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Long-term mental health services use in children referred to a clinical intervention

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ABSTRACT

Background: Recent advancements in pediatric mental health (MH) increased accessibility of evidence-based interventions. Yet, accessibility alone does not explain the rise in MH services use (MHSU). Maltreatment-related adversity, symptom severity, and access to early interventions have been linked to ongoing need for services, yet their joint contributions to continuities in MHSU remain unclear.

Objective: The study examines the role of maltreatment, externalizing symptom severity, and referral for early intervention in pediatric MHSU across five years. To evaluate engagement in treatment, we accounted for treatment progress and referral type, comparing MHSU in court-mandated and voluntary participants.

Participants and setting: Participants were 321 children ($M = 4.3$ years; 58.9 % boys) referred to parent–child interaction therapy (PCIT), an evidence-based intervention for families struggling with child disruptive behaviors and maltreating families involved with child welfare. Services were provided at a university-affiliated clinic in a metropolitan county.

Method: Symptom severity was assessed with standardized questionnaires; maltreatment history and referral type were obtained from casefile reviews. MHSU was tracked through county behavioral health diagnostic reports. The data were analyzed using structural equation modeling.

Results: Results indicated that for the 44.9 % of children with onward referrals, the frequency of service use, but not progress in treatment, predicted ongoing services. Maltreatment emerged as a universal predictor, while externalizing predicted MHSU only in court-mandated participants, suggesting referral type contributes to quantifiable differences in MH needs.

Conclusions: Findings emphasize importance of ongoing funding for pediatric MH services, and the need to explore mechanisms underlying continuous MHSU in vulnerable children.

1. Introduction

Adaptive functioning is a strong predictor of positive outcomes throughout the lifespan, bringing pediatric mental health (MH) to the forefront of science and public policy. Maltreated and traumatized children are particularly likely to have unmet MH service needs (Leslie et al., 2005). Mounting scientific evidence supports early childhood evidence-based interventions as effective for targeting common childhood MH diagnoses, such as conduct-related disorders (Hambrick, Oppenheim-Weller, N'zi, & Taussig, 2016; Toth, Gravener-Davis, Guild, & Cicchetti, 2013). These findings informed recent changes in policy, from Medicaid expansion (The Patient Protection and Affordable Care Act of 2010, P.L. §§ 111–148) to the introduction of the Family First Prevention Services Act of 2018 (Bipartisan Budget Act of 2018, H.R. § 1892, 115th Congress. 2017–2018). Increased accessibility of evidence-based clinical interventions represents a significant milestone in addressing childhood disorders.

At the same time, expansion of clinical services and changes in diagnostic criteria do not fully account for the steady increase in pediatric mental health services use (MHSU) in recent years (Glied & Cuellar, 2003; Gopalan et al., 2010). To design an effective public health response strategy to meet the complex needs of children at risk for psychopathology, more research is needed on factors contributing to continuities and discontinuities in pediatric MHSU. Stability of childhood diagnoses, individual risks undermining adaptive functioning, and access to early interventions are vital components to charting trajectories of MHSU over time. Although recent studies investigated these factors individually, little is known about how they fit together within a broader picture of pediatric mental health.

The goal of the current study is to investigate continuities and discontinuities in MHSU in vulnerable children referred to an early clinical intervention, accounting for the degree of engagement in treatment and relevant socio-demographic characteristics, such as symptom severity, maltreatment history, and age of the child. First and foremost, the study bridges existing research on stability of MHSU, focused on specific socio-demographic factors and diagnoses. Second, utilization of administrative data on MHSU allows us to track referrals longitudinally. Third, children in our sample have been referred to a pediatric MH clinic, enabling us to probe for differences in long-term MHSU trajectories based on participation in an early evidence-based behavioral intervention. Finally, the study accounts for the degree of treatment engagement, using type of referral (i.e. mandated) and dosage of treatment as proxies, allowing us to contrast outcomes for children who are court-mandated vs. voluntarily participating in treatment.

1.1. Long-term stability of clinical symptoms in pediatric patients

Studies generally find moderate stability of symptomatic profiles over time, with some variation by informants, diagnoses, and socio-demographic factors (Deutz et al., 2020; Glied & Cuellar, 2003; Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). However, much research on continuities in pediatric MH symptoms relies on standardized clinical questionnaires. While this approach captures variability in symptom severity over time, lack of comprehensive clinical assessments and controls for early intervention participation present some limitations. To this end, a MHSU metric offers several benefits. First, it capitalizes on the strong association between the presence of childhood MH diagnosis or functional impairment and MHSU, whereas the link between symptom severity and MHSU is not clear (Gopalan et al., 2010; McKay & Bannon, 2004). Second, to the degree that a child's use of services reflects their adaptive functioning, MHSU can be tested for continuities regardless of the actual diagnoses or changes in providers. Third, it provides information on the effectiveness of early intervention, critical to understanding MHSU trends in pediatric patients. Although greater availability of administrative datasets increased visibility of a MHSU metric, it has been primarily examined with children in the Child Welfare System (CWS; Bellamy, Gopalan, & Traube, 2010; Burns et al., 2004; Hurlburt et al., 2004) and adults (Wang et al., 2005), including those with a childhood diagnosis (Du Rietz et al., 2020). Cumulatively, the evidence lends support for high comorbidity and long-term stability of externalizing psychopathology.

1.2. Characteristics associated with mental health services use

Factors commonly associated with clinical services utilization include children's conduct problems, age, maltreatment-related adversity, and involvement with the CWS (Burns et al., 2004; Gopalan et al., 2010; Hurlburt et al., 2004).

1.2.1. Conduct problems

Behavioral dysregulation, undermining adaptive functioning in multiple domains, is highly prevalent and fairly persistent between early and middle childhood, with estimates ranging between 9 % and 21 % (Acri, Chacko, Gopalan, & McKay, 2018; Deutz et al., 2020; McKay & Bannon, 2004; Polanczyk et al., 2015). Due to these characteristics, conduct problems constitute the most common reason for MH referrals (Acri et al., 2018; Gopalan et al., 2010), regardless of their etiology. Duration and intensity of aggressive and disruptive behaviors carry particular weight in clinical decision-making (Burns et al., 2004; Gopalan et al., 2010; Hurlburt et al., 2004). Children with higher symptom severity are more likely to come in contact with MH system, and may be referred for multiple, overlapping services (Glied & Cuellar, 2003). At the same time, severity of behavioral dysregulation places children at higher risk for dropping out of treatment compared to children with internalizing problems (Acri et al., 2018; Gopalan et al., 2010; McKay & Bannon, 2004).

1.2.2. Maltreatment and involvement with the child welfare system

The trauma of childhood maltreatment, including neglect, physical and sexual abuse, carries long-term implications for childhood MH. Although specific developmental consequences of maltreatment vary depending on the timing, type, and severity of abuse or neglect, it is thought to be particularly detrimental to self-regulation, which develops rapidly in early childhood (Toth et al., 2013; Witt

et al., 2016). The downstream consequences of lower self-regulation include lack of age-expected social skills and behavioral competencies. These deficits undermine adaptive functioning, increasing risk of disruptive behavior disorders requiring long-term care (Barth et al., 2005; Burns et al., 2004; Hurlburt et al., 2004; Toth et al., 2013). Moreover, maltreatment often occurs within the broader context of poverty and exposure to interpersonal violence, with over 60 % of U.S. children experiencing or witnessing violence each year (Gopalan et al., 2010). Chronic exposure to violence and deprivation contributes to behavioral dysregulation; yet, higher MH needs associated with high-risk contexts are at odds with lower service accessibility, further disadvantaging vulnerable children (Acri et al., 2018; Gopalan et al., 2010; Toth et al., 2013).

One way hard-to-reach children may be connected to services is through the CWS (Leslie et al., 2005). Despite estimates that only 12 % of CWS–involved children with clinical levels of externalizing behaviors receive needed services, children in out-of-home placements are more likely to be referred for services than children with similar behavioral problems outside of foster care (Burns et al., 2004; Hurlburt et al., 2004). Aside from placement type, maltreatment type is another factor that affects the rate of referrals. For instance, sexually abused children are more likely to receive MH referrals than children with histories of neglect (Burns et al., 2004). Some socio-demographic factors, such as age, contributes to differences in the odds of referrals. In summary, studies examining MHSU in child welfare dependents provide valuable information regarding ongoing MH needs of maltreated and traumatized children but offer limited insight on how MHSU in these samples stacks up against trends observed in the general population.

1.2.3. Age

While older child age generally corresponds to higher MH service needs, epidemiological data show both positive and negative associations between age and MHSU (Gopalan et al., 2010; McKay & Bannon, 2004). For instance, Hurlburt et al. (2004) found that age was positively associated with the odds of clinical referrals in CWS–involved children, even after controlling for externalizing behavior. At the same time, Burns et al. (2004) reported that younger children, particularly with a history of sexual abuse, were more likely to come into contact with pediatric MH care.

1.3. The role of early intervention in long-term mental health services use

Research generally supports the effectiveness of evidence-based interventions in improving self-regulation and socio-behavioral competence (Toth et al., 2013), which may reduce the need for services. However, follow-up protocols set to evaluate retention of treatment gains, particularly reduction in symptom severity and improvement in adaptive functioning, are relatively short, ranging between one month and two years post-treatment (Nixon, Sweeney, Erickson, & Touyz, 2004). Moreover, adaptive functioning is assessed with treatment-specific questionnaires rather than independent metrics, such as MHSU. Finally, outcomes may vary by intervention quality and treatment engagement (Acri et al., 2018).

1.3.1. Intervention quality

One challenge in assessing the role of early intervention in long-term MH functioning is vulnerable children's access to high quality empirically-based treatments with fidelity in a community MH setting. For instance, one nationally representative study that found no effects of early intervention on long-term adaptive functioning in foster children attributed it to inconsistent access to evidence-based treatment modalities in the CWS (Bellamy et al., 2010). Glied and Cuellar (2003) similarly noted that a clinical referral for services is not an antecedent to improvements in children's long-term MH, reporting that in some cases the subpar quality of interventions and diffusion of responsibility when children are referred to multiple services may have detrimental, rather than positive, effects. At the same time, maltreated and traumatized children's participation in evidence-based programs is related to improvements in adaptive functioning (Barth et al., 2005; Hambrick et al., 2016).

1.3.2. Treatment engagement

Another factor that may affect post-intervention need for services is treatment engagement, traditionally quantified by the number of attended sessions or treatment completion (Acri et al., 2018). However, this practice has been increasingly criticized as insufficient, as it does not reflect true progress in treatment, clients' "buy-in", or attitudes toward treatment (Acri et al., 2018; Gopalan et al., 2010; McKay & Bannon, 2004). We identified two approaches to gauge treatment engagement that meet criteria of practical feasibility and relevance for maltreating families. First, looking at the phase of treatment at discharge has been proposed as a better indicator of treatment engagement than the number of sessions, as programs vary in length and attendance requirements (Gopalan et al., 2010; McKay & Bannon, 2004). Second, considering the differences between CWS–involved and community-referred families, distinguishing between voluntary and court-mandated participation may be linked to differences in motivation for treatment (Barth et al., 2005; Beckmann, Knitzer, Cooper, & Dicker, 2010).

Each year an estimated 850,000 U.S. families participate in parent training programs which they attend voluntarily or are court-mandated to attend for family maintenance or reunification (Barth et al., 2005; Beckmann et al., 2010). Given the benefits of treatment completion and the challenges to participation faced by high-risk families (Acri et al., 2018), mandated attendance is a promising strategy to engage maltreating families in clinical programs (Barth et al., 2005; Beckmann et al., 2010; Mirick, 2018). Despite the wide use of this practice, there is no consensus on the effectiveness of court-mandated attendance with CSW–involved families. Reports range from success attributed to consistent attendance (Geller & Srikameswaran, 2006; Snyder & Anderson, 2009) to null effects (Sotero, Moura-Ramos, Escudero, & Relvas, 2018), to ethical concerns regarding the dampening effect of mandated attendance on families' agency, motivation, and readiness for change (Mirick, 2018).

1.4. The present study

This study advances understanding of current trends in long-term pediatric MH by bridging gaps in research on early intervention effects on child adaptive functioning and rates of MHSU. We track five years of MHSU in children referred to parent–child interaction therapy (PCIT), an early evidence-based, relational intervention for children two to seven years of age and their caregivers (Eyberg, 1988). Several characteristics of PCIT position it as an excellent candidate treatment for exploring the role of early intervention participation in long-term pediatric MHSU. First, PCIT is a widely recognized evidence-based treatment, available in an array of modalities nationally and internationally (see www.pcit.org). Second, effectiveness of PCIT has been extensively studied with populations from a wide range of socio-demographic backgrounds and clinical diagnoses, increasing outcome generalizability (Taylor, Charles Wilson, & Igelman, 2007). Third, PCIT gains, including reductions in child externalizing behavior, were found to last up to six years post-treatment (Hood & Eyberg, 2003; Nixon et al., 2004), suggesting that early interventions produce lasting changes in child adaptive functioning, which can be explored longitudinally.

The overarching aim of this study is to assess whether referral to an early intervention is associated with discontinuities in long-term MHSU and explore potential mechanisms underlying such effects. To address this goal, we account for dose of exposure to PCIT and type of referral as proxies for treatment engagement. The dose is indexed by phase of treatment at PCIT discharge, rather than the number of attended sessions. The standard PCIT protocol encompasses two phases: child-directed interactions (CDI), aimed at enhancing parent–child relationships by teaching positive parenting skills; and parent-directed interactions (PDI), targeting increases in child compliance by teaching parents behavior management techniques (see Taylor et al., 2007). Each didactic session is followed by as many in-vivo coaching sessions as it takes individual families to meet set mastery goals. To graduate, a family must demonstrate mastery of CDI and PDI skills. This PCIT characteristic allows us to draw meaningful comparisons between those who have never started treatment, those who completed the first phase (i.e. CDI), and those who completed CDI and PDI phases (Acri et al., 2018; Gopalan et al., 2010; McKay & Bannon, 2004). Moreover, we account for the referral type as a potential confounding to motivation for treatment, particularly relevant with maltreating dyads. Because of PCIT's effectiveness with CWS-involved families (Hambrick et al., 2016; Toth et al., 2013), PCIT providers receive referrals from a variety of sources. In community-referred cases, attendance is voluntary, with the primary goal to address child conduct problems. In contrast, CWS–involved families may be court-ordered to attend PCIT in leu of a parenting program requirement (Barth et al., 2005; Beckmann et al., 2010).

Finally, considering that the presence of earlier risk factors may exacerbate ongoing MH needs, we examine externalizing symptom severity and history of maltreatment as predictors of MHSU. Based on previous research, we hypothesize that in the total sample, (H_{1a}) history of maltreatment and (H_{1b}) higher levels of initial externalizing behavior predict more months in MH services after PCIT discharge; (H_2) a higher dose of exposure to PCIT predicts fewer months with open referrals for MH services either by directly decreasing the odds of referrals or by mediating effects of individual risks on MHSU; and (H_3) relations between predictors and outcomes vary as a function of voluntary vs. court-mandated participation.

2. Method

2.1. Study participants

Participants were 321 English-speaking children (58.9 % boys) 2–7 years of age ($M_{age} = 4.3$, $SD = 1.3$) and their biological mothers ($M_{age} = 28.5$, $SD = 5.9$). The sample was ethnically diverse, with 46.3 % mothers and 47.5 % of children identified as Non-Hispanic White, 22.5 % of mothers and 29.7 % of children as African American, 21.6 % mothers and 19.1 % of children as Latinx, and 9.7 % of mothers and 3.8 % of children identified with other ethnicities. Educational attainment was at or below high school level for the majority of mothers (76.5 %), over a third were single (35.8 %), and just over half (56.2 %) reported an annual income of $10,000 or less.

2.2. Measures

2.2.1. Demographics

To control for group demographics, participant's age, gender, ethnicity, caregiver's marital status, educational level, and yearly income were gathered from the Family Life Questionnaire, developed by the University clinic's research team. Maternal mental health and criminal involvement, as well as children's exposure to domestic violence and history of foster care were collected from referrals and casefile reviews. In our sample, 31.5 % of mothers had a history of mental health diagnosis or treatment, and 13.3 % had a criminal record. Over half of all children were exposed to domestic violence (65.1 %) or had been in foster care (65.7 %).

2.2.2. Maltreatment

Children's exposure to maltreatment was obtained from information on referrals and supporting documentation, such as dependency court records. Participants without records of allegation, suspicion, or documentation of physical abuse, sexual abuse, or neglect, were coded as risk-negative and assigned a score of 0. Those coded as risk-positive were assigned a score of 1–3, depending on how many types of maltreatment were documented for that participant. The Kuder–Richardson coefficient $KR = .40$ was modest, but acceptable, considering distinct maltreatment types represented by these items (Ryff & Keyes, 1995). Records indicated suspected or documented physical abuse for 35.2 % of cases, sexual abuse for 8.4 % of cases, and neglect for 58.9 % of cases. Cumulative numbers exceed 100 %, as approximately one in four participants (23.7 %) experienced more than one type of maltreatment, whereas 5.0 % had

no record of maltreatment.

2.2.3. Symptom severity

A latent externalizing factor was created based on pre-treatment scores of the externalizing broadband of the Child Behavior Checklist (CBCL 1.5–5; CBCL 6–18; Achenbach, Rescorla, & Maruish, 2004) *aggressive behaviors subscale* ($\alpha = 0.73$); the Brief Parenting Stress Index Short Form (BPSI-SF–4; Abidin, 2012) *difficult child subscale* ($\alpha = 0.90$); and the Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999) *problem behaviors intensity subscale* ($\alpha = 0.79$). The externalizing ($\alpha = 0.90$) and internalizing ($\alpha = 0.86$) broadband scores of the CBCL were also used in descriptive and post hoc analyses. At intake, children generally presented with externalizing symptom severity in the borderline or clinical range ($M_{ext} = 60.6$, $SD = 14.8$) of the CBCL and slightly lower levels of internalizing symptoms ($M_{int} = 55.6$, $SD = 11.6$). Post-treatment externalizing ($M_{ext} = 46.0$, $SD = 11.2$) and internalizing ($M_{int} = 43.8$, $SD = 10.8$) scores averaged below the borderline cutoff.

2.2.4. Treatment engagement

Treatment engagement was assessed in two ways. First, to account for progress in treatment, *dose of exposure to PCIT* was calculated for each participant, based on the phase of treatment at discharge (0 = no CDI sessions, 1 = some CDI sessions, 2 = completed CDI, 3 = completed CDI and some PDI sessions, 4 = completed CDI and PDI). More than half of the dyads (62.6 %) did not complete treatment, with 10.6 % dropping out after intake, 35.5 % prior to meeting CDI mastery goals, 4.0 % after CDI but prior to starting PDI, and 12.5 % after some PDI sessions. Second, to account for potential differences in motivation, participants were dichotomized by *type of referral* (0 = voluntary, 1 = court-mandated) as indicated in PCIT referral forms and CWS–related documentation. Over half of our sample (58.9 %) were referred by a pediatrician, a specialty clinic, or an outreach agency and participated voluntary, whereas the rest (41.1 %) were stipulated to attend PCIT by the local CWS.

2.2.5. Mental health services use

Clinical referrals and diagnostic movement history post-PCIT were pulled for each participant from *Avatar*, the county behavioral health treatment tracking system. The number of months a referral stayed active served as a proxy for the number of months a child was engaged in treatment. All months of treatment were aggregated for each child across five 12-month periods, starting from the date of PCIT discharge. Referrals that were active for less than a month were excluded to account for automatically generated referrals where treatment was declined or did not progress past the initial assessment.

2.3. Procedure

Participants were recruited between 2001 and 2012 from one university-affiliated clinic providing outpatient MH services to children eligible for subsidized insurance in a moderate-sized metropolitan county. Mothers filled out a battery of standardized clinical assessments at intake (pre-treatment), after meeting CDI mastery goals (mid-treatment), and after completing PDI (post-treatment). The study was approved by the University Institutional Review Board. All families received standard PCIT services, regardless of study participation or type of referral. The rate of attrition is within the 60 % range typically reported for early behavioral interventions and parent training programs (Acri et al., 2018; McKay & Bannon, 2004). In contrast, the average number of attended sessions ($n = 13$, $SD = 8.9$) was three times higher, while the proportion of families who dropped out after intake was four times lower than the national averages (Gopalan et al., 2010).

2.4. Analytical plan

After confirming adequate inter-variable correlations (Table 2), Structural Equation Modeling (SEM; Bollen, 1989) analyses were carried out in R 3.4.1, package *lavaan* (Rosseel, 2012), using maximum likelihood estimation for missing data (less than 1 %).

2.4.1. Main model

Five outcome variables, one for each year of MHSU post PCIT were regressed on four predictors—externalizing behaviors, maltreatment, dose of exposure to PCIT, and child's age. To examine rank-order stability of MHSU after PCIT, we added autoregressive paths where each year of MHSU predicted the next (Selig & Little, 2012). Finally, predictive paths were added from maltreatment, externalizing behaviors, and child's age to dose of exposure to PCIT. The externalizing factor was allowed to covary with maltreatment and child's age. For parsimony, equality constraints were imposed between the three indicators of the externalizing factor, and between the autoregressive paths predicting MHSU in years *2*, *3*, *4*, and *5* (see *Supplemental Materials*). Of note is that equal unstandardized estimates often appear to vary when presented in a standardized form, however, they are not statistically different from each other. The path between MHSU in years *1* and *2* was freely estimated to allow for follow-up mediation analyses. Differences in MHSU by year were tested with repeated measures *Analyses of Variance* (*ANOVA*). A series of *t*-tests were used in post-hoc tests of differences between children who did and did not use services after PCIT.

2.4.2. Multi-group moderation

To test for moderation, group differences by referral type were examined in multi-group SEM analyses. Following invariance testing, the configural model was fitted to the data from voluntary and court-mandated participants.

2.4.3. Multi-group mediation

We explored mechanisms by which PCIT may have affected MHSU in mediation analyses. Using the multi-group model, we tested whether dose of exposure to PCIT mediated effects of maltreatment and externalizing behaviors on MHSU. The outcomes were constrained to the first two years after PCIT.

3. Results

3.1. Main analyses

The final configural model yielded excellent fit, $\chi^2(27) = 34.54$, $p > .05$, CFI $= 0.99$, TLI $= 0.99$, RMSEA $= 0.03$. Based on the data from all participants, small-magnitude effects were found for maltreatment ($\beta = 0.28$, $SE = 0.08$, $p < .01$) and externalizing behavior ($\beta = 0.23$, $SE = 0.07$, $p < .01$) on MHSU in year *1*, but not subsequent years. Neither child's age nor dose of exposure to PCIT predicted MHSU across the 5-year follow-up, but post-hoc paired *t*-tests confirmed that children who completed PCIT experienced reductions in externalizing, $t(85) = 9.24$, $p < .001$, Cohen's $d = 0.99$, and internalizing symptom severity, $t(85) = 8.32$, $p < .001$, Cohen's $d = 0.94$. In contrast, only externalizing symptoms improved in children who completed CDI but not PDI, $t(21) = 2.83$, $p < .05$, Cohen's $d = 0.44$. The lower magnitude of effect in reduction of externalizing and no change in internalizing symptom severity in this group underlie differences in symptom change scores between those who completed CDI and those who completed CDI and PDI. Group differences in reduction of symptom severity were significant for externalizing, $t(106) = 3.89$, $p < .001$, and internalizing symptoms, $t(106) = 2.59$, $p < .05$.

The best predictor of MHSU in each year after PCIT was the frequency of service use in the preceding year (see Figs. 1 and 2). The omnibus *F*-test showed no differences in mean frequencies of MHSU in any of the five years, $F(4, 1600) = 0.19$, $p > .05$. Follow-up analyses comparing children who actively used MH services after PCIT to those who did not, showed no differences in ethnicity, age, or clinical levels of externalizing or internalizing symptoms at pre- or post-treatment assessments. In terms of symptom severity, the group with onward referrals were higher in intensity of internalizing symptoms at intake, $F(1, 250) = 5.32$, $p < .05$, and externalizing symptoms at discharge, $F(1, 84) = 5.28$, $p < .05$. Two factors that set these groups apart were maltreatment history and child's gender. Children with extensive use of services after PCIT were more likely to be boys, $\chi^2(1) = 9.29$, $p < .01$, have a history of maltreatment,
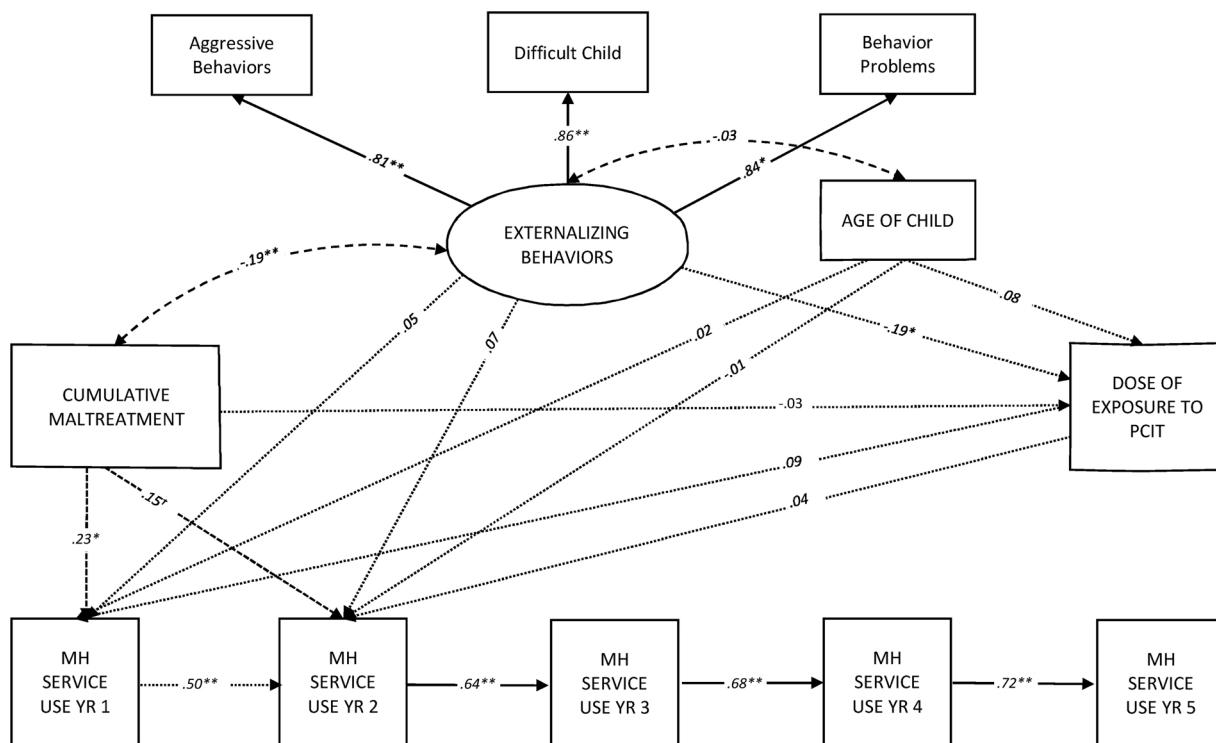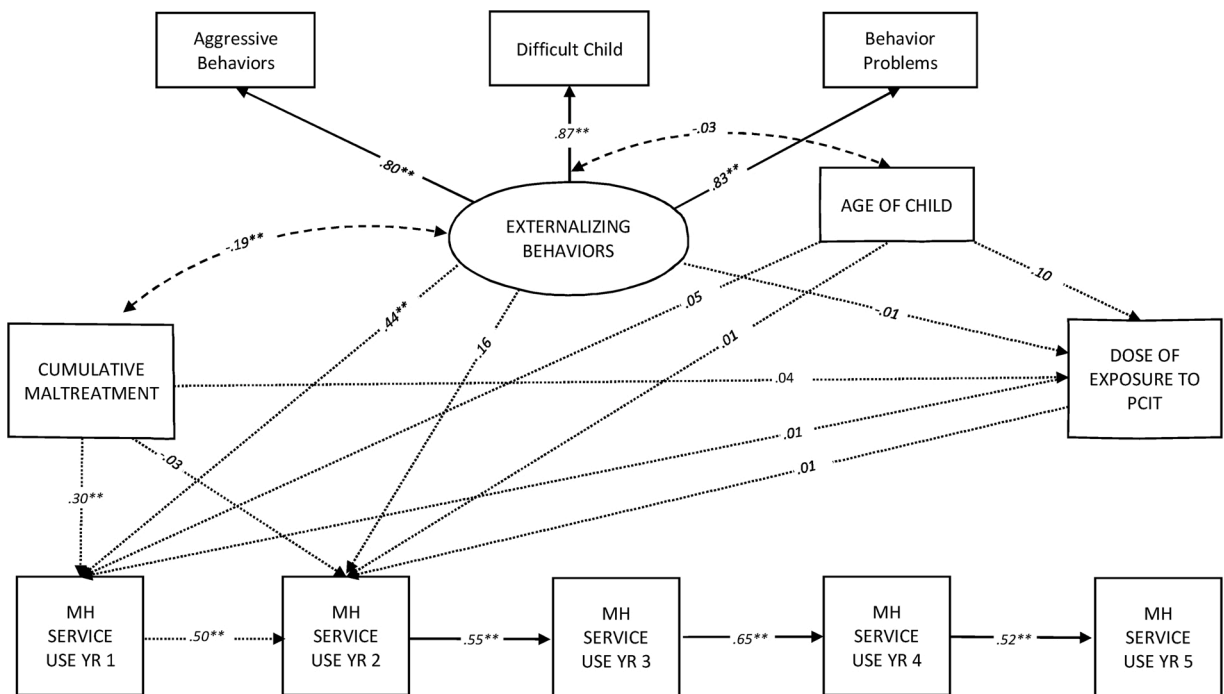

Fig. 1. Multigroup model fit indices for the voluntary group: $\chi^2(67, n = 189) = 36.27$, $p = .184$, CFI $= 0.99$, TLI $= 0.99$, RMSEA $= 0.03$. Non-significant paths are omitted, except those used in estimation of mediation (denoted by dotted lines). Solid lines indicate equality constraints. Coefficients are reported in a standardized form; $^{\dagger}p = .05$; $*p < .05$; $**p < .01$. Abbreviations: MH, mental health; YR, year; PCIT, parent—child interaction therapy.

Note 1: The negative covariance between externalizing and maltreatment is an artifact of these data representing both, community cases referred for high externalizing behaviors, and court-ordered cases, where neglect, uniquely implicated in the development of internalizing problems, is the most common form of maltreatment.

Fig. 2. Multigroup model fit indices for the court-mandated group: $\chi^2(67, n = 132) = 40.97$, $p = .184$, CFI and TLI = 0.99, RMSEA = 0.03. Non-significant paths are omitted, except those used in estimation of mediation (denoted by dotted lines). Solid lines indicate equality constraints. Coefficients are reported in a standardized form; $*p < .05$; $**p < .01$. Abbreviations: MH, mental health; YR, year; PCIT, parent—child interaction therapy.

Note 1: The negative covariance between externalizing and maltreatment is an artifact of data representing both, community cases referred for high externalizing behaviors, and court-ordered cases, where neglect, uniquely implicated in the development of internalizing problems, is the most common form of maltreatment.

Note 2: The direct path from maltreatment to MHSU in year *2* has a small negative effect. Given that lack of significance indicating no true suppressor effect, and the sample size under 500, we chose to use absolute value for this path estimate when calculating proportion mediated. This approach is useful when standard estimation methods result in mediation effects in excess of 100 % (e.g. MacKinnon, Fairchild, & Fritz (2007). Mediation analysis. *Annu. Rev. Psychol.*, *58*, 593–614.).

$\chi^2(1) = 10.58$, $p < .01$, and experience more types of maltreatment, $\chi^2(3) = 13.14$, $p < .01$, than children without onward referrals. Although no gender differences in clinical symptom severity emerged at any treatment timepoint, mothers of boys reported higher intensity of externalizing symptoms at PCIT intake, $F(1, 250) = 9.08$, $p < .01$, and discharge, $F(1, 84) = 14.77$, $p < .001$, and higher internalizing behaviors at discharge, $F(1, 84) = 6.77$, $p < .05$, than mothers of girls.

To better understand these differences, we used the Reliable Change Index statistic (RCI; Jacobson & Truax, 1992) to compare the magnitude of pre-to-post change in symptom severity by gender. The RCI, designed to measure meaningful clinical change, accounts for the initial standard deviation (*SD*), the change score (*CS*), and measure test-retest reliability. For these analyses, the reliability was set to $r = 0.88$, based on the average of test-retest reliability scores reported for the CBCL 1.5–5 ($r = 0.85$) and CBCL 6–18 ($r = 0.90$; Achenbach et al., 2004). Although the paired sample *t*-tests showed significant pre-to-post change in internalizing and externalizing symptoms in boys and girls, only girls had a change scores above the calculated RCI for externalizing (CS = 14.20; RCI = 13.22) and internalizing behaviors (CS = 11.88; RCI = 11.40). For boys, the change scores approached, but did not exceed RCI either for externalizing (CS = 10.98; RCI = 12.71) or internalizing (CS = 8.83; RCI = 9.96) symptoms. These results point to potential, although minimal, gender differences in magnitude of treatment gains.

3.2. Multi-group moderation analyses

Prior to multi-group analyses, court-mandated and voluntary dyads were compared on demographic variables, child maltreatment-related adversity, dose of exposure to PCIT, levels of externalizing and internalizing behaviors at PCIT intake and discharge, and the rate of MHSU. Results indicated no group differences (see Table 1), suggesting no modifications were necessary in order to fit the configural model to the multi-group data. Measurement invariance was established for factor loadings, intercepts, covariances, and residuals, suggesting that the constructs did not differ between the two groups. However, constraining the regression paths to be equal across the two groups resulted in a significantly worse fit, pointing to group differences in the strength of associations among variables (see Supplemental Materials). Based on invariance tests, the model was constrained to between-group equivalence in all parameters other than the predictive paths, which were freely estimated for each group. The solution based on 10,000 bootstrapped samples is

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Table 1

Mother and child demographics, PCIT progress at discharge, child maltreatment history and symptom severity by treatment status.

Characteristic	Voluntary (n = 189)	Court-Mandated (n = 132)	Effects
Mother Demographics			
Mean age (SD)	27.6 (6.0)	26.9 (5.6)	$F(1, 284) = 2.81$
Ethnicity of mother			$\chi^2(3) = 2.73$
Caucasian	46.8 %	45.5 %	
African American	24.5 %	19.7 %	
Hispanic	18.6 %	25.7 %	
Other[a]	10.1 %	9.1 %	
Education (less than high school)	18.2 %	15.4 %	$\chi^2(1) = 2.20$
Marital status (% single)	35.8 %	24.9 %	$\chi^2(1) = 0.00$
Mental health (diagnosed or treated)	31.5 %	24.9 %	$\chi^2(1) = 4.04$
Criminal history	13.3 %	11.6 %	$\chi^2(1) = 2.04$
Child Demographics			
Mean age (SD)	4.2 (1.2)	4.2 (1.3)	$F(1, 319) = 0.24$
Percent male	37.5 %	23.3 %	$\chi^2(1) = 0.27$
Ethnicity of child			$\chi^2(3) = 3.86$
Caucasian	44.1 %	52.3 %	
African American	33.5 %	24.2 %	
Hispanic	18.1 %	20.5 %	
Other[a]	4.3 %	3.0 %	
Maltreatment-Related Adversity[b]			
Physical Abuse	20.2 %	15.0 %	$\chi^2(1, n = 321) = 0.13$
Sexual Abuse	4.0 %	4.4 %	$\chi^2(1, n = 321) = 1.40$
Neglect	31.2 %	27.7 %	$\chi^2(1, n = 321) = 6.77$
Domestic Violence	38.0 %	27.1 %	$\chi^2(1, n = 321) = 0.06$
Foster Care History	38.0 %	27.7 %	$\chi^2(1, n = 321) = 0.29$
More than 1 Type of Abuse	12.1 %	11.5 %	$\chi (1, n = 321) = 0.24$
Cumulative Maltreatment Count			$\chi^2(1, n = 321) = 5.51$
0 Counts	17.4 %	8.7 %	
1 Count	29.3 %	20.9 %	
2 Counts	10.3 %	8.4 %	
3 Counts	1.9 %	3.1 %	
Dose of exposure to PCIT			$\chi^2(1, n = 321) = 1.67$
Never Started Treatment	10.6 %	10.6 %	
Some CDI Sessions	36.5 %	34.1 %	
Completed CDI Phase	4.8 %	3.0 %	
CDI and Some PDI Sessions	13.2 %	11.4 %	
Completed CDI and PDI	34.9 %	40.9 %	
Symptom Severity			
Externalizing at PCIT intake	60.3 (13.6)	61.0 (14.9)	$F(1, 250) = 0.18$
Externalizing at PCIT discharge	47.8 (11.2)	43.5 (10.1)	$F(1, 84) = 3.10$
Internalizing at PCIT intake	55.6 (11.2)	55.6 (12.1)	$F(1, 250) = 0.00$
Internalizing at PCIT discharge	45.4 (11.0)	41.4 (10.2)	$F(1, 84) = 2.83$

Note. No associations were significant at the $\alpha = 0.01$ level, set to decrease the risk of the Type 1 error with multiple significance testing.
Abbreviations: PCIT, parent—child interaction therapy, CDI, Child-Directed Interaction phase; PDI, Parent-Directed Interaction phase.
[a] Child and mother's ethnicity "Other" includes Native-American, Pacific-Islander, Russian, and "Other".
[b] Types of maltreatment exceed 100 % due to some children having more than one type of maltreatment documented.

Table 2

Pearson correlations of variables in the analyses.

n = 321	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Aggressive behaviors (CBCL)	–												
2. Difficult child (B-PSI)	.64**	–											
3. Behavior problems (ECBI)	.70**	.75**	–										
4. Physical abuse	−.09	−.09	−.11	–									
5. Sexual abuse	.10	.05	.14*	.20**	–								
6. Neglect	−.13*	−.23**	−.24**	.06	.07	–							
7. Dose of exposure to PCIT	−.12*	−.14*	−.06	.02	.04	.01	–						
8. Age of the child	−.03	−.05	.01	−.05	.08	−.03	.09	–					
9. MH services use in year 1	.12*	.16**	.15**	.21**	.16**	.10	.06	.01	–				
10. MH services use in year 2	.17**	.13*	.14*	.13*	.16**	.07	.05	.03	.55**	–			
11. MH services use in year 3	.11	.04	.06	.10	.11*	.06	.08	−.04	.22**	.53**	–		
12. MH services use in year 4	.15**	.04	.09	.05	.05	.01	.01	−.08	.16**	.39**	.68**	–	
13. MH services use in year 5	.09	.05	.08	.07	.09	−.01	.01	−.06	.17**	.32**	.46**	.64**	–

Note. Abbreviations: CBCL, Child Behavior Checklist; B-PSI, Brief Parenting Stress Inventory, PCIT, parent—child interaction therapy. *$p < .05$; **$p < .01$.

presented by group in the two diagrams in Figs. 1 and 2.

Maltreatment history positively predicted MHSU for both voluntary ($\beta = 0.23$, $SE = 0.10$, $p < .01$) and court-mandated ($\beta = 0.30$, $SE = 0.11$, $p < .01$) participants, but only in the first year after PCIT. For voluntary dyads, higher externalizing symptoms were associated with a lower dose of exposure to PCIT ($\beta = -0.29$, $SE = 0.13$, $p < .05$), whereas for court-mandated participants, severity of externalizing behavior predicted a higher rate of MHSU in the first-year post PCIT ($\beta = 0.44$, $SE = 0.10$, $p < .01$). Autoregressive estimates linking consecutive years of MHSU did not differ between voluntary (Fig. 1) and court-mandated (Fig. 2) groups in multi-group analyses.

3.3. Multi-group mediation analyses

After our main analyses showed no direct effect of PCIT on MHSU, we sought to explore whether exposure to PCIT acted as a mediator between individual risks and MHSU. Contrary to our expectations, we found no evidence that dose of exposure to PCIT mediated effects of maltreatment or initial externalizing symptom severity on MHSU after PCIT in either voluntary or court-mandated participants. Instead, effects of maltreatment and externalizing behavior were mediated by MHSU in the first year after PCIT, affecting MHSU in the following year. Interestingly, these mediational pathways diverged by type of referral (refer to Figs. 1 and 2). For voluntary participants, effects of maltreatment on MHSU in year *1* accounted for 42.7 % of variance in MHSU in year *2*, $\beta = 0.12$, $SE = 0.05$, $p < .01$; 95 % CI [14.3 %, 87.5 %]. In contrast, for court-mandated participants, the amount of variance in MHSU in year *2* accounted by the same relations increased twofold, registering at 80.9 %, $\beta = .15$, $SE = 0.07$, $p < .01$; 95 % CI [33 %, 96 %]. Additional variance (30.8 %) in MHSU in year *2* in this group was explained by the effect of externalizing behavior on MHSU in year *1*, $\beta = 0.22$, $SE = 0.08$, $p < .01$; 95 % CI [14 %, 52.9 %].

4. Discussion

4.1. Long-term mental health services use in vulnerable children

The study aimed to explore long-term pediatric MHSU, accounting for relations between common risk factors, referral to an early clinical intervention, and treatment engagement. Over a 5-year period, we tracked pediatric referrals to clinical or psychiatric services in children who participated in PCIT with their mothers. The choice of PCIT for this study was based on extensive literature documenting decreases in maltreatment-related trauma symptoms, behavioral and internalizing problems, as well as socio-emotional impairments associated with autism, ADHD, and developmental delays (Barth et al., 2005; Taylor et al., 2007). Beyond overall trends in MHSU, we were particularly interested in the role of maltreatment-related adversity, externalizing symptom severity, and engagement in PCIT.

4.1.1. Maltreatment and externalizing symptom severity

As expected, maltreatment and externalizing behavior predicted MHSU in our sample. Children who had experienced more maltreatment types and had higher levels of symptom severity at PCIT intake were more likely to receive ongoing referrals, but only in the first year after PCIT. However, the specificity of our low-income, high-risk clinical sample may mean that these children were at risk of continuous exposure to high-stress environments. Ongoing MHSU may be best predicted by more proximal adverse experiences, suppressing effects of more distal events, such as earlier history of abuse (Flouri & Tzavidis, 2008). In fact, considering the broader socio-demographic context may partially explain the remarkable stability of MHSU observed in our sample across the five years of follow-up. Almost half of all children initially referred to PCIT ($n = 144$; 44.9 %) received onward referrals within 12 months post-intervention. Unlike children who did not engage in services after PCIT, this group of children remained continuously involved with pediatric MH care system throughout the five year-span.

4.1.2. Characteristics of children with high service utilization

While children with the pattern of frequent MHSU shared most socio-demographic characteristics with children who did not use such services, they were more likely to experience multiple forms of maltreatment. Boys appeared to be particularly at risk of receiving ongoing referrals after the intervention. Although there is some indication of higher rates of MHSU in boys (McKay & Bannon, 2004), the evidence is not ubiquitous. At the time of referral to PCIT, boys in our sample were rated higher on externalizing symptom severity than girls. Boys also showed somewhat lower treatment-related gains at discharge. The greater margin in reduction of externalizing and internalizing symptoms in girls compounded initial gender differences in symptom severity. The higher prevalence of aggressive and disruptive behavioral expressions in boys, as well as girls' steeper gains in adaptive functioning, following positive environmental changes have been previously reported (Dixon, 2002; Gewirtz, DeGarmo, & Medhanie, 2011). However, gender differences in symptomatic profiles do not appear to extend to general risk for psychopathology (Deutz et al., 2020). Indeed, despite higher symptom severity reported by mothers of boys, girls in our sample were just as likely to exhibit externalizing or internalizing problems in the borderline or clinical range.

The inconsistency between similar prevalence in psychopathology and a higher rate of MHSU in boys may point to several issues worth investigating in future studies. For instance, assessment of MH needs may depend on methodology, diagnostic criteria, definitions of functional impairment, and informants (Polanczyk et al., 2015). In our case, based on mothers' reports, boys had similar levels of internalizing but higher levels of externalizing problems than girls. The latter is not surprising, given that aggressive and disruptive behaviors are more common in boys, whereas girls show higher vulnerability to anxious-depressive symptoms (Deutz et al.,

2020; Dixon, 2002). Assuming no gender differences in the risk for psychopathology leads us to speculate that mothers of girls may have under-reported internalizing symptoms on the CBCL. It is worth noting that the CBCL has high cross-informant reliability ($r = 0.80$). However, agreement between parent, teacher, and child self-reports is substantially lower ($r = 0.20–0.30$), particularly, for internalizing behavior (Achenbach et al., 2004). Assessment of externalizing behavior, found to be more consistent between informants, is not exempt from subjective influences. While boys are generally rated lower on self-control and social competence, it is possible that normative gender expectations exacerbate gender differences in informant reports of behavioral dysregulation (Dixon, 2002; Merten, Cwik, Margraf, & Schneider, 2017).

4.2. Referral to an early intervention and long-term mental health services use

Advancements in clinical intervention research hold promise, particularly for maltreated and traumatized children. Active engagement in evidence-based intervention programs such as *the Incredible Years*, *Triple P*, *Parent Management Training–Oregon Model*, and *PCIT*, among others, is associated with moderate effect sizes in reduction of children's symptom severity and caregivers' gains in positive parenting skills (Barth et al., 2005; Beckmann et al., 2010). PCIT is referenced as one of the few programs meeting the most stringent criteria for evidence-based practice, particularly for children involved with CWS (Barth et al., 2005; Toth et al., 2013). Therefore, we expected that greater PCIT engagement would correspond to lower service needs.

4.2.1. Dose of exposure to parent–child interaction therapy

Although progress in PCIT predicts improvement in child adaptive functioning in a dose–response manner (Lieneman, Quetsch, Theodorou, Newton, & McNeil, 2019; Lyon & Budd, 2010), we found no evidence that children who completed PCIT received less onward referrals than children who dropped out at intake or after the first phase of treatment. This lack of association was particularly unexpected, given significant reduction in pre-to-post assessments of externalizing and internalizing symptom severity. To explore this phenomenon, we examined treatment gains in children who dropped out after CDI. As expected, PCIT completers experienced the greatest reduction in externalizing behaviors. However, children who dropped-out mid-treatment still demonstrated measurable improvements in frequency and severity of externalizing behavior. Such gains in adaptive functioning following even a few PCIT sessions are well-documented (Lieneman et al., 2019; Taylor et al., 2007), and may have been enough to keep some children from needing ongoing services.

4.2.2. Voluntary versus court-mandated referrals

Due to the paucity of research and the controversy surrounding mandated participation, its effectiveness with CWS–involved families referred to PCIT is difficult to estimate. The practice is widespread, as mandated families are thought to accrue more treatment-related gains as a benefit of enhanced retention (Barth et al., 2005; Beckmann et al., 2010). To date, only one study examined whether PCIT attendance varied as a function of the referral type, finding that court-mandated participants had increased odds of early treatment termination (Lyon & Budd, 2010). While the small sample size precludes drawing definitive conclusions, this outcome reflects concerns that the lack of initiative in mandated participation acts as a barrier to treatment progress (Mirick, 2018). At the same time, the possibility that mandated families become engaged during treatment, achieving results similar to voluntary attendees, cannot be ruled out (Sotero et al., 2018). In support of this view, one preliminary examination found no differences in PCIT–taught parenting skills and self-reported treatment acceptability by type of referral (Timmer, Urquiza, Boys, & Forte, 2014). Accordingly, after PCIT, court-mandated children may show lesser, higher, or similar needs for services.

What we found was far more nuanced than any single trend. In terms of MHSU, the two groups did not differ in the proportion of children who needed services in the first 12 months after PCIT, nor in the overall rate of service use across five years. Another similarity concerned the effects of maltreatment history, which predicted MHSU in both groups, underscoring far-reaching potential of abuse and neglect for disrupting adaptive functioning in children. However, the extent that maltreatment factored into ongoing referrals post-intervention was twice as high for court-mandated dyads than for children referred from the community. In other words, the type of referral was associated with the degree of mediation by which maltreatment continued to shape MHSU for up to two years after PCIT.

Another way that the two groups differed concerned initial externalizing symptom severity. Although the average symptom severity scores were comparable regardless of group membership, referral type moderated effects of externalizing symptom severity on MHSU. For court-mandated children, higher pre–PCIT levels of externalizing behavior increased the odds of onward referrals post-–PCIT. In comparison, in voluntary participants higher symptom severity was unrelated to MHSU, suggesting that PCIT may have met their behavioral needs. However, it did correspond with less progress in PCIT, affirming the link between higher disruptive behaviors and premature termination, reported in earlier studies (Gopalan et al., 2010; McKay & Bannon, 2004). The lack of this relation in court-mandated participants points to some effectiveness of this strategy in keeping high-risk families in treatment.

Although more research is needed to parse out the meaning of the observed group differences, it may relate to group-specific treatment goals. It may be that caregivers who brought children to PCIT voluntarily to address their child's difficult behavior, were more successful in achieving that goal, if they were able to stay actively engaged in PCIT. Caregivers from court-mandated dyads may have been more oriented toward learning positive parenting skills. While gains in caregivers' parenting skills were outside of the scope of this study, such interpretation fits well with the outcomes reported by Timmer et al. (2014).

5. Conclusions and limitations

The study set out to examine long-term MHSU in children previously referred to an evidence-based clinical intervention. Close to half of all children engaged in ongoing services, which is comparable to reported rates in the U.S. (Wang et al., 2005). Remarkable continuity was observed in patterns of engagement with the pediatric MH system over time. Children with high MHSU were more likely to be boys and to have a history of maltreatment. Referral to an early evidence-based intervention led to measurable decreases in externalizing symptom severity for children who made it at least to mid-treatment but had no effect on long-term trajectories of MHSU. In the 12 months following intervention, history of maltreatment and initial externalizing symptom severity continued to account for a large proportion of ongoing referrals, particularly, in families mandated to treatment. These families were less likely to drop out of treatment due to child difficult behaviors, suggesting differences in outcomes may have varied by treatment goals.

Strengths of this study include its longitudinal design, large high-risk sample, multi-method data, and inclusion of maltreated and non-maltreated children, which allowed us to compare community-referred and court-mandated dyads. Moreover, despite the challenges of working with vulnerable families in early interventions, our study sample participated in more sessions and fewer dropped out than most studies of families nationwide (Acri et al., 2018; Gopalan et al., 2010; McKay & Bannon, 2004). This study, however, is not without limitations. First, although PCIT effect sizes are comparable to other evidence-based treatments for families (Barth et al., 2005), differences in protocols may limit generalizability. Second, the use of a county behavioral health referrals as a proxy for MHSU carries a possible, albeit small risk of false positives and negatives, as the presence or absence of a referral may not reflect true child adaptive functioning or MH needs. Third, the unknown duration and severity of maltreatment, as well as major life stressors across the five years after PCIT may have confounded MHSU outcomes. Finally, we did not differentiate MHSU trajectories by diagnosis or type of services, which should be explored in future studies.

6. Practical implications

Results of the study accentuate overall stability and high comorbidity of childhood MH disorders, underscoring continuous need for sufficient funding of public MH services for high risk, low-income children. Expansion of Medicaid extended the reach of evidence-based services to vulnerable children, particularly, those, affected by maltreatment. While greater accessibility of services and implementation of evidence-based practices in pediatric MH care are important steps forward, we draw attention to the disconnect between intervention-related improvement in symptom severity and continued need for services. Parsing out this inconsistency, stability and comorbidities of childhood diagnostic profiles appear to be significant, but not the only contributory factors (Deutz et al., 2020). Complexity and shortcomings of the existing pediatric MH system is one component that may be more amenable to change (Glied & Cuellar, 2003).

Simplification of MH system navigation is imperative, considering that children rely on their caregivers for program attendance. The burden is particularly high for CWS–involved families, who face multiple barriers to treatment while struggling to meet demands of competing systems of care. For these families, service provision may be streamlined by extending "medical home model" to clinical and psychiatric care for themselves and their child (Jaudes, Champagne, Harden, Masterson, & Bilaver, 2012). Another aspect concerns how well children are matched to services. For instance, gender-related expectations may influence assessments of symptom severity beyond parental perceptions. In clinical decision-making, unchecked beliefs may lower a subjective "threshold," resulting in a "detection bias" (Merten et al., 2017). Therefore, bias awareness training should be implemented in MH public sector. Our final recommendation concerns improvements in clinical system tracking capabilities. Currently, the system is triggered by service use requiring a diagnosis, missing children with milder functional impairments, whose MH needs may be met by school counseling and other services not tracked by counties (Glied & Cuellar, 2003; Merten et al., 2017; Polanczyk et al., 2015). Expanding system functionality to private pay, preventive, and supportive services would enable evaluation of pediatric MHSU along the full spectrum of child adaptive functioning.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.chiabu.2020.104763.

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