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Treating attention problems in children exposed to intimate partner violence: Evaluating the Preschool Kids' Club

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ABSTRACT

Childhood exposure to intimate partner violence (IPV) increases risk for symptoms of inattention and hyperactivity, and yet no known evaluations of interventions for IPV-exposed children have demonstrated effectiveness in treating their attention problems. This study examined the utility of the Preschool Kids' Club (PKC), a treatment program tailored to the needs of preschool-aged children whose mothers had experienced IPV, in reducing children's attention problems during this critical developmental period. Participants ($N = 120$) were preschool-aged children who, with their mothers, participated in an eight-year randomized controlled trial (RCT) of the PKC. Longitudinal multi-level modeling was used to evaluate the main effect of intervention participation on children's attention problems, as well as moderating effects of IPV exposure and maternal depression. Although there was no main effect of intervention participation, children's outcomes were moderated by IPV exposure. Specifically, among children exposed to high levels of IPV, symptoms of inattention and hyperactivity were significantly lower for intervention participants than children in the control group one year post-intervention. These improvements were not sustained in the eight-year follow-up. Results provide support for the use of trauma-specific interventions for children exhibiting attention problems following exposure to high levels of IPV. However, more comprehensive and long-term treatment may be necessary to promote enduring change.

1. Introduction

Intimate partner violence (IPV) – defined as physical, sexual, or emotional violence inflicted by a current or former intimate partner – is a public health issue of growing concern, affecting up to 45% of women in the United States (Willie & Kershaw, 2019). An estimated 28% of children in the United States witness IPV against their mothers (Finkelhor, Turner, Shattuck, & Hamby, 2013), and experiences of IPV are known to have a range of deleterious effects on physical and mental health among women and their children (Peterson et al., 2018; Vu, Jouriles, McDonald, & Rosenfield, 2016). Of particular concern is the increased risk for symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD), henceforth termed *attention problems*, among IPV-exposed youth (Graham-Bermann & Seng, 2005). Attention problems may be exacerbated or maintained by heightened rates of maternal depression among women who have experienced IPV (Paulson, 2020), as maternal depression is a known risk factor for youths' attention problems (Cheung, Aberdeen, Ward, & Theule, 2018).

Prior work has consistently linked IPV exposure and maternal depression to youths' attention problems, and yet no known research has tested whether interventions are effective in reducing attention problems among IPV-exposed youth while accounting for the possible moderating effects of maternal depression. The purpose of this study was to examine the effectiveness of the Preschool Kids' Club (PKC), offered jointly with the Moms' Empowerment Program (MEP), in reducing preschoolers' attention problems across eight years while also examining changes in maternal depression. The PKC and MEP are brief, group-based interventions tailored to young children and mothers who have experienced IPV and are customarily offered concurrently to optimize outcomes for families affected by IPV. Informed by the

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literature outlined below that delineates the distinct links between IPV, maternal depression, and youths' attention problems, it was expected that youths' participation in the PKC (and, by extension, mothers' participation in the MEP) would be associated with reductions in youths' attention problems over time, and that this effect would be moderated by degree of IPV exposure as well as levels of maternal depression.

1.1. Attention problems in youth

ADHD is a neurodevelopmental disorder that emerges during childhood and manifests in symptoms of impulsivity, inattention, and hyperactivity (American Psychiatric Association [APA], 2013). ADHD symptoms generally arise during the preschool years and become increasingly impairing during elementary school (APA, 2013). These impairments can contribute to poor reading and math achievement in school-aged children, as well as increased risk for grade retention and high school dropout (Arnold, Hodgkins, Kahle, Madhoo, & Kewley, 2015). ADHD is also associated with poor self-esteem and reduced social functioning, as well as an increased risk for addiction and suicide across the lifespan (Harpin, Mazzone, Raynaud, Kahle, & Hodgkins, 2016; Shaw et al., 2012).

The functional impairment associated with ADHD warrants the efforts that researchers have made to identify factors that increase risk for symptoms of the disorder. It is well established that ADHD is attributable in large part to genetic vulnerability, with twin studies yielding heritability estimates around 75% (Biederman & Faraone, 2005). Yet environmental influences make notable contributions to children's attention problems. A multitude of environmental risk factors for attention problems have been identified, and all of these influences are thought to interfere with the development of neurological systems that facilitate executive functions (Froehlich et al., 2011). Executive dysfunction is a core component of attention problems, and the emergence of attention problems during the preschool years can set the stage for delayed cognitive development that compounds across the lifespan—a process that is exacerbated by exposure to environmental risk factors during critical periods of neurological growth (Barkley, 1997).

1.2. Social risk factors for attention problems

One such critical period for the maturation of neural networks responsible for attentional control occurs during the preschool years. Children's adverse experiences during this time pose a substantial threat to their cognitive development, and research points to a number of familial and demographic variables that can increase risk for attention problems in children with genetic vulnerabilities. Among these, limited access to socioeconomic resources is the most strongly linked to maladaptive cognitive outcomes (Brown et al., 2017; Rowland et al., 2018). The threat posed by low SES is greatest during early childhood, as demonstrated in a large study of income trajectories and ADHD risk suggesting that SES in the preschool years may be more predictive of attention problems over time than SES in infancy and toddlerhood (Choi, Shin, Cho, & Park, 2017). Interactions between SES and early adversity raise further concern about cascading risk for preschoolers. In an illustrative example, Wade et al. (2016) found that the effects of childhood exposure to abuse, parental mental health concerns, and family violence on maladaptive adjustment in adulthood were five times greater among low-SES children relative to those of higher SES. This suggests that the transactional effects of socioeconomic disadvantage and stressful family environments increase the burden on children's cognitive development to an extent that is greater than either risk factor alone.

In the United States, race and SES are strongly linked. Non-white children are more likely than white children to live in poverty and to have limited access to high-quality education (Fram, Miller-Cribbs, & Van Horn, 2007). One result of these systemic inequalities is the underdiagnosis and undertreatment of Black children with ADHD, despite their increased risk for attention problems (Miller, Nigg, & Miller, 2009). Thus, the socioeconomic disadvantage and increased IPV experienced by marginalized ethnoracial identities (Clark, Galano, Grogan-Kaylor, Montalvo-Liendo, & Graham-Bermann, 2016) may place non-white children at increased risk for developing attention problems.

1.3. The role of maternal depression

There is an extensive literature suggestive of strong links between maternal depression and children's attention problems, with evidence for a dose–response relationship and effect sizes that range from medium to large (Cheung et al., 2018; Wolford et al., 2016). In their proposed model to explain these effects, Goodman and Gotlib (1999) argued that maternal depression influences children's development through biological and environmental mechanisms, and that these relationships are moderated by children's age of first exposure to their mothers' depressive symptoms. Specifically, evidence suggests that children first exposed to maternal depression at preschool age have twice the odds of adjustment problems in adolescence relative to children first exposed during earlier or later periods of development (Naicker, Wickham, & Colman, 2012). Preschoolers whose mothers' depression is more chronic also exhibit poorer performance on measures of executive functioning than their peers whose mothers have lower or remitting levels of depression (Hughes, Roman, Hart, & Ensor, 2013). Clearly, untreated depression among mothers of preschool-aged children can have compounding effects on neurological systems that facilitate children's attention and self-regulatory abilities, and studies have shown that reductions in mothers' depressive symptoms coincide with improvements in their young children's attention problems over time (Modell et al., 2001).

1.4. Childhood exposure to intimate partner violence

Maternal depression often co-occurs with other stressors that negatively influence children's development, and exposure to family violence is one such factor that can be especially detrimental. Children who witness IPV are at unique risk for a host of physical and mental health problems, including attention problems (Evans, Davies, & DiLillo, 2008; Graham-Bermann & Seng, 2005). The effects of IPV on attention problems are dose-dependent, with childhood exposure to more severe forms of IPV contributing to a higher likelihood of ADHD diagnosis in adulthood (Cater, Miller, Howell, & Graham-Bermann, 2015). The threat to children's adjustment that is conferred by IPV is greatest for children who witness IPV at young ages, and this effect persists after controlling for the cumulative number of violent acts to which children are exposed, indicative of a sensitive period during which IPV exposure is most debilitating (Graham-Bermann & Perkins, 2010). These effects are exacerbated for preschoolers whose mothers report clinically significant levels of depression, as the risk for ADHD among these youth is four times greater compared to their peers without histories of IPV (Slopen & McLaughlin, 2013). IPV is strongly associated with maternal depression both concurrently and longitudinally, and there is evidence to suggest that maternal depression partially accounts for the relation between early childhood exposure to IPV and subsequent behavior problems (Holmes, Yoon, & Berg, 2017). Despite this compelling evidence, however, there are limited treatment options for mothers and children with histories of IPV that have been shown to improve children's attention problems. Moreover, the diagnosis of ADHD in the context of traumatic stress can be especially difficult, as there is overlap in the symptom presentation between ADHD and posttraumatic stress disorder (PTSD; Galano, Miller, & Graham-Bermann, 2014; Horn, Miller-Graff, Galano, & Graham-Bermann, 2017; Szymanski, Sapanski, & Conway, 2011). Yet, there is evidence of true comorbidity between ADHD and PTSD (Biederman et al., 2013). Thus, taking a trauma-focused lens to the treatment of attention problems within IPV-exposed children may be especially important.

1.5. Interventions for children with attention problems

Stimulant medications are ubiquitous treatments for children with ADHD. Despite clear evidence for the effectiveness of these medications in the short-term (Maia et al., 2017), there is a dearth of research demonstrating the long-term benefits of stimulants (Rajeh, Amanullah, Shivakumar, & Cole, 2017). Further, because most pharmacological treatments for ADHD are not indicated for use prior to age six, very few studies have examined the effectiveness of ADHD medications in preschoolers. The only known long-term placebo-controlled trial for this age group found no significant differences in attention problems between medicated and non-medicated young children, suggesting that early-emerging attention problems are likely chronic and require more rigorous, multimodal treatment (Riddle et al., 2013).

Most successful behavioral interventions for attention problems in preschoolers involve parent training, which promotes parents' use of strategies that increase desired behaviors in their children and establish structure and organization. There is evidence for the short-term effectiveness of intensive parent training programs, such as the Triple P (Positive Parenting Program; Sanders, Kirby, Tellegen, & Day, 2014) and the Incredible Years series (IY; for review, see Pidano & Allen, 2015). However, longer-term follow-up studies of parent training programs have revealed that although improvements in parenting strategies are maintained through the school-age years, the immediate reductions in preschoolers' problem behaviors do not persist beyond the short term (Heinrichs, Kliem, & Hahlweg, 2014).

Briefer interventions, including Parent-Child Interaction Therapy (PCIT; Eyberg & Boggs, 1998) and the New Forest Parenting Programme (NFPP; Sonuga-Barke, Daley, Thompson, Laver-Bradbury, & Weeks, 2001) have yielded mixed results. Both programs have demonstrated effectiveness in reducing attention problems in the short term (Thompson et al., 2009; Ward, Theule, & Cheung, 2016). However, the NFPP was found to be inferior to a generic (i.e., non-ADHD-specific) parent training program in at least one study (Abikoff et al., 2015). There are no known long-term evaluations of the NFPP, and the few studies of the PCIT have high rates of attrition and do not consistently suggest that treatment effects persist beyond two years post-intervention (Hood & Eyberg, 2003; Pade, Taube, Aalborg, & Reiser, 2006).

Taken together, the literature on parent training for attention problems indicates that most of the existing behavioral interventions engender positive effects in the short term, but that these improvements are unlikely to be sustained (Molina et al., 2009; Rimestad, Lambek, Christiansen, & Hougaard, 2016). Furthermore, although pilot studies have demonstrated that PCIT reduces problem behaviors in children living in domestic violence shelters immediately following intervention (Herschell, Scudder, Schaffner, & Slagel, 2017), the long-term effectiveness of behavioral treatments for attention problems in the context of IPV is untested. Designed with an emphasis on reducing problem behaviors in children, parent training programs may require a change in perspective to address dysfunction in the family system where IPV is present. This is especially apparent given evidence from longitudinal research in families experiencing IPV that youths' externalizing problems are not attributable to deficits in mothers' parenting and are instead more consistently linked to the stress of ongoing IPV exposure (Greeson et al., 2014; Sullivan, Nguyen, Allen, Bybee, & Juras, 2000). Accordingly, IPV-exposed children with attention problems may require more specialized interventions that were developed to address the distinct intersection of risk factors present in this high-risk group.

1.6. Interventions for children exposed to IPV

One approach to intervention in families experiencing IPV engages perpetrators in behavioral change programs to target the reduction of IPV directly. Several such programs have been found effective in reducing perpetrators' use of violence in reaction to children's misbehavior and in improving co-parenting with mothers (for review, see Chung et al., 2020). However, there are no known evaluations of the utility of interventions with perpetrators of IPV in reducing youths' attention problems over time. Furthermore, mothers experiencing IPV and their children who witness violence in the home require their own support, and although some perpetrator intervention programs include outreach to mothers (e.g., Caring Dads; Scott & Crooks, 2007), mothers and children struggling with the impacts of IPV on their mental health are not the focus of these programs and therefore may have ongoing challenges navigating the sequelae of IPV without additional intervention centered on their experiences.

Of the interventions that have been implemented to support children living in homes where IPV occurs, the Kids' Club program (Graham-Bermann, 1992) is among the most rigorously tested. The Kids' Club, developed for school-aged children of mothers experiencing IPV, is a group intervention that addresses the cognitive, emotional, and social consequences of IPV exposure for children. It incorporates art and play therapy and aims to improve children's attitudes and beliefs about violence, conflict resolution skills, social competence, and emotion regulation. Studies have demonstrated the effectiveness of the Kids' Club in reducing children's internalizing and externalizing problems and in restructuring unhelpful beliefs about violence (Graham-Bermann, Kulkarni, & Kanukollu, 2011; Graham-Bermann, Lynch, Banyard, DeVoe, & Halabu, 2007). These effects are greatest for children whose mothers participate in the Moms' Empowerment Program (MEP; Graham-Bermann, 2010), a group intervention for mothers with recent IPV histories (Graham-Bermann, Lynch, Banyard, DeVoe, & Halabu, 2007). Indeed, research on the mechanisms of change for families who participate in these programs shows that children's improvements are mediated by reductions in mothers' mental health symptoms (Graham-Bermann, Howell, Lilly, & DeVoe, 2011). The MEP and Kids' Club are now customarily offered in tandem to facilitate optimal outcomes. The Preschool Kids' Club (PKC), examined in the present study, is an adaptation of the Kids' Club program tailored to preschool-aged children and is also offered jointly with the MEP to optimize outcomes for both mothers and children.

Another manualized intervention for families exposed to IPV is Project SUPPORT (Jouriles et al., 1998), a home-based program for women and young children leaving domestic violence shelters. The intervention is administered flexibly to meet the individual needs of each family and typically consists of weekly, one-hour home visits. Project SUPPORT has been found to be effective in producing reductions in children's externalizing problems, and to improve mothers' child management skills (Jouriles et al., 2001). There is also evidence pointing to the program's effectiveness in reducing children's externalizing behavior problems for up to two years post-intervention, and these changes were found to be partially mediated by improvements in mothers' mental health (Jouriles et al., 2009; McDonald, Jouriles, & Skopp, 2006). Still, there are no known evaluations of Project SUPPORT's effectiveness beyond two years, and its utility in specifically treating children's attention problems has not been assessed.

A third option available to women and children experiencing IPV is Child-Parent Psychotherapy (CPP; Lieberman, 2004). CPP involves joint sessions with mothers and children aimed at improving the mother–child relationship. A randomized clinical trial of CPP found that both mothers and children benefited from participation in the program, as evidenced by reductions in traumatic stress and child behavior problems (Lieberman, Van Horn, & Ghosh Ippen, 2005). These gains were maintained at a six-month follow-up (Lieberman, Ghosh Ippen, & Van Horn, 2006) and toddlers who participated in CPP were found to have more positive peer relationships seven years later (Guild, Toth, Handley, Rogosch, & Cicchetti, 2017). However, the only known long-term evaluation of CPP did not measure changes in children's attention problems nor was it specific to IPV-exposed families. Indeed, the present study is the first known follow-up beyond two years post-treatment of an intervention developed for IPV-exposed children (for reviews of these and other interventions for children living in homes where IPV occurs,

see Anderson & Van Ee, 2018, and Latzman, Casanueva, Brinton, & Forman-Hoffman, 2019).

1.7. The present study

Despite the evidence in support of parent training for children with attention problems in the short term, these programs may not be suitable for children who have witnessed IPV and their longitudinal implications for IPV-exposed families are unknown. Further, among the treatments that have been developed specifically for IPV-exposed children, there are no longitudinal studies beyond two years post-intervention and none of these programs have been evaluated for their effectiveness in improving children's attention problems. This is an especially important area of research, given the associations between attention problems and children's academic achievement, social development, and later IPV victimization (Daley & Birchwood, 2010; Guendelman, Ahmad, Meza, Owens, & Hinshaw, 2016). Broadly, the purpose of this study is to examine the long-term effect of an adaptation of the Kids' Club program for preschoolers exposed to IPV—the Preschool Kids' Club (PKC; Graham-Bermann, 2000)—on children's attention problems. More specifically, using data from an eight-year RCT of the PKC (and, by extension, the MEP as these interventions are administered jointly), this study will test the following hypotheses:

(1) Children who participated in the PKC will exhibit fewer attention problems compared to children assigned to the Control group.
(2) a. Children of mothers with fewer depressive symptoms will exhibit fewer attention problems than children whose mothers report greater depression.
b. This effect will interact with intervention participation such that children of mothers who benefit most from the intervention will have fewer attention problems.
(3) a. Children exposed to less IPV will demonstrate fewer attention problems than children whose mothers report greater IPV.
b. The effect of the intervention will interact with IPV exposure, such that children exposed to lower levels of IPV will demonstrate the greatest benefit from the intervention program.

2. Method

2.1. Participants

Participants ($N = 120$) were children who, with their mothers, were recruited for a randomized controlled trial (RCT) of the Preschool Kids' Club (PKC) and Moms' Empowerment Program (MEP), joint interventions designed for families with recent experiences of IPV. Children were recruited between the ages of four and six ($M = 4.94$, $SD = 0.85$) and followed for approximately eight years until they were an average age of 12.51 ($SD = 1.78$). Approximately 62% of the sample ($n = 74$) endorsed a marginalized ethnoracial identity (African American, Asian American, Hispanic/Latino, or Biracial), and an equal proportion of boys and girls were represented. Although predominantly low-income, the sample included children from a range of socioeconomic backgrounds ($M = \$1{,}337.53$, $SD = \$1{,}386.20$). Sixty percent ($n = 72$) of children had mothers with at least some college education at baseline.

2.2. Procedures

This study utilized data from a RCT of the PKC and MEP interventions, which was funded by grants from the University of Michigan Office of the Provost and from the Blue Cross Blue Shield of Michigan Foundation. Data from the RCT included in the present analyses comprised interviews conducted at Time 1, which occurred prior to intervention; Time 2, a one-year follow-up; and Time 3, a long-term follow-up approximately eight years after Time 1. An additional data collection period occurred immediately post-intervention; however, because that interview protocol excluded several measures germane to these analyses, data from that time point were not used in the present study.

Upon approval from the University of Michigan Institutional Review Board, participants were recruited for the RCT through flyers, mailings, and referrals from community agencies. If interested, mothers contacted the study staff by telephone and were screened for eligibility. Children were eligible if they were between ages 4–6 and their mothers reported experiencing IPV within the past two years. Eligibility screens did not evaluate the extent of IPV exposure or youth attention problems; families were invited to participate provided that mothers endorsed IPV within the past two years and their children were in the target age range.

After being recruited for the study and providing informed consent and assent, children and their mothers were sequentially assigned to one of two groups: the treatment condition (Treatment), who would immediately participate in the intervention, or the waitlist condition (Control). Group assignment was sequential such that the first six mother/child pairs to contact the study staff were assigned to the Treatment group and the next six were assigned to the Control group, and so on, until all 120 pairs had been assigned to a group. This assignment procedure was selected to reduce attrition and decrease the time between study enrollment and treatment for this high-risk population. Initially, 60 pairs each were assigned to the Treatment and Control groups. However, upon designation to the Treatment group, 7 mothers expressed that they were unable to participate in the intervention but could remain in the study to complete follow-up interviews. These dyads were then re-assigned to the Control group, rendering a final allocation of 53 pairs in the Treatment group and 67 in the Control group at Time 1.

Data collection interviews were scheduled at the location that was safest and most convenient for each participant. Graduate students and advanced undergraduates trained in research ethics and clinical interviewing administered the assessments. A five-week intervention period followed the Time 1 assessment, when participants in the Treatment condition engaged in the interventions. Participants completed follow-up interviews an average of 58 weeks ($SD = 38.20$) after Time 1, and again roughly 8 years (401 weeks) after Time 1 (see Fig. 1). To locate and contact participants after the substantial time elapsed between Time 2 and Time 3, the research team used the contact information (i.e., telephone numbers, emails, mailing addresses, and emergency contact information) provided in the first two measurement occasions. If families were unable to be reached using these methods, online searches including social media and people-finding search engines were employed to obtain updated contact information. Families' privacy and safety was protected by using intentionally vague information in the follow-up recruitment contacts. All follow-up recruitment procedures and materials (including mailings and letters sent to participants' homes and via email/social media messages) were approved by the University of Michigan Institutional Review Board.

2.2.1. Moms' Empowerment Program (MEP) and Preschool Kids' Club (PKC)

Mothers and children assigned to the Treatment group participated in the MEP (Graham-Bermann, 2010) and PKC (Graham-Bermann, 2000) interventions described above. Further details about the MEP and its theoretical foundations can be found in Graham-Bermann et al.'s (2007) study, and a thorough description of the PKC is provided in Howell et al.'s (2013) work. In this RCT, the ten sessions of the MEP and PKC were distributed over five weeks and each session was 60 minutes in duration. The MEP and PKC were held concurrently, and groups consisted of 5–8 participants. Sessions were conducted by two facilitators who were trained by the program's developer and received weekly supervision.

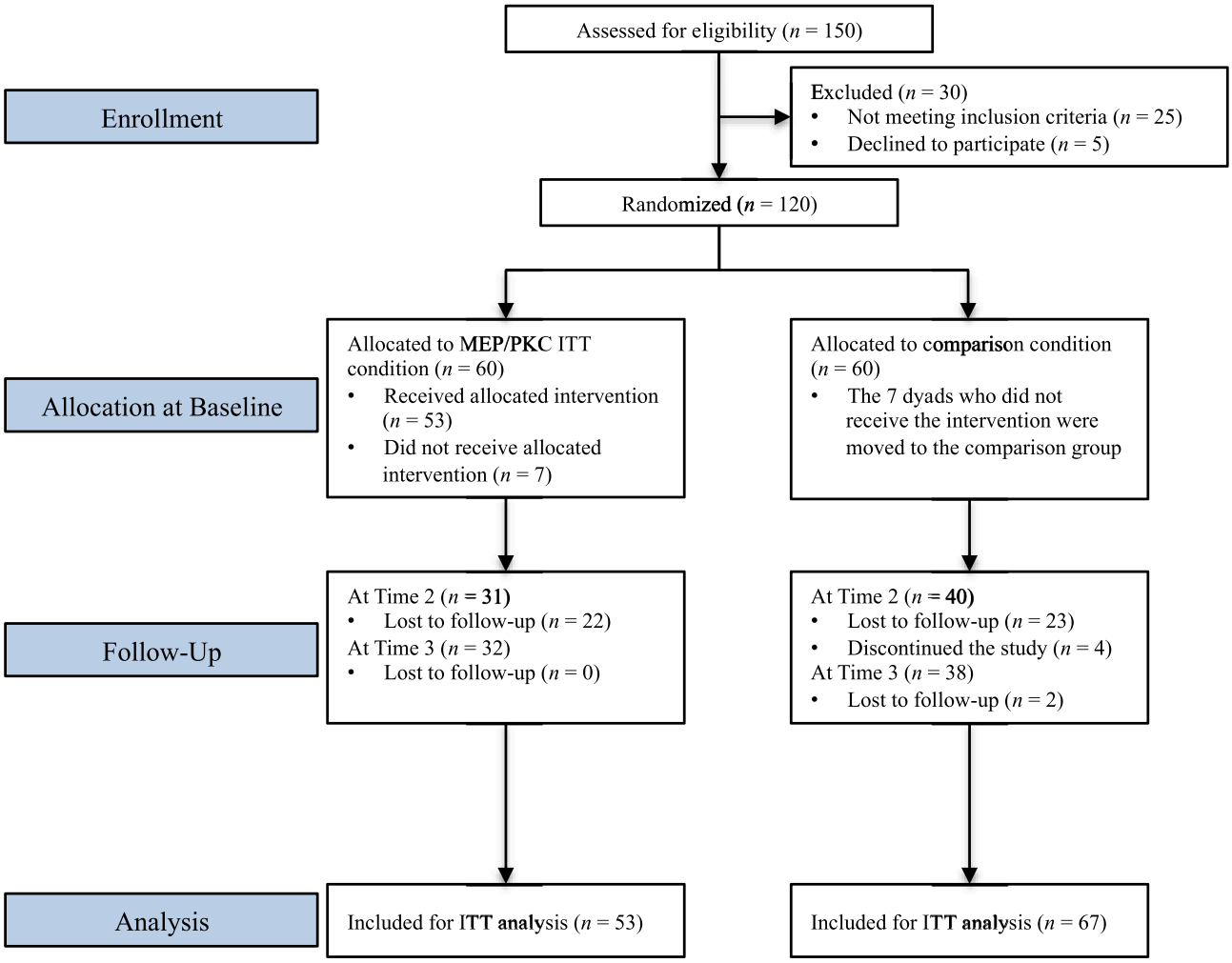

Fig. 1. Preschool Kids' Club CONSORT flow diagram.

2.3. Measures

2.3.1. Demographic characteristics

Mothers selected their child's race/ethnicity from one of the following categories: White, African American, Latino/Hispanic, Biracial, Asian American, American Indian, or Other. Child race/ethnicity was then recoded as a dichotomous variable indicating children's marginalized identity status (0 = White; 1 = African American, Latino/Hispanic, or Biracial; no children were identified as Asian American, American Indian, or Other). At each data collection period, mothers reported their highest level of education on a scale ranging from 1 ("Grade school or less") to 7 ("Graduate degree"). Mothers also reported their monthly household income in USD during each data collection interview.

2.3.2. Attention problems

Children's attention problems were assessed at each time point using mothers' reports on the Attention Problems (AP) subscale of the Child Behavior Checklist (CBCL; Achenbach, 1991). The AP subscale comprises eleven items, each representing a particular symptom of inattention or hyperactivity. Mothers responded to each item on a three-point scale ranging from 0 ("Not true") to 2 ("Very or often true") to indicate the degree to which the symptom described their child over the past six months. Prior studies assessing the psychometric properties of the AP subscale have demonstrated its convergent and discriminant validity in a wide range of populations (Derks, Hudziak, Dolan, Ferdinand, & Boomsma, 2006; Lampert, Polanczyk, Tramontina, Mardini, & Rohde, 2004). Internal consistency of AP scores in this study was strong (Cronbach's α Time 1 = 0.83; Time 2 = 0.86; Time 3 = 0.85).

2.3.3. Intimate Partner Violence (IPV) exposure

Mothers' responses to the Revised Conflict Tactics Scale (CTS2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996) were used to measure children's IPV exposure. The 33 violence victimization items of the CTS2 index the frequency with which women have experienced acts of physical, sexual, psychological, and injurious violence within the past year on a scale ranging from 0 ("Never") to 6 ("20 times or more"). The CTS2 was scored by summing responses to violence victimization items, with possible scores ranging from zero to 198. The CTS2 is a valid and reliable measure of children's IPV exposure (Calvete, Corral, & Estévez, 2007; Straus & Douglas, 2004; Yun, 2011), and internal consistency in the present study was strong (Cronbach's α Time 1 = 0.94; Time 2 = 0.90; Time 3 = 0.92).

2.3.4. Maternal depression

The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) comprises 20 items that measure current depressive symptomatology and was used to quantify mothers' depression in the present study. Mothers responded to items on a scale from 0 ("None of the time") to 3 ("Most or all of the time") to indicate how often each symptom was present in the past two weeks. Responses to each item were summed after reverse-scoring positively-worded items to calculate total depression scores (ranging from 0 to 60), with higher scores indicating higher levels of depression. The CES-D was developed by the

National Institute of Mental Health and has proven reliable and valid in epidemiologic studies with diverse samples (Murphy, 2011). Across time points in this study, the reliability of the CES-D was strong (Cronbach's α Time 1 = 0.92; Time 2 = 0.89; Time 3 = 0.92).

2.4. Analytic strategy

The treatment effect of the PKC on children's attention problems was assessed using multi-level modeling (MLM), as it allows and corrects for correlations between repeated measures (Raudenbush & Bryk, 2002; see Table 1 for bivariate correlations between study variables). The use of multiple imputation with 30 imputed datasets facilitated the retention of data from all participants interviewed at Time 1, yielding a full analytic sample of 120 children.

First, a model (Model One) with random intercepts was fitted to test the main effect of the PKC on children's attention problems over time. Next, to evaluate the moderating effects of maternal depression and IPV on children's attention problems over time, the following (Model Two) with random intercepts was specified:

$$y_{it} = \beta_0 + \beta_1(\text{Treatment}) + \beta_2(\text{Time}) + \beta_3(\text{Treatment*Time}) + \beta_4(\text{IPV}) + \beta_5(\text{Treatment*IPV}) + \beta_6(\text{Time*IPV}) + \beta_7(\text{Treatment*Time*IPV}) + \beta_8(\text{Maternal Depression}) + \beta_9(\text{Treatment*Maternal Depression}) + \beta_{10}(\text{Time*Maternal Depression}) + \beta_{11}(\text{Treatment*Time*Maternal Depression}) + \beta_{12}(\text{Child Race}) + \beta_{13}(\text{Maternal Education}) + \beta_{14}(\text{Household Income}) + u_{0i} + e_{it}$$

Here, y_{it} corresponds to each child's (i) AP score at time t. β_0 is the intercept, and $\beta_1 - \beta_{14}$ are regression parameters. The interaction term β_3 corresponds to the conditional treatment effect of the PKC. The three-way interaction terms β_7 and β_{11} denote whether the effect of the intervention significantly differed depending on the extent of children's exposure to IPV and maternal depression, respectively. The random intercept for each child is denoted by u_{0i}, and e_{it} is the error term, accounting for the specific variation in children's attention problems on each measurement occasion. All analyses were conducted in STATA Version 15.

3. Results

3.1. Model one results

Model One revealed no statistically significant difference in attention problems over time between Treatment and Control groups, $ps > 0.05$ (see Table 2).

3.2. Model two covariates

The second multi-level model with random intercepts was fitted to evaluate whether children's AP scores were significantly affected by PKC participation over time, controlling for maternal depression, IPV exposure, child race, maternal education, and household income. Unexpectedly, household income ($b = -0.148$, $p = .263$) and race ($b = 0.016$, $p = .982$) did not significantly contribute to variation in children's AP scores, and maternal education was positively associated with children's attention problems ($b = 0.648$, $p = .032$; See Table 2). Maternal depression significantly influenced children's attention problems, such that children of mothers with higher levels of depression exhibited more attention problems ($b = 0.123$, $p < .001$). None of the interaction terms between maternal depression, group assignment, and time were statistically significant, indicating that the effect of depression on children's attention problems was invariant over time and between groups.

3.3. Model two intervention effects

Model Two did not reveal a conditional intervention effect, although results indicated a three-way interaction suggesting that treatment

Table 2
Multilevel Models of Children's Attention Problems.

Model One				
Parameter	*b*	*SE*$_b$	*t*	*p*
Treatment	−0.957	0.810	−1.18	0.237
Time 2	−0.756	0.715	−1.06	0.291
Time 3	−0.934	0.780	−1.20	0.232
Treatment*Time 2	0.895	1.126	0.80	0.427
Treatment*Time 3	1.376	1.091	1.26	0.208
Random Effects	*b*	*SE*$_b$	95% Confidence Interval	
Individual Random Intercept	2.422	0.355	1.817–3.232	
Residual	3.649	0.272	3.146–4.234	
Model Two				
Parameter	*b*	*SE*$_b$	*t*	*p*
Treatment	−0.673	1.723	−0.39	0.696
Time 2	2.402	1.538	1.56	0.118
Time 3	0.962	1.428	0.67	0.501
Treatment*Time 2	0.193	2.283	0.08	0.932
Treatment*Time 3	0.326	2.036	0.16	0.873
IPV	0.012	0.012	0.99	0.321
IPV*Treatment	0.004	0.019	0.19	0.848
IPV*Time 2	0.057	0.032	1.79	0.074
IPV*Time 3	−0.023	0.042	−0.55	0.585
IPV*Treatment*Time 2	**−0.115**	**0.055**	**−2.10**	**0.036**
IPV*Treatment*Time 3	0.048	0.056	0.87	0.385
Depression	**0.123**	**0.033**	**3.72**	**<0.001**
Depression*Treatment	−0.034	0.058	−0.59	0.556
Depression*Time 2	−0.128	0.070	−1.84	0.065
Depression*Time 3	−0.031	0.061	−0.51	0.613
Depression*Treatment*Time 2	0.134	0.102	1.32	0.188
Depression*Treatment*Time 3	0.066	0.092	0.72	0.472
Child Race	0.016	0.688	−0.02	0.982
Maternal Education	**0.642**	**0.299**	**2.15**	**0.032**
Household Income	−0.148	0.132	−1.12	0.263
Random Effects	*b*	*SE*$_b$	95% Confidence Interval	
Individual Random Intercept	2.789	0.308	2.246–3.463	
Residual	2.653	0.192	2.302–3.057	

**Note*. Estimates were obtained using multiply-imputed data.

Table 1
Study Variable Means (Standard Deviations) and Bivariate Correlations.

	M (*SD*)	1	2	3	4	5	6	7	8	9
1. T1 AP Score	5.39 (4.27)	1								
2. T2 AP Score	4.87 (4.29)	0.73***	1							
3. T3 AP Score	5.11 (4.52)	0.56***	0.44**	1						
4. T1 IPV	64.63 (37.61)	0.29**	0.23	0.24	1					
5. T2 IPV	18.06 (20.27)	0.25	0.23	0.19	0.16	1				
6. T3 IPV	13.97 (19.80)	0.22	0.12	0.37**	0.14	0.34*	1			
7. T1 Depression	25.70 (13.49)	0.40***	0.35**	0.41**	0.30***	0.15	0.19	1		
8. T2 Depression	17.78 (10.61)	0.31**	0.27*	0.35*	0.11	0.27	0.15	0.54***	1	
9. T3 Depression	19.46 (13.17)	0.35**	0.33*	0.47***	0.31**	0.43*	0.56***	0.49***	0.54***	1

*$p < .05$, $^{**}p < .01$, $^{***}p < .001$. There were no significant differences between Treatment and Control groups on any study variables at Time 1.

effects were dependent on children's IPV exposure over time ($b = -0.115$, $p = .036$). To investigate the nature of this interaction, simple slopes for the relation between group assignment and AP score at high and low (±one standard deviation from the mean) levels of IPV at each time point were assessed. Analyses revealed a significant treatment effect for children exposed to high levels of IPV at Time 2, such that those assigned to the Treatment group had lower AP scores than those in the Control group ($b = -7.108$, $p = .029$). Experimental group assignment was not significantly associated with Time 2 AP scores for children whose mothers reported lower levels of IPV ($b = 1.560$, $p = .290$). The three-way interaction between Treatment, Time, and IPV was not significant at Time 3 ($b = 0.048$, $p = .385$; See Fig. 2).

4. Discussion

Although these results did not support Hypothesis 1 – that children's participation in the PKC would be associated with reduced attention problems in the long term – this study provides evidence that children exposed to high levels of IPV as preschoolers can benefit from a five-week group intervention up to one year later. This is the first known RCT demonstrating that an intervention developed specifically for children who have witnessed IPV can be effective in reducing attention problems during a sensitive period of development. These findings are consistent with the literature on parent training programs for ADHD, which generally yield initial positive results but have questionable durability beyond one year (Rimestad et al., 2016). Moreover, these findings highlight the utility of trauma-focused interventions for the treatment of attention problems following exposure to traumatic stress. The PKC is thus a viable treatment option for preschoolers with attention problems who have witnessed high rates of IPV, and it has the benefit of reducing additional sequelae of IPV (Howell, Miller, Lilly, & Graham-Bermann, 2013; Miller, Howell, Hunter, & Graham-Bermann, 2012). Additionally, given the evidence that IPV-exposed youths' adjustment difficulties may not be attributable to mothers' parenting deficits (Greeson et al., 2014; Sullivan et al., 2000), the PKC may be a more appropriate intervention than a parent training program for preschoolers exhibiting attention problems who have witnessed IPV as it focuses on youths' experiences of IPV and promoting their adaptive coping. Further, the PKC is appropriate for use in agencies with limited resources, as is often the case for those serving IPV-exposed families.

The moderating effect of IPV exposure was an unexpected finding, as it was hypothesized that children exposed to lower levels of IPV would maximally benefit from the PKC (Hypothesis 3). This hypothesis was informed by prior research showing that IPV exposure reduced the effectiveness of interventions for children with disruptive behavior disorders (Shenk, Dorn, Kolko, Rausch, & Insana, 2014). Perhaps, however, the results of the present study point to the need for trauma-specific—as opposed to symptom-specific—interventions for children exhibiting attention problems in the context of psychosocial adversity. There is evidence in the adult literature to show that women experiencing higher rates of IPV gain more from trauma-focused interventions than women whose experiences of IPV are less chronic (Iverson, Resick, Suvak, Walling, & Taft, 2011). Considered with the results of the present study, this suggests a need for structured, supportive, and specific treatment options for high-risk families coping with adversity.

As anticipated in Hypothesis 2a, children of mothers with higher levels of depression exhibited more attention problems. This effect was invariant over time and was not moderated by treatment, which was contrary to Hypothesis 2b, but replicated the robust associations between maternal depression and children's attention problems that have been reported in prior research. Improvements in mothers' depression have been found to result in reduced functional impairment for their children with ADHD, indicating that interventions supporting mothers' mental health are likely to improve children's attention problems (Chronis, Gamble, Roberts, & Pelham, 2006). Past studies of the MEP (offered in tandem with the PKC in the present study) have pointed to its effectiveness in reducing mothers' depressive symptoms (Stein, Grogan-Kaylor, Galano, Clark, & Graham-Bermann, 2021). Future evaluations of the PKC would do well to assess whether improvements in mothers' mental health mediate treatment effects for their children.

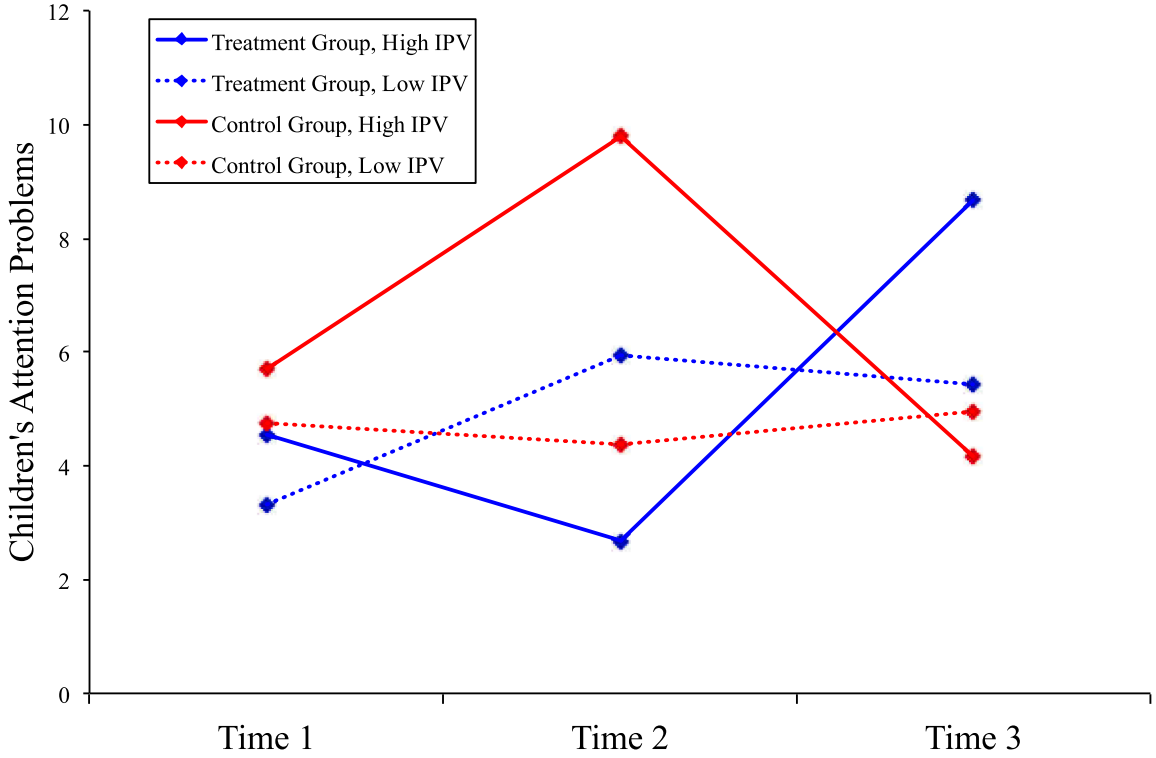

Fig. 2. Three-way interaction between intimate partner violence (IPV) exposure, experimental group (Treatment or Control), and time. *Note*. Estimates were obtained using multiply-imputed data.

Surprisingly, children's race and family income were not associated with their attention problems, and the relation between maternal education and children's attention problems was opposite to what was anticipated. Although there is evidence of an inverse relation between maternal education and children's attention problems (Russell, Ford, Williams, & Russell, 2016), some studies suggest that risk is increased for children of mothers with the lowest and highest levels of education (Berchick, 2016). Berchick (2016) proposed that positive associations between attention problems and maternal education may be due to the privileged position of highly educated mothers to identify and report their children's problems. Conversely, children of mothers with lower levels of education may be more likely to exhibit attention problems due to the intersection between education, poverty, trauma, and health factors that can impair cognitive development. Thus, the relation between maternal education and child attention problems in the present study may have been strong because participants were recruited under circumstances of psychosocial adversity.

The unique nature of this sample may also explain the null findings for child race and family income on children's attention problems. All children in this RCT experienced early IPV exposure, and the rates of IPV were high compared to most community samples. Further, prior studies linking race and SES to children's attention problems after controlling for psychosocial adversity have quantified adverse circumstances dichotomously (e.g., Brown et al., 2017; Wade et al., 2016). Our findings suggest that the effects of IPV exposure on children's attention problems are dose-dependent, and perhaps more variance in children's attention problems is explained when the extent of their adverse experiences is taken into account. This does not rule out the possibility that psychosocial hardships are especially damaging to children's cognitive development when their SES is limited. Instead, these results suggest that investigations of the interacting effects of race, SES, and adverse childhood experiences on attention problems could be enhanced by quantifying the extent of children's exposures.

4.1. Limitations

These findings are not without limitations. First, the generalizability of these findings may be limited due to its controlled design. Efforts were made to enhance ecological validity, as the PKC and MEP intervention programs were administered in partnership with community networks that more closely parallel the services available to IPV-exposed women and children outside of research settings. However, the implementation of the PKC and MEP was closely monitored for fidelity and may not fully capture the way the intervention would be administered outside of a research context. Furthermore, the participants in this study were recruited from communities in the Midwestern United States and nearby towns in Canada. Consequently, these results may not be generalizable to rural populations whose access to local agencies may be more limited, or to urban populations with higher rates of exposure to community violence. Leveraging social support and safety planning are key components of the MEP and PKC, and for women and children who cannot utilize existing resources for any number of reasons (e.g., experiences of discrimination, distrust of local authorities) or for whom there are no local supports, it may be more challenging to engage in these aspects of the intervention. However, there is evidence that adaptations of the MEP and Kids' Club for Spanish-speaking families can reduce participants' exposure to IPV (Clark et al., 2018), suggesting that these programs may be flexible and effective in a variety of settings.

High levels of attrition at both Time 2 and Time 3 follow-ups also limit these findings. Despite using statistical procedures allowing for retention of data from all Time 1 participants, the validity of these findings would be improved with complete data across all time points. The rates of attrition in this RCT are comparable to other longitudinal work with difficult-to-reach populations; however, efforts to retain such participants must be intensified. The measure used to evaluate children's attention problems further limits the validity of the study. Although it is a reliable and valid index of children's inattention and hyperactivity, the CBCL was not developed specifically to measure ADHD symptomatology and the version administered in this study did not include reports from teachers. In order to draw stronger conclusions about the effectiveness of IPV-specific interventions in treating ADHD, future work in the field would do well to include more comprehensive measures of attention problems. This is especially true because symptoms of ADHD can overlap with other forms of psychopathology (e.g., difficulties concentrating, irritability) that are common in IPV-exposed youth, underscoring the importance of utilizing measures that differentiate youths' attention problems from other forms of psychopathology. Finally, children's IPV exposure was inferred from mothers' reports on the CTS2, which limits these findings as some children may have had ongoing contact with IPV perpetrators even if their mother and the perpetrator had separated. The use of multiple indices of children's IPV exposure – including youth self-report measures as well as parent-report measures – could enhance the validity of the IPV exposure construct.

4.2. Clinical implications and future directions

The results of this study demonstrate that an intervention designed to improve preschoolers' adjustment following IPV exposure was effective in reducing attention problems among the most vulnerable children in the sample. These effects persisted for up to one year after the intervention, results that parallel the literature on treatments developed for the express purpose of treating children's attention problems. Accordingly, children exposed to a high degree of adversity may have more to gain from interventions that were developed with a focus on their adverse experiences as opposed to symptom reduction alone. The PKC and Kids' Club programs have also been found to enhance children's social competence, improve safety planning, and reduce internalizing problems and disruptive behaviors (Graham-Bermann, Kulkarni, & Kanukollu, 2011; Graham-Bermann, Lynch, Banyard, DeVoe, & Halabu, 2007; Howell, Miller, Lilly, & Graham-Bermann, 2013; Miller, Howell, Hunter, & Graham-Bermann, 2012). Thus, clinicians working with high-risk children might consider treatments focused on coping with adversity—as opposed to symptoms alone—in order to efficiently address comorbid symptom presentations.

Neither the treatment effects in this study, nor those found in other evaluations of interventions for children with attention problems, persisted into late childhood. This pattern of results may point to the need for ongoing support services for ADHD-prone children, particularly those living in high-risk environments as they navigate the challenges of adjusting to school and developing peer relationships. Being a brief and cost-effective intervention, the relative durability of the PKC is encouraging as it suggests that longer-term maintenance of treatment gains could be facilitated with few resources (e.g., periodic booster sessions or telephone support). Future research should test the bolstering effects of these low-cost additions on long-term adjustment. In the absence of such data, the present study provides empirical support for the use of the PKC and MEP in families with high levels of IPV to improve children's attention problems during the critical preschool years.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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