (3.8)	63.1 (3.1)	63.0 (3.8)	55.4 (2.2)	14.0 (1.4)
Mental illness-worker or caregiver report	57.6 (4.3)**	40.2 (3.3)	74.4 (3.4)**	60.2 (3.3)	67.5 (2.7)***	52.4 (2.2)	30.1 (1.7)
Cognitive impairment	53.2 (9.3)	44.8 (2.7)	80.0 (6.0)*	62.9 (2.9)	70.3 (5.8)*	55.6 (1.9)	6.3 (0.8)
Unrealistic child expectations	50.9 (5.6)	44.0 (3.0)	74.3 (3.2)*	62.3 (3.4)	66.3 (3.0)**	54.8 (2.3)	17.3 (1.5)
Recent arrests	37.9 (6.8)	45.3 (3.3)	59.6 (7.4)	65.7 (2.6)	50.0 (4.8)	57.7 (2.2)	11.7 (1.2)
Domestic violence-worker report	46.5 (3.6)	44.9 (3.5)	72.5 (3.6)*	61.3 (3.1)	61.9 (2.9)	54.7 (2.3)	29.3 (2.1)
Domestic violence-worker or caregiver report	51.0 (3.9)	41.2 (3.1)	70.5 (3.5)*	60.7 (3.5)	62.0 (2.6)*	53.4 (2.4)	40.1 (2.0)
Poor parenting skills	55.9 (3.6)**	40.7 (3.5)	69.8 (3.8)	61.4 (3.3)	65.0 (2.9)***	52.7 (2.3)	32.4 (1.9)
Physical impairment	47.3 (14.9)	45.2 (2.7)	70.5 (10.2)	63.9 (2.6)	65.4 (8.7)	56.3 (1.8)	6.0 (0.8)
Family characteristics							
High stress	48.2 (3.4)	43.3 (3.8)	67.1 (3.6)	62.2 (3.8)	59.6 (2.4)	54.8 (2.6)	51.5 (2.0)
Trouble paying basic necessities	51.5 (5.3)	43.5 (3.1)	68.5 (4.5)	62.6 (3.0)	61.2 (3.6)	55.1 (2.1)	23.7 (1.8)
Low social support	54.5 (4.3)*	42.0 (3.2)	70.0 (3.9)	61.2 (3.1)	64.3 (3.2)**	53.3 (2.2)	30.3 (1.9)
Low cooperation	44.3 (7.8)	45.5 (2.8)	66.9 (6.4)	63.6 (3.0)	61.1 (5.2)	56.2 (2.1)	9.1 (0.9)
Maltreatment characteristics							
Severity: 1 (least severe)	46.5 (4.1)		60.6 (3.0)		55.1 (2.5)		50.3 (1.8)

2	46.7 (6.1)		76.6 (4.2)**		64.4 (3.5)*		28.0 (1.6)
3	48.1 (9.4)		58.1 (6.8)		54.5 (5.2)		9.9 (0.7)
4 (most severe)	47.3 (8.2)		67.9 (7.5)		59.2 (6.5)		11.8 (1.3)
Multi-type maltreatment	48.3 (4.8)	45.1 (2.9)	64.1 (5.6)	64.4 (2.7)	57.8 (3.9)	56.7 (2.0)	25.3 (1.9)
Active maltreatment	45.1 (3.4)	46.5 (3.4)	69.6 (3.1)*	58.0 (4.3)	61.0 (2.5)*	52.9 (2.7)	50.9 (2.1)
Any emotional abuse	35.3 (7.8)	46.3 (2.5)	67.9 (7.6)	64.1 (2.7)	57.8 (5.0)	57.0 (1.9)	4.9 (0.9)
Biological perpetrator	45.5 (3.0)	46.6 (4.4)	61.8 (3.1)*	73.9 (3.6)	55.3 (2.3)*	63.4 (3.2)	72.9 (2.0)
Duration (in days)							
1 (1 day)	42.9 (5.2)		62.1 (4.7)		53.9 (3.8)		36.8 (2.8)
2 (2 to 90 days)	50.0 (5.7)		66.4 (4.5)		59.8 (3.4)		25.4 (1.9)
3 (91 to 364 days)	46.8 (9.2)		65.4 (7.5)		58.3 (6.4)		15.6 (1.9)
4 (365 days or longer)	45.2 (6.9)		63.4 (6.4)		58.5 (4.9)		22.2 (2.0)
Maltreatment history							
Prior reports	52.3 (3.9)*	40.5 (3.4)	69.6 (3.3)**	58.9 (3.0)	63.3 (2.3)***	50.8 (2.2)	52.7 (1.7)
Prior investigations	53.9 (4.0)**	39.9 (3.3)	69.4 (3.4)*	60.0 (3.0)	63.8 (2.4)***	51.2 (2.2)	49.4 (1.6)
Prior substantiations	48.9 (4.8)	45.0 (3.0)	67.3 (4.7)	64.5 (2.5)	61.7 (3.5)	55.9 (1.9)	26.6 (1.6)
Prior child welfare services	56.7 (4.2)**	39.5 (2.9)	72.9 (3.6)*	61.9 (2.9)	66.9 (2.6)***	52.5 (2.0)	31.4 (2.3)
Total % of children with symptoms	45.9 (2.5)		64.3 (2.7)			57.0 (1.9)	

Note. Total n varies by available data. Includes CBCL total, internalizing, and externalizing symptoms for children ages 2 to 14, in addition to depression and posttraumatic stress for children ages 7 to 14 and 8 to 14, respectively.

* $p < .05$. ** $p < .01$. *** $p < .001$. Chi-square tests of association.

Some developmentally-specific relationships emerged. Variables that were significantly related to symptomatology among 2 to 6-year-olds (but not 7 to 14-year-olds) included poor parenting skills ($p < .01$) and low social support ($p < .05$). Children whose child welfare worker reported these risks were more likely to have symptoms (56% and 55%, respectively) compared with children whose worker did not report these risks (41% and 42%, respectively). Poor parenting skills and low social support were significantly related to symptom status among children in the total sample ($p < .001$ and $p < .01$, respectively).

Among 7 to 14-year-olds (but not 2 to 6-year-olds) and the total sample, other variables that were significantly related to an increased likelihood of having symptoms included: having a caregiver with less than a high school education ($p < .05$ for both groups), cognitive impairment ($p < .05$ for both), unrealistic child expectations ($p < .05$ and $p < .01$, respectively), past or current domestic violence ($p < .05$ for both), moderately severe maltreatment ($p < .01$ and $p < .05$, respectively), active maltreatment ($p < .05$ for both), and current maltreatment involving a non-biological perpetrator ($p < .05$ for both). Two additional variables were significantly related to symptom status for the total sample only: worker reports that the child has a poor ability to self-protect ($p < .001$) and abuse or neglect as a child ($p < .05$).

Table 3.2 presents the mean scores of the summed items by domain for children in the two age groups and for the total sample. The mean score for the total sample on the child and caregiver characteristics domain was 3.50, and 3.85 when including both worker and caregiver reports. This means that families had an average of 3 to 4 child and caregiver risks of 14 total risks. Mean scores for the total sample on the remaining domains were as follows: 2.14 (family characteristics, of 4 total), 4.66 (current maltreatment, of 12 total), and 2.53

(maltreatment history, of 4 total). Mean total scores were 12.62 using worker reports only, and 13.06 using both worker and caregiver reports (of 34 total).

Table 3.2 also presents the results of bivariate t-tests of the relationship between mean scores and children's symptom status. Among 2 to 6-year-olds, children with borderline or clinical-level symptoms had significantly higher mean scores in the child and caregiver characteristics domain (worker and caregiver report; $p < .05$), maltreatment history domain ($p < .01$), and total score (worker and caregiver report; $p < .05$) compared with children who did not exhibit symptoms. Children ages 2 to 6 who exhibited symptoms showed a mean total score that was about 1 point higher (13.56) than children who did not exhibit symptoms (12.26). Mean child and caregiver characteristics scores were 4.40 among children with symptoms and 3.81 among children without symptoms. Mean maltreatment history scores were 2.61 among children with symptoms, and 2.17 among children without symptoms.

Among 7 to 14-year-olds and the total sample, symptom status differed significantly by scores in the child and caregiver characteristics domain ($p < .001$ and $p < .01$, respectively), maltreatment history domain ($p < .05$ and $p < .001$, respectively), and total score ($p < .05$ and $p < .01$, respectively). Mean scores were significantly higher among symptomatic children in these groups compared with asymptomatic children regardless of whether the scores included only child welfare worker reports of caregiver risks or both worker and caregiver reports. Mean total scores among symptomatic 7 to 14-year-olds, for example, were 13.42 using worker reports only and 13.88 using both worker and caregiver reports, and close to 2 points lower among asymptomatic children (11.66 and 12.08, respectively). Mean scores in the family characteristics domain, including such items as high family stress and low social

support, were also significantly higher among symptomatic children in the total sample (2.22) than asymptomatic children in the total sample (2.04), at the level of $p < .05$.

Table 3.2. Mean scores on the domains and results of bivariate analysis of symptom status by domain

Domain	Mean score by symptom status (SE)						Mean scores for total sample (n=1013-2802)
	Ages 2 to 6 (n=432-1109)		Ages 7 to 14 (n=578-1690)		Total (n=1010-2799)^		
	<u>Symptoms</u>		<u>Symptoms</u>		<u>Symptoms</u>		
	No	Yes	No	Yes	No	Yes	
Child and caregiver characteristics	3.50	3.86	2.91	3.63**	3.22	3.71**	3.50
Worker report only	(0.2)	(0.2)	(0.1)	* (0.2)	(0.1)	(0.1)	(0.1)
With caregiver report	3.81	4.40*	3.21	3.96**	3.52	4.10**	3.85
	(0.2)	(0.2)	(0.2)	* (0.2)	(0.2)	(0.1)	(0.1)
Family characteristics	2.01	2.21	2.07	2.22	2.04	2.22*	2.14
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.0)
Current maltreatment	4.39	4.51	4.74	4.82	4.57	4.73	4.66
	(0.2)	(0.2)	(0.3)	(0.2)	(0.2)	(0.1)	(0.1)
Maltreatment history	2.17	2.61**	2.44	2.75*	2.30	2.70**	2.53
	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	* (0.1)	(0.1)
Total score	11.91	13.01	11.66	13.42*	11.78	13.29*	12.62
Worker report only	(0.5)	(0.4)	(0.6)	45 5)	(0.4)	* (0.4)	(0.3)
Total score	12.26	13.56*	12.08	13.88*	12.17	13.78*	13.06
With caregiver report	(0.5)	(0.4)	(0.7)	(0.5)	(0.4)	* (0.4)	(0.3)

Note. Total n includes cases with complete data only and varies by score. The lowest sample sizes are for the total scores. Bivariate tests showed no significant differences ($p < .05$) in symptom status between cases with observed and unobserved (missing) data for all of the scores, for both age groups and the total sample.

* $p < .05$. ** $p < .01$. *** $p < .001$. Independent t-tests.

Table 3.3 presents the results of logistic regression analyses predicting children's symptom status by age group and for the total sample (12 models total). Models A and B include the four domain scores only (excluding the total score) and Models C and D include the total scores (excluding domain scores). Results show that among 2 to 6-year-olds, the only variable significantly related to symptom status ($p < .05$) was children's total score: the odds of children scoring in the borderline or clinical-range increased by .07 to .09 in association with each one point increase in the total score. Among children ages 7 to 14 and the total sample, significant variables included child age ($p < .001$ for both), mean score in the child and caregiver characteristics domain (regardless of reporter; $p < .05$ and $p < .001$, respectively), and mean total score (regardless of reporter; $p < .01$ and $p < .001$, respectively). For each year increase in child age, the odds of having symptoms increased by .26 to .28 among 7 to 14-year-olds and by .15 to .17 among children in the total sample. A one-point increase in the child and caregiver characteristics domain was associated with a .25 (worker reports only) to .26 (worker and caregiver reports) increase in the likelihood of having symptoms among 7 to 14-year-olds and a .20 (worker reports only) to .24 (worker and caregiver reports) increase in the likelihood of having symptoms among children in the total sample. Results concerning the total score among older children and the total sample were very similar to the results for the younger children—for each one-point increase in the total mean score, the likelihood of having borderline or clinical-level symptoms increased by .07 to .08.

Table 3.3. Results of logistic regression analysis predicting symptom status by domain scores and child demographic characteristics

Independent variable (reference group)	Ages 2 to 6				Ages 7 to 14				Total sample			
	Model (n)				Model (n)				Model (n)			
	A (432)	B (437)	C (432)	D (437)	A (578)	B (600)	C (578)	D (600)	A (1010)	B (1037)	C (1010)	D (1037)
Child demographics												
Age (continuous)	1.09	1.10	1.09	1.09	1.28 ^c	1.26 ^c	1.27 ^c	1.26 ^c	1.17 ^c	1.17 ^c	1.15 ^c	1.15 ^c
Race/ethnicity (<i>White</i>)												
Black	.84	.80	.86	.83	.68	.63	.69	.69	.74	.70	.76	.75
Hispanic	1.45	1.45	1.57	1.58	.91	.93	.85	.85	1.08	1.10	1.06	1.06
Other	2.06	2.22	2.05	2.15	.99	.95	.83	.83	1.22	1.25	1.12	1.14
Gender (<i>Female</i>)												
Male	1.33	1.34	1.22	1.19	.79	.77	.78	.79	.99	.98	.94	.94
Domain scores (continuous)												
Child and caregiver characteristics	1.10				1.25 ^a				1.20 ^b			
With caregiver report		1.19				1.26 ^a				1.24 ^c		
Family characteristics	1.11	1.05			1.08	1.08			1.07	1.05		
Current maltreatment	.97	.96			.93	.92			.95	.94		
Maltreatment history	1.17	1.15			1.00	.99			1.05	1.04		
Total score: worker reports only			1.07 ^a				1.07 ^b				1.07 ^c	
Total score: with caregiver report				1.09 ^a				1.07 ^b				1.08 ^c

^ap<.05.

^bp<.01.

^cp<.001.

Table 3.4 presents the results of the final set of analyses which used the results of the logistic regression modeling to estimate the validity of using children's total score to discriminate those with and without borderline or clinical-level symptoms. Results from Model C, which used worker reports only, were used since there was little difference in the preceding parameter estimates using both worker and caregiver reports. The predicted probabilities generated in the regression modeling were used to assign values indicating "casesness". Different thresholds for distinguishing casesness were tested, starting with a threshold of .50. That is, children with a predicted probability of .50 or greater were assigned a value of 1 (symptomatic) and children with a predicted probability of <.50 were assigned a value of 0 (asymptomatic). These values were then compared with children's observed symptom status as per the clinical measures. Table 4 presents the results using the most adequate threshold for each group of children. Adequacy was considered to maximize sensitivity with moderate specificity.

Table 3.4. Sensitivity of total score classifications using worker reports only (Model C) in relation to observed symptom status as per the clinical measures criterion: Percent agreement, sensitivity, and specificity^a

Total score classification (Model C)	Clinical measures classification (unweighted n)			Percent agreement	Sensitivity	Specificity
<u>Ages 2 to 6</u>	Subclinical	Clinical	Total			
Subclinical	75	53	128	54%	.75	.34
Clinical	146	158	304			
Total	221	211	432			
<u>Ages 7 to 14</u>	Subclinical	Clinical	Total			
Subclinical	64	82	146	65%	.79	.35
Clinical	120	312	432			
Total	184	394	578			
<u>Total sample</u>	Subclinical	Clinical	Total			
Subclinical	210	166	376	64%	.73	.52
Clinical	195	439	634			
Total	405	605	1010			

^aBased on the predicted probability of having clinical-level symptoms as generated by the model. The threshold for "casesness" using the predicted probabilities varies by age group. Figures represent a threshold of $\geq .40$ among 2 to 6-year-olds, a threshold of $\geq .55$ among 7 to 14-year-olds, and a threshold of $\geq .50$ among the total sample.

Among 2 to 6-year-olds, the .50 threshold resulted in sensitivity of .45 and specificity of .70. Thresholds from .38 to .45 were also tested. Lowering the threshold to .40 (a total score of 9 or higher) resulted in 75% sensitivity and 34% specificity (figures presented in Table 4). Percent agreement between the predicted and observed classifications using the .40 threshold was 54%.

Among children ages 7 to 14, the .50 threshold (total scores of 5 and higher) resulted in 68% agreement, .88 sensitivity, and .26 specificity. Thresholds from .48 to .60 were also tested. Increasing the threshold to .55 (scores of 8 and higher) resulted in 79% sensitivity and 35% specificity, with 65% agreement between the predicted and observed classifications.

Among children in the total sample, the .50 threshold (total scores of 10 and higher) resulted in 64% agreement, .73 sensitivity, and .52 specificity. Again, other thresholds were tested, but the .50 level produced the most balanced results between sensitivity and specificity.

A final analysis was conducted to determine whether these validity estimates represent an improvement over any worker-reported indication that a child has mental health problems. Two individual items from the worker baseline interview were used: the risk assessment item inquiring about whether the child had “major special needs or behavioral problems” at the time of the investigation, and an item inquiring about whether any child mental health services have been “provided, arranged, or referred” by the agency since the investigation. These items were combined to create a measure of “any worker indication of mental health problems” (1=yes; 0=no) and compared to results using the clinical measures (1=symptoms; 0=no symptoms). Results among children in the total sample showed agreement of 61% between this combined indicator and children’s clinical status, .48

sensitivity, and .78 specificity, estimates that are less desirable than the estimates using the total risk score derived in this study, particularly with regard to sensitivity. Using the combined indicators would result in misclassification of over one-half of children (52%) with symptoms into the category of having no symptoms. In comparison, using the total score at the “most adequate” threshold reduces these types of misclassifications by nearly one-half, to 27%. The 78% specificity level using the combined indicator indicates that 22% of asymptomatic children would be classified as symptomatic. While this number increases to 48% when using the total score, misclassifications of this type are less problematic because they over-identify children.

Discussion

Child welfare risk assessments and other pieces of investigative information can yield scores that are sensitive to the presence of mental health problems among children referred to child welfare services. Children with borderline or clinical-level symptoms on standardized measures show higher mean scores on a derived inventory of child, family, and maltreatment characteristics compared with children who do not have borderline or clinical-level symptoms. This was observed among both older (ages 7 to 14) and younger (ages 2 to 6) children, as well as for the total group of over 1,000 children for which the hypothesis was tested. An increase of one unit (one additional “risk”) on a score including just 14 child and caregiver characteristics increases the probability that a child will have clinical symptoms by 20 to 25%. Among the youngest children, including information in the score about the details of the current maltreatment and their maltreatment history appears necessary to identifying those with symptoms, while more limited information may suffice for older children and the total group. When all of the investigative information is included, 80% of 7 to 14-year-olds

with symptoms and 75% of 2 to 6-year-olds with symptoms can be identified using information routinely collected by child welfare workers.

The information that was used to create the “risk score” in this study—information that is often available following a maltreatment investigation—proved more apt to correctly classify children into groups of those who are, and are not, exhibiting mental health symptoms than reports from child welfare workers about which children have mental health problems or are in need of services. Workers’ indication that a child has “major behavior problems” or had mental health services arranged, referred, or provided since the investigation resulted in 61% agreement with clinical indications of need, but the majority of this agreement was in the direction of correctly classifying children who *do not* have symptoms. In comparison, using investigative information in the form of the cumulative risk score resulted in 64% agreement with clinical indicators, but in the direction of correctly classifying children *with* symptoms. Given that the concern in child welfare services is with under-, rather than over-, identification of children’s needs, this is an important distinction.

The recommended standards for the validity of psychological measures are 70 to 80% sensitivity to identify individuals with symptoms or disorders, and 70 to 80% specificity to identify individuals who do not have symptoms or disorders (American Academy of Pediatrics, 2001; Glascoe, 2000). The risk score derived in this study meets sensitivity, but not specificity standards. Practically, this means that more children will be identified as having symptoms than actually do have such symptoms as per clinical measures. This rate of “over-referral” could reach 65% (among 7 to 14-year-olds; 48% among the total sample). The benefit of the risk score classification, however, is that roughly 75% of symptomatic children will be so identified without the addition of using a standardized psychological

measure. Adjusting the criteria for “caseness” (having symptoms) could increase this proportion to over 80%. Given that the risk composite in this study is not a psychological measure and includes just one item related to child mental health, these are intriguing results. In comparison, using worker indications of child mental health problems alone correctly classifies just 48% of symptomatic children, no more than would be expected by chance.

The study did not find that adding caregiver’s own reports of certain problems, such as substance abuse and domestic violence, influences the classification accuracy of the risk score to a great extent. That is, risk scores are roughly equally predictive of children’s symptom status regardless of whether or not caregivers contributed information. This is not to say that the caregiver-reported information has no effect on distinguishing which children have mental health problems, since there were additional instances of children exposed to these risks when including caregiver reports, but when using a composite score, caregiver reports may be minimally influential. If caregiver reports were to be used in a score to predict which children have mental health symptoms, a measure of caregiver depression would likely be the most useful. Results show that including children’s age in some fashion in the risk score would be a valuable addition, especially among older children. For each year increase in age among children older than 6, the likelihood of having symptoms increases by about 25%, regardless of risk. Using children’s age alone, however, to distribute mental health services is not recommended, since this would likely contribute to the pattern that younger children are underserved when it comes to their mental health.

Conclusions

Implementing universal mental health screening in child welfare services is a substantial commitment that will require careful consideration. Agencies and communities

can now better weigh the option of using standardized mental health screening to identify children in need of mental health services with the option of using information that is already routinely available following a maltreatment investigation to identify children in need. A positive risk assessment score above an identified threshold could signal to workers that a child ought to be offered follow-up screening or assessment, wherein a standardized measure could be used. This would reduce considerably the number of children who would be given a standardized psychological measure, as has been proposed among large groups of child welfare-involved children, while still providing the benefit of identifying children in need. The number of children investigated for maltreatment during a given year is over 2 million, of which roughly 70% (over 826,000 children) receive some type of on-going child welfare service (U.S. DHHS, 2005). Any increase in the efficiency of identifying those with need for mental health services has a substantial potential for benefit and cost-avoidance.

To illustrate, one study found that the yearly cost of screening all middle-school children in a New York community for three disorders (anxiety, depression, and substance use) was \$146 per student, including direct and indirect costs (Chatterji, Caffray, Crowe, Freeman, & Jensen, 2004). Estimates of the costs of implementing a well-validated and recommended psychosocial screening tool, the Pediatric Symptom Checklist (Jellinek & Murphy, 1998), are between \$11.43-15.98 per screen, including provider rates and materials (e.g. Bergman, 2004; Dobrez et al., 2001). Even a 2-item screening instrument that involves asking parents whether they have any concerns about their child's development is estimated to cost \$0.68 per screen in staff and overhead costs (Glascoe, Foster, & Wolraich, 1997). Using the lower estimate for the Pediatric Symptom Checklist and screening the roughly

826,000 children who receive child welfare services, thus, could cost well over 9 million dollars in one year.

The rate of “over-identification” found in this study, however, is important to consider because of the resources that may be expended unnecessarily and the potential inconvenience and strain that may be experienced by parents and children who receive any follow-up attention. Children may feel stigmatized by a mistaken positive screen regarding their need for mental health services and parents may struggle to initiate services for their children, only to be told that there is nothing wrong. The degree of such problems likely depends on the procedures adopted by agencies following the results of a positive risk screen. If the protocol is to provide an additional screening to children who score positive and if this can be done quickly and conveniently by the child welfare worker, or even by caregivers or children themselves (e.g. the CBCL), then the costs of over-identification would likely be less than if the protocol is to refer children who screen positively directly to a specialty mental health provider. At the same time, children who score highly on a risk assessment instrument comprised of family and maltreatment-related problems may benefit from mental health services although they may not have clinical-level symptoms at the time. Importantly, measures designed for the specific purpose of screening children for mental health problems also carry with them the risk of over-referring, and some even exceed the 48% over-referral rate estimated in the current study (McCrae, 2005). Regardless, families would need to be informed about the use of investigative information to screen for mental health concerns (and, thus, about the risk of over-identification), and be offered options for any follow-up care. A balanced risk assessment or screen would also include information about families’ strengths, an area for future study.

In conclusion, implementing standardized mental health screening in child welfare services is likely to be a costly and challenging endeavor. The AACAP-CWLA recommendations regarding children in foster care (2003) are that screening be conducted by a trained professional with immediate mental health consultation available, and triaged intervention for children determined in need of further attention. Using risk assessment and investigative information in the form of a cumulative risk score to screen children for mental health problems may be a viable alternative to the current options of continuing to operate as usual (with no formal screening and documented under-identification) or providing universal mental health screening, which requires considerable resources. Risk-based screening might reduce the need for child welfare workers to become specialists in children's mental health, a requisite to engaging and speaking with families about mental health issues that might be identified during a standardized mental health screening. Risk-based screening also suits child welfare practice that is more preventative than reactive, since some at-risk but asymptomatic children may be linked with services. At the very least, agencies could consider using a risk-based method until mental health screening instruments for use in child welfare have been tested for their stated purposes. At the current time, there is no mental health screening instrument that has been shown to be outstanding for use with children involved with child welfare services (McCrae, 2005). It is clear, however, that a new strategy is needed, since the current study results suggest that at least 470,000 children nationally may not be recognized by their child welfare workers as having clinical-level mental health symptoms at the conclusion of an investigation for maltreatment.

Limitations

The limitations to this study are that of missing data and the measure used to indicate workers' reports of children's problems. Missing data on a few of the investigative items resulted in the reduction of the total sample from roughly 3,000 children to just over 1,000 children. The variables that were most frequently missing were whether or not the caregiver had experienced abuse or neglect as a child, and characteristics of the current maltreatment, mainly the duration of the maltreatment. Bivariate analyses were conducted to determine whether children differed in symptom status according to having complete or missing data on the risk scores. No significant differences ($p < .05$) were found between observed and unobserved (missing) cases for all of the risk scores tested and among children in both age groups and the total sample.

A second limitation is that the study used an indirect measure to indicate child welfare worker-reported mental health problems. The items inquired about whether children had major special needs or behavior problems at the time of the investigation, and whether mental health services were provided, arranged, or referred since the investigation. While these are reasonable indicators to compare with clinical-level symptoms determined by psychological measures, a better comparison would have resulted had workers been asked directly whether or not they thought that children had clinical-level symptoms. Additional studies ought to test the ability of workers to identify children with mental health symptoms to inform this area of practice.

Another limitation is that the dependent measure that captured most of the children was the CBCL, which is completed by caregivers and may reflect the caregivers' assignment of blame for family problems to the child, rather than an unbiased diagnosis. This is in substantial part confirmed by Lau, Valeri, McCarty, & Weisz (2006) who showed that

abusive parents have exaggerated reports of children's behavior, compared with observations by other individuals, whereas this is not true among non-abusive parents. While the current study did not rely exclusively on caregiver reports, it does suggest that the proportion of children with mental health problems may be exaggerated, at least with regard to externalizing behavior problems. If there were fewer children with mental health problems, the sensitivity and specificity would likely be adjusted.

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CHAPTER 4

CHANGES IN EMOTIONAL-BEHAVIORAL PROBLEMS AMONG MALTREATED CHILDREN IN ASSOCIATION WITH MENTAL HEALTH SERVICES

Children receiving mental health services following child welfare referral should receive services that help reduce their mental distress and prevent their risk of developing serious mental disorders. The extent to which U.S. communities can claim effective mental health services is, however, in question. Results of systems of care strategies are well known; namely, that psychosocial outcomes among children served in systems-of-care are comparable to outcomes among children served in communities operating “as usual” or not served at all (Bickman, Lambert, Andrade, & Penaloza, 2000; Bickman, Noser, & Summerfelt, 1999). Studies suggest that usual care, that is, treatment evolved from clinical practice and supervision and not primarily from research, is also, on average, no more helpful than having no treatment (Weisz, Donenberg, Han, & Weiss, 1995). Noser & Bickman (2000) found in a study of 240 adolescents that mental health service utilization between baseline and 6 months explained 1% of the variance in children’s functioning at 6 months, while quality indicators, such as client satisfaction, parent involvement, and client-therapist relationship, were significantly related to outcomes, though negligibly. Undoubtedly, “the quality of mental health care in public service systems is much lower than what is possible” (Landsverk & Davis, 2002).

At the same time, a number of reviews indicate that there are effective treatments for children with various types of psychological problems (Asarnow, Jaycox, & Tompson, 2001;

Brestan & Eyberg, 1998; Burns, Hoagwood, & Mrazek, 1999; Farmer, Compton, Burns, & Robertson, 2002; Weisz, Hawley, & Doss, 2004). Weisz and colleagues (2004) report that at least 326 different treatment programs demonstrate significant benefit to children in the areas of anxiety, depression, attention-deficit disorders (ADD or ADHD), and conduct problems. Burns and colleagues (1999) found strong evidence of treatment effectiveness for ADHD, depression, anxiety, and disruptive behavior disorders. Twelve interventions for conduct-disordered children were identified as well-established or probably efficacious in another review (Brestan & Eyberg, 1998), and various forms of cognitive-behavioral therapy have been recommended for physically and sexually abused children, childhood posttraumatic stress disorder (PTSD), depression, and anxiety (Asarnow et al., 2001; Burns et al., 1999; Cohen, Berliner, & Mannarino, 2003). When children receive such treatments, it is reasonable to expect that their symptoms will improve.

Yet, treatments are often deemed effective based on the results of controlled research conducted in clinical trials, laboratory, and university-based settings, rather than on research conducted in community settings, wherein a number of other factors may influence children's outcomes (Angold, Costello, Burns, Erkanli, & Farmer, 2000; Weisz et al., 1995). Children may not receive a sufficient amount of service to make a difference, or may not receive the intervention in the manner in which it was originally tested. Therefore, it is important to examine the utility of services in community settings, and the experiences of children who receive "treatment as usual". To date, no study has examined how children involved with child welfare services, in particular, experience changes in their mental health related to the services they receive. Research that has been done in this area has mostly focused on patterns of access and use (e.g. Burns et al., 2004; Farmer et al., 2001; Raghavan

et al., 2005) rather than on changes in children's mental health. The topic of mental health care among child welfare-involved children is particularly relevant now that child welfare agencies are under federal pressure to ensure that children receive adequate services to meet their mental health needs.

This study provides an initial view of the relationship between mental health services and children's emotional-behavioral well-being among children involved with child welfare services. The study uses data from the National Survey of Child and Adolescent Well-being (NSCAW), the first nationally-representative study of children investigated for maltreatment. Because the study views service associations using non-experimental (survey) data, adjustments were made to the analyses to account for the probability of selection bias: that children who receive services are likely to differ from children who do not receive such services at the outset. Propensity Score Matching (PSM) was used to create matched "treatment" and comparison groups according to 16 child, family, and agency characteristics at baseline, and hierarchical linear modeling (HLM) was used to test the relationship between services and children's emotional-behavioral trajectories. The study addresses two primary questions: (1) to what extent are services related to changes in children's emotional-behavioral trajectories over three years, and (2) does this relationship vary for children of different ages at intake to child welfare services? Because the success of the matching procedure depends on identifying factors that influence children's selection into service groups, this is the focus of the following discussion.

Factors related to children's receipt of mental health services

Three studies contribute the majority of what we know about children who receive mental health services: the Great Smoky Mountains Study (GSMS), a longitudinal study of

over 1,000 9, 11, and 13-year-olds recruited from public schools in North Carolina and over 400 American Indian children (e.g. Burns et al., 1997; Farmer et al., 2001); the NSCAW study (Hurlburt et al., 2004; Raghavan et al., 2006); and studies of children in foster care in California (e.g. Leslie et al., 2000). Information from two general population samples also contribute to what we know about children who receive mental health services (Cunningham & Freiman, 1996; Zahner & Daskalakis, 1997).

Studies show that, first and foremost, services are related to need. Among children with high need in the GSMS, defined as having a diagnosis and impaired functioning, 47% received mental health services over two years compared with 24% of children with moderate need and 9% of children with low need (Burns et al., 1997). Children in the NSCAW study with clinical-level scores on the Child Behavior Checklist (CBCL; Achenbach, 1992) were significantly more likely to have received mental health services 12 months prior to intake, and 12 to 18 months after intake, compared with children whose scores were not in the clinical-range (Burns et al., 2004; Hurlburt et al., 2004; Leslie et al., 2005). Services were also significantly related to CBCL scores in several studies of children in foster care (James, Landsverk, Slymen, & Leslie, 2004; Leslie et al., 2000) and the general population (Zahner & Daskalakis, 1997).

Other factors that contribute to children's receipt of mental health services can be grouped into child demographic characteristics, characteristics of the local service community, family characteristics, such as parental mental illness and insurance status, and characteristics of the maltreatment or other child welfare-related factors. Children's age and race/ethnicity have been consistently linked with service receipt. White children and older children are more likely to receive services than other children, even when their need for

services is taken into account (Burns et al., 1995; Hurlburt et al., 2004; James et al., 2004; Leslie et al., 2005; Zahner & Daskalakis, 1997). In the GSMS study, for example, just 4% of children received mental health services before age 5 (Farmer, Burns, Phillips, Angold, & Costello, 2003). Burns and colleagues (2004) found that demographic characteristics related to service use varied by child age, with children's race/ethnicity a significant factor for school-aged children, but not preschoolers or adolescents. Another child demographic characteristic—gender—has been less consistently linked with service receipt, but when a relationship is found, boys are more likely to receive services than girls (Burns et al., 1995; James et al., 2004; Leslie et al., 2000; Zahner & Daskalakis, 1997). Results from the NSCAW study suggest, however, that gender is not a substantial determinant of which children receive mental health services (Hurlburt et al., 2004; Leslie et al., 2005).

Family characteristics that may influence children's service use include maternal mental illness, education level, poverty level, and insurance status. Data from the GSMS show that children from poor families are more likely than children from nonpoor families to use mental health services (Burns, Costello, Angold, & Tweed, 1995). Results from another study, however, point to greater service use among families with higher incomes (Cunningham & Freiman, 1996). Several studies show that children with Medicaid insurance are more likely to use mental health services than children with private insurance or no insurance (Burns et al., 1997; Cunningham & Freiman, 1996; Farmer, Stangl, Burns, Costello, & Angold, 1999). Insurance status was not significantly related to service use among children in the NSCAW study, however, when other family and county-level service characteristics were taken into account (Hurlburt et al., 2004). Raghavan and colleagues

(2006) found that children in the NSCAW study were more likely to receive mental health services in association with having a caregiver with higher levels of education.

Children may be more likely to receive mental health services if their parents have received mental health services, or have a need for such services. Parental history of psychopathology was linked with greater use of mental health services among children in the GSMS and NSCAW studies, and among 6 to 17-year-olds in the general population, although the strength of this relationship is unclear (Burns et al., 2004; Cunningham & Freiman, 1996; Farmer et al., 1999). Among the NSCAW children, maternal mental illness, as reported by child welfare workers, was significantly related to service use, but only among adolescents (Burns et al., 2004). Cunningham and Freiman (1996) found that parental history of mental health services was significantly related to children's use of such services, but further examination revealed that some children were receiving services for a family-related (e.g. divorce), rather than child-specific, problem. At least two studies have found that parent reports of the impact of children's problems or need for mental health services are related to subsequent service receipt (Farmer et al., 1999; Zahner & Daskalakis, 1997). While more ought to be learned about exactly how parental mental illness influences children's use of services, it is clear that a relationship exists between these two variables.

Factors related to children's involvement with child welfare services also influence the likelihood that they will receive mental health services. In the GSMS, children who experienced foster care placement at any point in their lives were more than five times as likely as children living in poverty but with no foster care placement to receive mental health services (Farmer et al., 2001). This was also found among a sample of children in foster care in California, wherein children with previous stays in out-of-home care were more likely to

use services over 18 months compared with children who had no history of out-of-home care (James et al., 2004). Children who remain at home without on-going child welfare services after an investigation for maltreatment were the least likely to receive mental health services over 18 months in a study using the NSCAW data (Leslie et al., 2005), while children living in group care and non-relative foster care following the investigation had the highest likelihood of mental health service receipt over 12 months in another NSCAW study (Hurlburt et al., 2004). Children placed with relatives (kinship care) following the investigation may be the least likely among children placed in out-of-home care to receive mental health services (Leslie et al., 2000).

The type of maltreatment that prompts children's involvement with child welfare appears to play a role in whether or not they will receive mental health services, although the precise nature of this relationship is unclear. Hurlburt and colleagues (2004) found that among open child welfare cases, children investigated for physical, sexual, or emotional abuse were significantly more likely than children investigated for neglect to receive services over 12 months, while Leslie and colleagues (2005) found that among all children investigated for maltreatment, children with "abandonment" identified in the report had the highest odds of receiving services over 18 months. Sexual abuse and emotional abuse were not significantly related to services in this study, while physical abuse increased the likelihood of service use, and physical neglect decreased the likelihood of service use (Leslie et al., 2005). In another study using the NSCAW data, mental health service use prior to intake was predicted by sexual abuse, but only among 2 to 5-year-olds (Burns et al., 2004). At least one study of children in foster care found that sexually abused children were more likely to receive mental health services than other children, regardless of need (Garland,

Landsverk, Hough, & Ellis-MacLeod, 1996). In contrast, another study of children in foster care found that maltreatment type, overall, was not a strong predictor of service use, except that “caretaker absence” decreased the likelihood that children would receive services (James et al., 2004). Some of the differences in these findings may be due to the source of information about services; for example, reports from caregivers compared with administrative or Medicaid records.

The relationship between community-level characteristics and children’s service receipt has been perhaps most thoroughly examined in two studies using data from the NSCAW study. In both studies, the NSCAW data were supplemented with data from the Caring for Children in Child Welfare (CCCW) study, which involved interviews with key informants in each county, and the 1999 Area Resource File, which includes information about county size and poverty level, degree of service coordination, mental health provider supply, and Medicaid reimbursement mechanisms (Hurlburt et al., 2004; Raghavan et al., 2006). Hurlburt and colleagues (2004) found that rates of service receipt among White and African-American children were more comparable in communities with higher levels of service coordination between child welfare and mental health agencies (Hurlburt et al., 2004). This study also showed that neither the supply of mental health providers in a county or county poverty level was related to children’s receipt of mental health services. Raghavan and colleagues (2006) examined the details of Medicaid policy in the NSCAW counties, showing these contextual policy variables were not primary predictors of children’s use of services, although behavioral health carve-outs as a policy were related to decreased use of inpatient mental health services among Medicaid-insured children. The study found that children living in counties with greater numbers of child psychiatrists had twice the odds of

receiving outpatient services over 12 months compared with children living in counties with lower numbers of child psychiatrists (Raghavan et al., 2006).

In sum, the strongest evidence exists for a link between mental health services and need, child age, child race/ethnicity, maternal mental illness and level of education, insurance status, maltreatment type, and child welfare service setting or previous child welfare experiences. Other factors that may play a role include community-level characteristics such as the number of providers available to serve children, and the degree of service coordination between mental health and child welfare agencies. These variables will be used in this study to model children's selection into mental health services.

Methods

This study includes children ages 4 to 14 who scored in the borderline or clinical-range of emotional-behavioral problems following the investigation that led to their inclusion in the NSCAW study (n=1,790). Data are from interviews with children, their caregivers, and child welfare workers at baseline, 18, and 36 months later. Children's emotional-behavioral symptoms are measured by caregiver report. Analyses were stratified by child age at baseline: ages 4 to 6 (n=412), 7 to 10 (n=650), and 11 to 14 (n=728). One-half of the sample is male, and 52% are White, 26% are Black, and 22% are Hispanic or of other race/ethnicities (weighted).

Sample

Children were selected into the NSCAW sample using a two-stage stratified sample design. The first stage involved selecting 92 Primary Sampling Units (PSUs) in 36 states. The PSUs are typically county child welfare agencies. The second stage involved selecting children, ages 0 to 14, from lists or files of children who were investigated for abuse or

neglect within the sample PSUs from October 1999 through December 2000. Eligible children at the end of this stage were stratified into 8 domains according to child age, service status (e.g. open for CWS, placed in foster care), and maltreatment type. A random sample of children was then chosen from each domain. The purpose of the stratification was to obtain enough infants, children reported for sexual abuse, and cases receiving ongoing child welfare services to sufficiently analyze. Sampling weights are used in statistical analyses to adjust for the unequal selection of subjects into the study, initial and follow-up nonresponse, and undercoverage of unsubstantiated cases and allow statistical inference to the national level of children investigated for maltreatment. In the current study, however, the sampling weights were not used except in basic descriptive analyses (where noted) because the matching procedure involves re-sampling, making the interpretation of the weighted data unclear.

Measures

Measures used in the propensity score matching procedure are presented first, followed by a description of the measures used in the analysis of children's outcomes.

Demographics and insurance status. Three child demographic characteristics (age, gender, and race/ethnicity), children's insurance status, and caregiver education level were reported by caregivers at baseline.

Risk assessment. A project-developed risk assessment measures the presence of 21 family risks reported by child welfare workers during the investigation. A variable was created to count the number of risks (1 if present, 0 if not present) as a proportion of the total risk, resulting in a range of proportions. The cumulative frequency of proportions was then divided into tertiles, creating a risk score of low (<21% of risks), moderate (21-40% of risks), or high (>40% of risks). A few items from the risk assessment were not used in the

cumulative score, but were used elsewhere in these analyses: child major special needs or behavioral problems, prior out-of-home care, and caregiver serious mental illness.

Caregiver-reported depression. Caregivers reported their level of depression over 12 months prior to baseline using the Composite International Diagnostic Interview Short-Form (CIDI-SF). The CIDI-SF is a set of screening scales based on the full-length CIDI, a structured diagnostic measure of adult psychiatric disorders that corresponds with the Diagnostic and Statistical Manual of Mental Disorders (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). Classification accuracy of the CIDI-SF with the CIDI ranges from 93-98% (Kessler et al., 1998). A dichotomous variable was created to indicate caregiver-reported depression at baseline and was combined with worker-reports to indicate maternal mental illness at baseline.

Type of maltreatment. Child welfare workers identified the types of maltreatment in the index maltreatment report using a modified version of the Maltreatment Classification System (MCS: Barnett, Manly, & Cicchetti, 1993). More than one type could be reported and categories used in this study (e.g. sexual abuse, abandonment) were not mutually exclusive.

Child welfare services. Children's living situation and child welfare service (CWS) status was determined following the first round of NSCAW interviews. Children were grouped into one of six categories: (1) in-home and not receiving CWS (case closure), (2) in-home and receiving CWS (case opening), (3) placed in kinship foster care, (4) non-kinship foster care, (5) group living situation, and (6) other placement out of the home. Overall, 89% of the children were identified as living at home with their permanent primary caregiver and 11% were removed from the home at baseline (U.S. DHHS, 2005). Three sources of data were used to determine these groupings: the sampling frame, and the caregiver and worker

baseline interviews. Further detail about decisions that were used in this process is available (U.S. DHHS, 2005).

Worker report of service need. Child welfare workers reported whether any services were provided to the family, arranged, or referred following the investigation. Follow-up questions inquired about child mental health counseling and treatment. A dichotomous variable was created to indicate children who had been provided, had arranged, or been referred to mental health services, and was combined with the risk assessment item (child major special needs or behavior problems) to indicate workers' report of child mental health service needs at baseline.

Child recent arrests. Children ages 11 and older responded to a modified version of the Self-Report Delinquency measure (Elliott & Ageton, 1980) from the National Longitudinal Survey of Youth. One item that inquired about whether the child had been arrested for acts other than minor traffic offenses in the 6 months prior to baseline was used in this study.

Community service linkages and child psychiatrist ratio. These variables were created by Hurlburt and colleagues (2004). The child welfare-mental health services linkages variable was created using twenty-six indicators of linkages from two interview modules of the CCCW study, one that focused on mental health services available to children in child welfare, and one that focused on characteristics of the local mental health agency. Examples of the indicators included co-location of services, case-by-case reviews of mental health service use, and joint training between child welfare and mental health. Items were summed to create a total linkages score and divided into tertiles to indicate low, moderate, and high levels of service linkages.

The child psychiatrist ratio variable was created using data from 1990 Area Resource Files concerning county-level characteristics (Hurlburt et al., 2004). The number of child psychiatrists per county was summed and a rate per 10,000 individuals in the county population was created. This distribution was divided into tertiles in this study to indicate low, moderate, and high provider supply in children's communities.

Child and Adolescent Services Assessment (CASA). Caregivers reported on children's receipt of mental health services from baseline to 36 months using a modified version of the CASA (Burns, Angold, Magruder-Habib, Costello, & Patrick, 1992). Services included specialty outpatient (mental health or community health center; therapeutic nursery; day treatment; visit with a psychiatrist, psychologist, social worker, or psychiatric nurse), non-specialty outpatient (in-home counseling; visit with a guidance counselor, school psychologist, or social worker), and inpatient (psychiatric hospitalization; residential treatment; emergency shelter). Categories were collapsed to create a dichotomous indicator of any mental health services, received between baseline and 36 months. Therapeutic nursery and emergency shelter services were not included because of concern about the extent to which children receive mental health services in these settings. Just four children received therapeutic nursery services over 36 months (<1% of the population) and 57 children received emergency shelter services (2% of the population).

Service dose. A variable was created to capture the total amount of services received between baseline and 36 months. Caregivers reported the number of weeks children received each service and the number of times per week. These values were multiplied and summed to create a continuous variable ranging from 0 (no service) to 642 (roughly 4 service sessions per week for 36 months). A categorical variable was also created by dividing the distribution

into quartiles to indicate no service, low, moderate, and high levels of service over 36 months.

Child Behavior Checklist (CBCL) and Youth Self-report (YSR). The CBCL and YSR are well-validated measures of child emotional-behavioral problems (Achenbach, 1991). The CBCL was administered to caregivers of children ages 2 and older and the YSR was administered to children ages 11 and older. Both are measured on a 3-point scale, with a value of “0” to indicate behavior that never occurs, “1” to indicate behavior that sometimes occurs, and “2” to indicate behavior that occurs often. Clinical-level problems are indicated by a T-score above 63, borderline-level problems are T-scores of 60-63, and normal-level scores are those below 60. The CBCL shows moderate reliability ($\alpha = .50-.70$) and the YSR shows moderate to high reliability ($\alpha > .70$) among the NSCAW children. The CBCL is the outcome of interest in this study, while just one item from the YSR was used (child recent arrests).

Re-reports and placements. Child welfare workers indicated whether additional maltreatment reports concerning the study child were received since the investigation. Because child welfare workers were only interviewed at follow-up if a case was open at baseline or thereafter (prompted by a new report or caregiver report of services), cases wherein the worker was not interviewed for this reason were treated as not having a new report. Workers also reported each time a child was placed in out-of-home care and these incidents were summed to create a variable of the number of out-of-home placements over 36 months. Values on the re-report variable range from 0 to 9, and values on the placement variable range from 0 to 10.

Data analysis

The primary study methodology was hierarchical linear modeling using a matching estimator to compare children's average linear trajectories over three occasions conditioned on their mental health service status. Because the goal of the study is to estimate associations between service receivers and non-receivers that have not been randomly assigned, adjustments were needed to account for children's naturalistic selection into these groups. That is, the groups are likely to differ according to their need for services at the outset. Propensity score matching (PSM; Rosenbaum & Rubin, 1984) was used to match children according to their "propensity" to receive services based on baseline characteristics, and subsequent analyses were conducted using the matched groups. The propensity score is the conditional probability of children's assignment to a treatment group, given observed covariates (Rosenbaum & Rubin, 1984). The analyses involved three primary steps—creating the propensity score, matching subjects based on the propensity score, and conducting the final analyses using the matched groups. These steps were completed for children in each of the three age groups: 4 to 6, 7 to 10, and 11 to 14.

Bivariate analyses were first used to test the relationship between children's baseline characteristics and receipt of mental health services over 36 months. Logistic regression analyses were then used to model children's likelihood of receiving services over this time conditioned on the baseline characteristics. Variables that were not significantly related to services in bivariate analyses for children in any age group ($p < .05$) were not used in the logistic regression analyses.

Next, nearest neighbor within caliper matching was used to create three new samples (by child age) according to the propensity scores (the log of the predicted probabilities generated in the logistic regression analyses). Subjects were randomly ordered and matched

with the closest propensity score within a defined common-support region or caliper (Guo, Barth, & Gibbons, 2006). A caliper size of .25 of the standard deviation of the propensity score was used. Each treatment case was matched with a non-treatment case to form the new samples.

Analyses of children's outcomes were conducted using hierarchical linear regression modeling (HLM), also known as growth curve analysis. The advantages of HLM are the controls for clustering due to autocorrelation of children's scores at each of the three time points, and that information about children missing one or more waves of data is still included. The modeling estimated an average linear trajectory for each child's CBCL score at baseline, 18, and 36 months. The first set of analyses examined the amount of variance in the trajectories attributable to time, individuals (children), and PSU's (agencies). The next set of analyses estimated the trajectories conditioned on child demographic characteristics (age, gender, and race/ethnicity), mental health service status (any versus no service), and the number of re-reports and placements children experienced since baseline. These models did not include agency-level effects. Different structures of random effects were tested in the final models, and model fit was assessed according to the significance of the random effect ($p < .05$) and values of the Akaike's Information Criterion and Bayesian Information Criterion (values closer to 0 indicated improved model fit). Effect sizes were then calculated as the difference in mean CBCL scores at the end of the study period (36 months) between the served and unserved groups divided by the pooled standard deviation (Cohen, 1988).

Analyses using the sampling weights were conducted using SUDAAN 9.0.1, analyses using unweighted data were conducted using SAS 9.1, and the matching procedure was conducted using STATA SE version 8.

Results

Overall, 65% of children (weighted) received mental health services at some point over the 36 months following the investigation. The proportion of 4 to 6-year-olds who received services was 51% and the proportion of 7 to 10-year-olds and 11 to 14-year-olds who received services was 70% (each). The mean CBCL score at baseline was 67.2 (weighted).

Table 4.1 presents the results of bivariate and multivariate analyses that were used to create the propensity scores, and the results of bivariate analyses of differences in the service groups after the matching procedure. All of the analyses are unweighted. Bivariate analyses prior to matching among 4 to 6-year-olds showed the following characteristics were related to service receipt: male gender ($p < .01$), White race/ethnicity ($p < .001$), high school or college education of the caregiver ($p < .05$ and $p < .001$, respectively), maternal mental illness ($p < .05$), high cumulative risk ($p < .01$), sexual abuse reported ($p < .05$), placement in out-of-home care at baseline ($p < .001$), worker-reported need ($p < .001$), and a high degree of service linkages in the community ($p < .05$). Children who received services also had significantly higher mean CBCL scores at intake (by 4.44 points) compared with children who did not receive services ($p < .001$).

Table 4.1. Proportion of children who received mental health services, results of logistic regression analyses predicting service receipt, and bivariate differences on the conditioning variables after the matching procedure[^]

Independent variable (referent group for logistic)	% received services (pre- and post-match) and odds of service receipt								
	Ages 4 to 6 (n=412)			Ages 7 to 10 (n=650)			Ages 11 to 14 (n=728)		
	Pre-match n=371	OR n=342	Post-match n=158	Pre-match n=588	OR n=524	Post-match n=222	Pre-match n=666	OR n=572	Post-match n=232
Child age (continuous) ^{^^^}	.17	1.03	.01	.14	1.16	.11	.05	.95	0
Child gender (Female)	50.6		53.5	71.2		50.9	75.9		51.0
Male	67.0**	1.84*	45.8	80.4**	1.31	49.1	81.1	1.09	48.2
Child race (White)	68.2***		47.5	81.5**		50.0	80.6		50.5
Black	49.0	.29*	53.7	72.9	.47*	48.5	75.6	.69	49.3
Hispanic or other	48.0	.37	51.4	68.1	.40	51.6	76.0	.65	50.0
Caregiver education (<HS)	46.5		45.8	72.2		51.9	67.8		52.1
HS equivalent	60.9*	1.43	51.6	78.2	1.59	49.1	80.9**	2.04**	47.3
College educated	81.1***	3.31	53.9	76.8	1.09	48.6	80.7*	1.16	53.1
Maternal mental illness (No)	52.3		49.4	71.2		51.9	73.8		51.4
Yes	65.6*	1.41	50.7	79.8*	1.18	47.3	82.2*	1.70*	47.6
Health insurance (None)	60.6		52.6	65.4		51.6	60.0		54.6
Medicaid/state	59.8	.66	47.5	79.5*	1.74*	48.5	82.0***	1.89	49.3
Private	56.1	.64	55.0	67.9	.82	52.7	73.4	1.78	49.2
Number of risk factors (Low)	49.5		51.8	69.9		55.2	73.7		53.0
Moderate	58.6	1.77	48.1	76.2	1.06	47.1	75.5	.78	46.3
High	66.4**	2.24	50.0	80.2*	.97	48.2	85.5**	1.15	50.8
Sexual abuse (No) ^a	56.2		50.0	76.1		50.0	79.4		48.8
Yes	71.4*	1.59	50.0	76.5	.82	50.0	73.4	.67	53.0
Emotional abuse (No) ^a	59.1		50.0	76.1		50.8	76.5		50.2
Yes	58.6	.56	50.0	77.0	1.09	45.2	88.5*	1.96	47.4
Prior out-of-home care (No)	57.2		51.1	73.1		50.8	75.0		52.2
Yes	61.5	.85	49.1	80.9*	1.04	48.1	84.7***	1.50*	45.2
Missing	58.5	.81	45.5	72.2	.65	52.6	67.5	.68	52.4
CBCL score ^b	4.44***	1.12***	.97	3.38***	1.04*	1.71	3.80***	1.06***	.30

Child welfare services	51.5		50.7	67.4		52.5	70.4		52.9
(In-home, no services)									
In-home, services	53.8	.93**	48.6	77.2*	1.09	48.9	76.8	1.38	49.5
Out-of-home care	86.8***	6.75***	53.3	85.8***	1.43	45.5	89.1***	2.66*	41.4
Worker report of need (No)	49.2		51.0	63.2		54.2	69.1		51.0
Yes	70.1***	1.56	48.4	84.1***	2.55***	44.0	83.2***	1.41	49.2
Child recent arrests (No)	--	--	--	--	--	--	75.8		50.9
Yes	--	--	--	--	--	--	90.7**	3.24*	25.0
Provider supply (Low)	53.7		42.4	75.6		48.9	75.8		51.9
Moderate	61.8	1.35	49.4	75.3	1.49	53.6	77.6	1.99	48.7
High	60.6	1.22	61.5	80.2	1.89	38.2	80.3	2.56	50.0
Missing	47.4	.61	50.0	69.2	.80	40.0	81.3	2.38	53.9
Service linkages (Low)	47.6		42.9	82.6*		43.3	81.7		43.8
Moderate	60.3	2.08	52.0	76.7	.65	51.2	77.3	.47	51.1
High	66.2*	2.64	50.0	74.1	.55	51.0	77.2	.48	52.3
Missing	59.0	2.26	52.6	64.8	.48	50.0	77.4	.54	47.6

Note. Analyses are unweighted.

^aPhysical abuse, failure to provide, failure to supervise, and abandonment were not significantly related to mental health services in bivariate tests among children in all age groups. Interactions that were not significant in the regression models were the interaction between service linkages and child race/ethnicity, and service linkages and CBCL score.

^bMean difference in scores between service receivers and non-receivers

*p<.05. **p<.01. ***p<.001.

Logistic regression analysis among 4 to 6-year-olds showed that boys were more likely to receive services than girls (OR=1.84; $p<.05$), Black children were less likely to receive services than White children (OR=.29; $p<.05$), and children who remained at home without child welfare services (CWS) were more likely to receive services than children who remained at home with CWS (OR=.93; $p<.01$). Children who remained at home without CWS, however, were less likely than children who were placed in out-of-home care to receive services (OR=6.75; $p<.001$). CBCL scores were also related to service receipt; for each unit increase in children's CBCL scores, the likelihood of receiving services increased by 1.12 ($p<.001$). After the matching procedure, there were no significant bivariate differences between children who did, and did not, receive mental health services on any of these characteristics. Served children had an average CBCL score of 64.84 at baseline and unserved children had an average CBCL score of 65.81 at baseline, after the matching procedure.

Bivariate analyses among 7 to 10-year-olds prior to matching showed that the following characteristics were related to service receipt: male gender ($p<.01$), White race/ethnicity ($p<.01$), maternal mental illness ($p<.05$), Medicaid insurance ($p<.05$), high cumulative risk ($p<.05$), prior placement in out-of-home care ($p<.05$), current placement in out-of-home care ($p<.001$) or remaining at home with CWS ($p<.05$), worker-reported need ($p<.001$), and a low degree of service linkages in the community (compared with missing data; $p<.05$). Children who received services also had significantly higher CBCL scores at intake than children who did not receive services, by 3.38 points, on average ($p<.001$).

Results of logistic regression analysis among 7 to 10-year-olds showed that Black children were significantly less likely to receive services compared with White children

(OR=.47; $p<.05$), Medicaid-insured children were more likely to receive services compared with uninsured children (OR=1.74; $p<.05$), and children whose worker reported mental health service needs were more likely to receive services than children whose worker did not report such needs (OR=2.55; $p<.001$). In addition, for each unit increase in children's CBCL score, their likelihood of receiving services increased by 1.04 ($p<.05$). After the matching procedure, there were no significant bivariate differences between service groups on any of these characteristics. Served children had an average CBCL score of 64.56 at baseline and unserved children had an average CBCL score of 66.27 at baseline, after the matching procedure.

Among 11 to 14-year-olds, results of bivariate analyses prior to matching showed that the following characteristics were related to service receipt: high school or college education of the caregiver ($p<.01$ and $p<.05$, respectively), maternal mental illness ($p<.05$), Medicaid insurance ($p<.001$), high cumulative risk ($p<.01$), emotional abuse reported ($p<.05$), prior placement in out-of-home care ($p<.001$), placement in out-of-home care at baseline ($p<.001$), worker-reported need ($p<.001$), and recent arrests ($p<.01$). Children who received services had significantly higher CBCL scores than children who did not receive services, by 3.80, on average ($p<.001$).

Results of logistic regression analysis among 11 to 14-year-olds showed that children whose caregiver had a high school education were more likely to receive services compared with children whose caregiver did not have a high school education (OR=2.04; $p<.01$). In addition, having a caregiver with a serious mental illness (OR=1.70; $p<.05$), current or prior placement in out-of-home care (OR=2.66; $p<.05$ and OR=1.50; $p<.05$, respectively), and recent arrests (OR=3.24; $p<.05$) significantly increased the odds of receiving mental health

services. For each unit increase in children's CBCL scores at intake, the odds of receiving mental health services by 36 months increased by 1.06 ($p<.001$). After the matching procedure, there were no significant bivariate differences between service receivers and non-receivers on any of these characteristics. Served children had an average CBCL score of 65.41 at baseline and unserved children had an average CBCL score of 65.71 at baseline, after the matching procedure.

Tables 4.2 and 4.3 present the results of hierarchical linear modeling (HLM) of children's emotional-behavioral trajectories. Table 4.2 presents the results of the models conditioned on time alone, and Table 4.3 presents the results of the models conditioned on other variables. Results of the 3-level models (not shown) that assessed PSU or agency-related effects showed that the proportion of variance attributable to differences among children within each PSU or agency was negligible (7% among 4 to 6-year-olds, 2% among 7 to 10-year-olds, and 0% among 11 to 14-year-olds). Results from these models also showed that the proportion of variance attributable to differences in individual children was 27% among 4 to 6-year-olds, 28% among 7 to 10-year-olds, and 33% among 11 to 14-year-olds. The remaining variance in scores was explained by time alone (66%, 70%, and 67%, respectively).

Table 4.2. Results of hierarchical linear modeling of children's emotional-behavioral scores conditioned on time (in years)

Fixed effects	Age at baseline		
	4 to 6 (n=158)	7 to 10 (n=222)	11 to 14 (n=232)
Intercept ^a	64.70***	65.02***	65.10***
Time	-2.89***	-3.60***	-3.20***

^aMean scores at the beginning of the study period.

*** $p<.001$

Results of the unconditional modeling showed that children's level of emotional-behavioral problems decreased significantly over time ($p<.001$ for each age group). Children

ages 4 to 6 had an average score of 64.70 at the beginning of the study period, and decreased their score at a rate of .18 points per month, on average, representing a total decrease of 6.48 points over 36 months. Children ages 7 to 10 had an average score of 65.02 at the beginning of the study, and decreased their score at a rate of .20 points per month, on average, for a total decrease of 7.20 points over 36 months. Children ages 11 to 14 had an average score of 65.10 at the beginning of the study, and an average decrease of .16 points per month, representing a total decrease of 5.76 points over 36 months.

Table 4.3. Results of multivariate hierarchical linear modeling of children's emotional-behavioral scores

Fixed and random effects	Child age at baseline		
	4 to 6 (n=138)	7 to 10 (n=201)	11 to 14 (n=194)
Fixed effects			
Intercept ^a	61.54***	61.41***	62.15***
Time (months)	-.18***	-.20***	-.16***
Age at baseline (years)	-.53	-.34	-.10
Gender: Male	.20	-.90	1.39
Race/ethnicity: Black, Hispanic, or other	3.48**	1.95	-.18
No. of re-reports since baseline	.07	1.20*	1.42**
No. of placements since baseline	-.75	.07	.50
Service: Yes	3.74**	1.42	3.13**
Time(months)*service	.19***	.14**	.16***
Random effects			
Intercept	37.36***	37.83***	37.76***
Time(months)*service	.02	.11*	.10**

^aModel-adjusted mean scores at the midpoint of the study

*p<.05. **p<.01. ***p<.001.

Results of multivariate modeling show that children's scores did not decrease uniformly. Among children ages 4 to 6, Black children, Hispanic children, and children of other racial/ethnic identities had scores that were 3.48 points higher (worse) at any given time, on average, compared with White children (p<.01). Children who received mental health services had scores that were 3.74 points higher, on average, compared with children who did not receive mental health services (p<.01). Children who received mental health

services also changed at a significantly different rate than children who did not receive services ($p < .001$). Service receivers typically increased their score at a rate of .01 points per month ($-.18 + .19$) compared to a decrease in scores of .37 points per month ($-.18 - .19$) for nonrecipients. The effect size for the difference in means between the groups at 36 months is medium (.59) using Cohen's criteria (Cohen, 1988). No other variables were related to children's emotional-behavioral trajectories in this age group.

Among children ages 7 to 10, scores were significantly related to the number of maltreatment re-reports since baseline ($p < .05$), and their mental health service status ($p < .01$). For each new report of maltreatment concerning the study child, scores increased by 1.20. Children, this age, who received services scored 1.42 points higher, on average at any given time, compared with children who did not receive services. Children who received mental health services decreased their score over time at a rate of .06 points per month ($-.20 + .14$), on average, a significant difference compared to an average decrease of .34 points per month among children who did not receive services. While children in both groups improved their level of emotional-behavioral problems over time, unserved children improved less on an average monthly basis than served children. The effect size for the mean difference between the groups is medium (.34).

Among 11 to 14-year-olds, service status and re-reports were again significantly related to children's emotional-behavioral trajectories. With each new maltreatment report, children's scores increased by 1.42 points, on average ($p < .01$). Served children had scores that were 3.13 points higher at any given time, on average, compared with unserved children ($p < .01$). Served children showed virtually no change in their level of emotional-behavioral problems from month to month ($-.16 + .16 = 0$), while unserved children typically improved

their level of emotional-behavioral problems by an average of .32 points per month. The effect size for the mean difference between the two groups at 36 months is medium (.46).

Analyses were conducted to further understand the service findings. Specifically, the analyses tested the possibility that the amount of services received by children accounted for the findings. In other words, perhaps served children did not receive enough service to improve their level of functioning beyond the level observed among unserved children. Table 4.4 presents the results of descriptive analyses of the types and amount of services received by children. Figures are also presented for the groups prior to matching for comparison. As shown, the most common types of services received (both pre- and post-matching) were school counseling services, services from a private practitioner (both in the range of 60 to 70% of children), and services from a community mental health center (typically 30 to 40% of children). Comparatively fewer children received inpatient services. In the pre-matched groups, 15% of 4 to 6-year-olds, 24% of 7 to 10-year-olds, and 38% of 11 to 14-year-olds received inpatient services. In the post-matched groups, the figures were 11% (each) of 4 to 6-year-olds and 7 to 10-year-olds, and 23% of 11 to 14-year-olds. The lower numbers of inpatient service receivers in the post-matched groups reflects the selection of more “moderate” treatment cases during the matching procedure (cases at the extreme ends of the propensity score distribution are unlikely to be matched with a suitable non-treatment case).

Table 4.4. Types of services received among pre- and post-matched groups

Service type	% received service ^a					
	<u>Ages 4 to 6</u>		<u>Ages 7 to 10</u>		<u>Ages 11 to 14</u>	
	Pre- (n=219)	Post- (n=79)	Pre- (n=448)	Post- (n=111)	Pre- (n=520)	Post- (n=116)
<i>Any outpatient</i>	100.0	100.0	99.6	100.0	99.0	100.0
Day treatment	8.7	8.2	13.7	6.8	16.0	10.3
Community mh	40.0	30.7	43.8	37.5	46.3	39.2
Private practitioner	69.7	56.4	66.7	54.3	74.4	67.6
In-home counseling	31.4	26.3	31.3	17.5	43.2	32.0

School counseling	63.6	71.4	75.6	72.0	71.4	67.3
<i>Any inpatient</i>	14.6	10.8	23.9	10.5	38.0	23.2
Psychiatric hospital	10.7	8.2	16.2	6.8	20.3	11.3
Medical hospital	6.2	5.6	7.8	2.9	8.0	7.3
Residential treatment	5.6	5.5	15.1	4.8	30.8	19.6
<i>Received >1 type</i>	64.4	55.7	71.9	61.3	76.0	69.8
Service dose: Low	27.8	31.9	19.2	37.1	16.3	30.2
Moderate	27.0	36.2	18.3	22.6	13.5	15.1
High	45.2	31.9	62.6	40.3	70.2	54.7

Note. Analyses are unweighted

^aProportion of service receivers. N varies slightly by service type. Service dose is missing for 538 of 1187 total pre-matched service recipients and for 140 of 306 total post-matched service recipients.

The majority of children received more than one type of service over 36 months. Among children in the matched service group, 56% of 4 to 6-year-olds, 61% of 7 to 10-year-olds, and 70% of 11 to 14-year-olds received more than one type of service. The amount of service was concentrated in the “high” category prior to matching, but was more evenly distributed after matching: among 4 to 6-year-olds, 32% received a low amount of service, 36% received a moderate amount of service, and 32% received a high amount of service. Among 7 to 10-year-olds, 37% received a low amount of service, 23% received a moderate amount of service, and 40% received a high amount of service. The figures were 30%, 15%, and 55% of 11 to 14-year-olds, respectively. A cautionary note is that because these figures are based on the matched sample, they may not generalize to the larger group of children involved with child welfare services. Also, many children were missing information about service dose (538 of the original 1187 service receivers), which may also hinder generalizability.

The multivariate models were re-analyzed using the service “dose” variable (total n=370). Results are presented in Table 4.5.

Table 4.5. Results of hierarchical linear modeling of children’s emotional-behavioral scores over time using a continuous measure of services

Variable	Child age at baseline
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	4 to 6 (n=101)	7 to 10 (n=143)	11 to 14 (n=123)
Fixed effects			
Intercept ^a	60.59***	60.81***	61.21***
Time (months)	-.20***	-.23***	-.21***
Age at baseline (years)	-1.43	-.54	.15
Gender: Male	-.55	-1.80	1.83
Race/ethnicity: Black, Hispanic, or other	2.93	1.68	-2.08
No. of re-reports since baseline	.01	1.97*	2.13**
No. of placements since baseline	-.94	-.42	.54
No. of service units	.02	.01	.01

^aModel-adjusted mean score at the midpoint of the study

*p<.05, **p<.01, ***p<.001

As shown, service dose was not significantly related to children's trajectories among children in any age group. That is, as children received more service, their average scores across the three time points were not notably different. There was a trend toward significance among children in the youngest age group ($p=.07$), but in the direction that more service was related to poorer outcomes. Bivariate analyses were used to examine children's CBCL scores at 36 months according to the amount of service: low versus moderate or high. Bivariate t-tests among children ages 4 to 6 showed that low service receivers had a mean CBCL score of 58.73, while moderate or high service receivers had a mean CBCL score of 63.52. Among children ages 7 to 10, low service receivers had a mean CBCL score of 56.57 and moderate or high service receivers had a mean CBCL score of 60.89. The pattern was similar among children ages 11 to 14, where mean scores were 58.33 and 63.80 among low and moderate or high service receivers, respectively. The results were not statistically significant. When the group is viewed as a whole ($n=120$), 46% of low service users had borderline or clinical-level problems at 36 months, compared with 67% of moderate to high service users, a significant difference using chi-square tests of association.

Discussion

Child welfare agencies will be challenged to meet the new federal standard that children receive adequate services to meet their mental health needs if services are not associated with positive changes in children's emotional-behavioral functioning. In this group of 612 maltreated children with borderline or clinical-level symptoms at intake to child welfare services, who were similar along 15 other demographic, family, community, and maltreatment-related characteristics, 60% who received mental health services remained with borderline or clinical-level symptoms three years later, compared with 42% who did not receive mental health services (the figures were 66% and 46% at the midpoint of the study). The oldest and youngest service recipients in this group typically showed minimal or no change in their level of emotional-behavioral symptoms on a month-to-month basis, while school-aged service recipients (ages 7 to 10) showed some positive change, but to a lesser degree than their school-aged counterparts who did not receive services. Like others before (Kolko, Baumann, & Caldwell, 2003; Noser & Bickman, 2000; Weersing & Weisz, 2002), this study failed to demonstrate that mental health services received under "usual care" conditions are associated with positive changes in children's emotional-behavioral well-being beyond having received no services at all.

Viewing the amount of service received by children and changes in their level of emotional-behavioral problems did not alter the service findings. As children received more service, their psychological trajectory declined, albeit slightly, but by the end of the study, 67% of moderate to high service users remained symptomatic compared with 46% of low service users. This could be because children received more service as their mental health declined, but the results are still unfavorable—in no situation in this study did served children improve while unserved children did not, the true marker of positive service

findings. It is likely that at least some of the high service users in this study were children who experienced out-of-home placement, either at intake or at some point thereafter, which may explain some of the results. Leslie and colleagues (2005) found that while mental health services increase among all children following contact with child welfare services, children who are placed in out-of-home care have consistently higher levels of new service over time compared with children who do not experience out-of-home placement (Leslie et al., 2005). Other studies have shown that children's behavior problems are both a cause and consequence of placement disruptions—children with behavior problems are more likely to experience multiple placements, and multiple placements are associated with poor mental health (Newton, Litrownik, & Landsverk, 2000). Regardless, had services made a positive, notable, and consistent difference in children's emotional-behavioral symptoms in this study, it is likely that this pattern would have emerged.

The most strongly supported explanation for findings such as these is that children do not typically receive evidence-based mental health services (e.g. Hoagwood & Burns, 2005; McLennan, Wathen, MacMillan, & Lavis, 2006). Many agencies do not require the use of evidence-based services, and when such services are provided, they are not typically carried out in the full-recommended protocol or in accordance with treatment manuals (Walrath, Sheehan, Holden, Hernandez, & Blau, 2006). In a survey of over 600 child mental health clinicians, respondents reported that an average of 10 years had passed since they received initial training in particular interventions (often since graduate school), and many reported receiving no, or very little, follow-up training since (Walrath et al., 2006). While providers often indicated that they value evidence-based practice and were familiar with evidence-based treatment, many reported that it was difficult to follow through with such services in

their routine practice (Walrath et al., 2006). This may be due to a lack of agency supports for evidence-based care, or because providers prefer flexibility and autonomy in their work (Dulcan, 2005; Walrath et al., 2006). That the field of child psychological disorders is constantly changing further complicates the ability of clinicians to implement evidence-based care (Dulcan, 2005).

There are also concerns about the strength of the “evidence-base” to begin with. Interventions that are effective in controlled studies may not be easily adapted into local communities (Drake, 2004; Evans & Weist, 2004; Kazdin, 2004). Weisz and colleagues (1995) found just nine studies of child psychotherapy outcomes over a 20-year-period that had been conducted in actual clinic, rather than university, settings and with practicing clinicians, rather than research assistants. Another review of 29 studies that compared two active treatments found just 10 that showed favorable outcomes for one treatment over another with adequate statistical power (Jensen, Weersing, Hoagwood, & Goldman, 2005). These reviewers noted that many studies did not investigate the mechanisms of change in particular treatment models, or of the specific ingredients that contribute to successful intervention, factors that were not able to be included in the current study either, and that would ultimately inform the development of new or enhanced interventions for child welfare-involved children with mental health problems. About one-half of the studies in the review by Jensen and colleagues, however, failed to demonstrate that a specific therapy improved children’s outcomes beyond receiving services as usual. Perhaps most concerning are reports that some treatments that have been demonstrated to cause harm to children are still being used (McLennan et al., 2006).

The current results are not surprising, then, in light of these conditions. In addition, child welfare-involved children are not likely to be among the easiest to treat. Recognition of children's problems in child welfare is poor, and services are often provided as a result of externalizing types of problems such as delinquency and aggression, problems which tend to be more persistent and difficult to treat (Achenbach, McConaughy, & Howell, 1987; Burns et al., 2004; Martin, Peters, & Glisson, 1998). The finding in this study, and in other studies (e.g. Burns et al., 1995), that children most often receive school counseling services for mental health problems supports a pattern of treating children's "acting out" behaviors. Indeed, maltreated children experience a number of problems that might prompt school intervention, including not only delinquency and aggression, but increased rates of thought and attention problems—clinical-level thought problems were the most common type of CBCL syndrome among the NSCAW children, and attention problems were also among the most persistent (McCrae, 2006). While the precise nature of the school-based counseling services received by children in this study is unknown, the traditional model of school counseling is one that focuses on diagnosing, testing, and referring children to special education services, a method that has been called "extraordinarily ineffective" (Kratochwill, Albers, & Shernoff, 2004, p. 885).

Another challenge that clinicians face in their work with maltreated children is promoting their mental health in situations wherein children's home environment is not improving or children are continuing to be maltreated. This study demonstrates the role that on-going maltreatment has in children's psychological well-being. As children experienced additional maltreatment reports, their behavior problems increased, by roughly two points for each new report among school-aged children and adolescents. Other results from the

NSCAW study show that re-reports are common. Nearly one-third of children are re-reported for maltreatment within three years, and at least 12% of children experience physical abuse that is not reported (Kohl, 2006). Services may not be effective in reducing children's risk of maltreatment and on-going family difficulties. Parenting services received by the NSCAW families have not been associated with improvements in the level of parents' responsiveness to their children and changes in spanking behaviors (Casanueva, 2005), a finding that is not surprising considering that these services are often not evidence-based, nor provided in a sufficient intensity to promote family change (Hurlburt, Barth, Leslie, Landsverk, & McCrae, 2006). There are also concerns about the quality of out-of-home caregiving. Many foster and kinship caregivers have low levels of education, live below the poverty level, and as many as one-fifth engage in parenting practices that can be considered to be punitive and under-responsive (Barth, Green, Guo, & McCrae, 2005). Maintaining children's emotional and behavioral health in situations such as these is likely to be quite challenging.

The scenario that emerges is one that typically considers children the "identified patient" in their mental health care, often when their school behavior is disruptive or reaches a notable level, at the same time that they are experiencing significant family problems that are likely at the root of, or at least may be exacerbating, their emotional-behavioral difficulties. Providing child-focused mental health care may give these children the message that their behavior is the primary problem, rather than the maltreatment or other serious family issues that prompted child welfare intervention. It is possible that maltreated children who receive mental health care at school also receive family-based services or family-focused counseling that addresses their mental health, but typical school-based services do not include a family-based component (Kratochwill et al., 2004), and that just 30 to 40% of

children in this study received in-home counseling, compared with 60 to 70% of children who received school counseling services, along with findings from other NSCAW studies that show rates of family-based services to be roughly 25% of families (McCrae, Lloyd, & Guo, 2005), suggests that this is not a common approach. Certainly, aggressive and disruptive children cannot be left alone, but they are also likely to need services that help alleviate family-related contributors to their problems, and clinicians that treat their problems from a family-based perspective. When such interventions to serve the family or to keep children safe from maltreatment are unsuccessful, the results may be particularly damaging. Children may feel hopeless that their situation will change, and alone because adults that have been called in to assist have not been able to. This may help explain increased rates of depression among child welfare-involved children, the hallmarks of which are feelings of hopelessness, helplessness, and sometimes worry and anxiety (Kovacs, 1992; McCrae, 2006). A model of psychological intervention for maltreated children at school is needed that focuses on prevention, and on a range of emotional-behavioral problems that likely stem from children's maltreatment and home experiences. Mental health professionals need to be abreast of, and interested in helping to improve, children's home situation, and child welfare professionals ought to work with clinicians to ensure that children's family situation is prominent in the treatment process. As long as the picture remains one in which families are often not provided evidence-based services (Hurlburt et al., 2006), nor services that improve family problems such as domestic violence (Kohl, 2006) and harmful parenting (Casanueva, 2005), children may remain at risk for declining mental health and behavior, regardless of receiving individual psychological attention.

Limitations

Despite using a matching procedure to create more comparable treatment and comparison groups, it is unlikely that all of the characteristics that distinguish these groups were included in this study. The strength of the PSM approach relies on the strength of the literature concerning service precedents. While the current literature could arguably be considered strong, since a substantial part stems from the NSCAW study itself, there may be other important variables that have not been tested, and children may differ in these unmeasured ways.

Similarly, the study did not match children according to their propensity to receive *more or less* service at the beginning of the study, a strategy that may have produced different propensity scores. Because logistic regression is used to create the propensity scores, the outcome is necessarily dichotomous, meaning that including service dose would require creating multiple groups of service units for comparison (e.g. 0 sessions, 1-5 sessions, 6-10 sessions) and conducting multiple logistic and outcome analyses, a task that would quickly become quite challenging. That many children were missing information regarding service dose, or had inconsistent dose information in this study, also made this an unsuitable approach. Ideally, future PSM strategies will allow the use of other regression techniques, such as *least squares regression*, so that continuous measures of service can more easily be included.

The study is also limited in that it includes a gross measure of services, combining a number of different treatment settings (e.g. school, community mental health care) that may employ a number of different treatment strategies. More details of the services would inform the outcomes. At the same time, however, conducting the analyses within rather small age-ranges likely reduces the variability in the treatments that the children received. The study

also provides a clear picture of services as children involved with child welfare receive them—a picture that often includes multiple types of services (roughly 70% of children see multiple providers), including a mix of visits to school counselors, community mental health centers, and private practitioners. This may signal treatment that typically lacks cohesion and is sporadic. Yet, because this is a study of service outcomes using non-experimental data, the results should still be considered broadly (an overall picture), rather than from the view that individual sessions with children, or individual therapeutic techniques or programs are ineffective. More finite research is needed to draw conclusions about specific types of therapies or programs. Undoubtedly, mental health services are beneficial to at least some children (clinicians could cite such successes), but this study did not produce convincing evidence that the overall picture of service outcomes for child welfare-involved children is positive.

Finally, children may have improved in other areas of functioning that were not addressed in this study. Outcomes that may be a focus of treatment include children's home and school functioning, quality of life, environmental stability, and care in the least restrictive environment (Hoagwood, Jensen, Petti, & Burns, 1996). Future research may reveal that mental health services are associated with improvements in any number of these areas. Children's symptoms were also reported by parents and caregivers, which may have resulted in a higher degree of reports of externalizing, compared with internalizing, problems, since internalizing problems may be more difficult for caregivers to detect. Similar research ought to be conducted from children's views.

Conclusions

The lack of positive service associations in this study is discouraging, but expected in some ways because of the results of similar studies, and the challenging context in which maltreated children are served. In addition, further research that uses experimental or quasi-experimental conditions in a community setting is needed to fully understand the results. While we know that there are effective treatments for some of the most common disorders in children (Burns et al., 1999; Weisz et al., 2004) and for psychological problems associated with maltreatment (e.g. Trauma-focused Cognitive-Behavioral Treatment), it does appear from this study that child welfare-involved children may not receive such treatments, or do not receive these treatments to an extent that makes a notable difference in their level of emotional-behavioral symptoms. Results suggest the need for approaches to mental health care for maltreated children that are family-focused, and guided by the principle that the family environment and maltreatment are primary, rather children's "acting out" behaviors. This could be in the form of preventing children's problems from becoming severe in the first place through home-based services such as the Nurse Home Visiting Program, or by improving school-based services to incorporate family-related interventions.

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CHAPTER 5

CONCLUSIONS

Child welfare agencies face the challenge of understanding the types and persistence of mental health problems that children typically experience, identifying which children are likely to have symptoms upon their involvement with child welfare, and providing the best service to meet children's unique needs. This series of studies aimed to contribute to the knowledge-base in each of these arenas so that child welfare and mental health service providers might better promote children's mental health.

Types and persistence of mental health problems among child welfare-involved children

An important finding regarding the types of problems that children experience is the prevalence and persistence of attention and thought-related problems among children investigated for maltreatment. Other studies have found that children in foster care have high rates of disruptive and attentive problems (Garland et al., 2001), and that these problems tend to be persistent (Stanger et al., 1996), but this may be the first research to document that thought and attention problems are among the most prevalent and persistent problems among the larger group of children involved with child welfare services. Thought problems include markers of psychosis and compulsions, such as hearing or seeing things that aren't there, having strange ideas or behavior, and repeating acts. These qualities may represent precursors to children's long-term difficulties with serious mental disorder, or may be associated with primary symptoms of anxiety or posttraumatic stress related to maltreatment. This cannot be fully determined from these data, but children with thought-related problems

may be at increased risk for being stigmatized by and isolated from their peers, and for having other cognitive and school-related challenges.

Similarly, children's attention-related problems may be indicative of Attention-Deficit Hyperactivity Disorder (ADHD), or may be related more directly to their home experiences, for example, daydreaming or having difficulty concentrating because of a lack of sleep, poor nutrition, or stress. The finding that over 60 percent of children with some type of clinical-level symptom at intake exhibit at least one clinical-level symptom three years later, but not necessarily within the same symptom category, suggests that children do have some transient or intermittent symptoms. Over the long-term, these patterns may help explain increased rates of mental disorders found among adults who have experienced child maltreatment (Molnar, Buka, & Kessler, 2001). More information is needed about the processes that underlie attention and thought-related problems, in particular, in association with child maltreatment.

Identifying children with mental health problems at child welfare intake

A number of different initiatives call for expanded and improved screening of children involved with child welfare services for a range of emotional, behavioral, and developmental problems. This paper offers the first data to test and support the idea that data collected by child welfare workers during routine case investigations could serve screening functions. Child maltreatment investigations necessarily include collecting a large amount of information about children and families that may aid the identification of children at risk for developing mental health problems. This study showed that using this information in the form of a cumulative risk score identifies 75 to 80% of children exhibiting emotional-behavioral symptoms at intake to child welfare services. Agencies could, therefore, use

investigative information to universally screen children for risk of mental health concerns and refer those children with positive screens for an additional assessment using a standardized instrument. This would reduce the number of children who are provided a standardized screening, having the potential for benefit and cost-avoidance.

Factors related to changes in children's emotional-behavioral symptoms over time

Determining the best course of intervention for children with psychological service needs following child welfare referral is one of the most important issues facing child welfare and mental health service providers. Children ought to receive services that help alleviate their level of emotional-behavioral distress and protect them from the risk of additional maltreatment. This study assessed the link between mental health services and children's symptom-levels following child welfare referral using a quasi-experimental study design and statistical modeling of their emotional-behavioral trajectories over time. The study provides a broad-based view of how services are related to change in children's symptoms, as reported by caregivers. This is the first study of such service-symptom patterns among children involved with child welfare services.

The study failed to demonstrate that children experience positive and notable changes in their mental health across three time points that is related to their receipt of mental health services. Results also show that children typically receive services from school-based providers and less often receive in-home counseling services to address their mental health, suggesting the need for more family-focused interventions. Children may often receive services that are prompted by their "acting-out" behaviors, at the same time that their family is experiencing substantial problems that include maltreatment. This may result in services that are unduly focused on fixing children's behavior rather than on improving parent-child

relationships or other family problems that led to child welfare involvement. Clearly, mental health problems are associated with maltreatment, and our current state of knowledge and practice may be insufficient to make measurable differences in children's level of risk for such problems.

Limitations

That this research uses large-scale survey data to answer the study questions has both strengths and limitations. Results of this research can be interpreted as preliminary indication of child welfare and mental health service issues in the U.S., rather than as definitive evidence about a particular method (e.g. using risk assessments to classify children with mental health problems), intervention (e.g. mental health services), or symptom (e.g. depression). Further research is needed at the agency-level to support and expand upon the study findings. The validity of using child welfare risk assessments to classify children with mental health problems, for example, may vary substantially depending on the instruments being used by particular agencies (if any at all), and the psychological standard by which the screening results are compared. Evaluation of service-symptom relationships is also likely to be enhanced by research that includes close monitoring of both the service being provided and any corresponding changes in children's symptoms and behavior.

At the same time, the research is strengthened by the study design to provide nationally-representative estimates of the study topics. Issues of missing data have been addressed with analyses comparing included and excluded cases to the extent possible. The research has also been conducted using well-validated measures of children's mental health, which allows for more confident conclusions about how child welfare-involved children

compare with other children, and how their reported symptom status might relate to their risk of serious mental disorder.

Future directions

The research highlights the need to learn more about children's symptom patterns, both in relation to maltreatment and other circumstances in children's lives, but also as a line of basic research. Children show consistent problems with mental health over a three-year period, but not typically within one symptom-dimension, complicating what we know about how serious mental disorders develop. Future research is needed to track the development of depression following maltreatment, since the rates and consequences of adult depression are increasing in the U.S. and worldwide, and to explore the link between early thought and attention problems and mental disorders.

Research is needed in local communities to address topics related to screening maltreated children for mental health problems. Specific questions include: (1) to what extent do available screening instruments identify maltreated children with mental health problems, (2) how receptive are families to mental health screening for their children, and (3) does screening increase children's use of services? Evaluations are needed of the screening activities of local child welfare agencies making changes in this regard.

Finally, the need for evidence-based practice related to children's mental health is evident, and suggests the need for more details about the types of services that children receive. In particular, information is needed about school, child welfare, and mental health service linkages and how school-based identification of children's problems relates to service receipt and improvements in children's mental health.

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