

RESEARCH BRIEF

Risks of Early Childhood Adversity for Academic Skill Development and Learning

PURPOSE OF THE STUDY

Our research was developed to assess the ways in which early childhood CPS involvement and homelessness were associated with later academic performance. Study one evaluated whether early childhood developmental readiness skills partially accounts for the relationship between early CPS involvement and 3rd grade achievement. Study two examined whether executive function skills assessed at screening served as a protective factor against the risks of early childhood homelessness for 3rd grade academic achievement.

BACKGROUND & PURPOSE

Most states in the United States—including Minnesota—mandate early screening of various developmental competencies during the preschool period (3 to 6 years) to identify the need for interventions to enhance long-term positive development and school success (Cairney et al., 2021; Kalstabakken et al., 2021). Beyond differences in children’s emotional and cognitive skills, several adverse early childhood experiences also predict later academic challenges. Research indicates that Child Protection Services (CPS) involvement and homelessness pose risks to school success, including low achievement, chronic school absenteeism, higher rates of school disciplinary actions, and lower rates of high school graduation (Armfield et al., 2020; Kovan et al., 2014; Manfra, 2019; Masten et al., 2015). Yet there is little research on how early experiences of CPS involvement are associated with developmental readiness skills, and whether those skills, or lack thereof, may account for some of the risk to achievement posed by early CPS involvement for later academic success. Further, childhood experiences of homelessness have been related to lower executive functioning (EF) skills, which in turn predict difficulties in school (Dilworth-Bart, 2012; Lawson & Farah, 2017). Nonetheless, many children experiencing homelessness do well in school (Cutuli et al., 2013), motivating the search for protective factors, particularly those that may be malleable, such as EF, within this challenging developmental context.

This research brief presents two studies drawing on the same longitudinal dataset to advance our understanding of processes linking early childhood CPS involvement and homelessness to later 3rd grade academic achievement, with the objective of mitigating risk and improving services. Both studies also assess specific mechanisms and buffers from early childhood risk to later third grade achievement. Although involvement with CPS or homelessness services assessed in these studies indicate high exposure to adversity, connections to these systems also provide early opportunities for timely multisystem collaborations to assure early detection of learning issues and interventions to promote positive development and success.

The current brief summarizes findings from these two studies, addressing the following research questions:

- 1. Study One:** *Do early childhood screening indicators of academic skills explain the link between early CPS involvement and academic difficulties in the third grade?*
- 2. Study Two:** *What is the role of early EF skills for 3rd grade academic achievement among children who have experienced homelessness in early childhood?*



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CHILD PROTECTION SERVICES (CPS) INVOLVEMENT AND HOMELESSNESS POSE RISKS TO SCHOOL SUCCESS, INCLUDING LOW ACHIEVEMENT, CHRONIC SCHOOL ABSENTEEISM, HIGHER RATES OF DISCIPLINE, AND LOWER RATES OF HIGH SCHOOL GRADUATION.

RESEARCH METHODS

Our research drew data from a sample of 606 families in Minneapolis, Minnesota, who agreed to participate in research during their early childhood screening with the Minneapolis Public School (MPS) district. Through Minn-LInK, participating children's screening and assessment data were integrated with data from the Minnesota Departments of Education (MDE) and Human Services, and the Homeless Management Information System (HMIS).

PARTICIPANTS

Our research drew data from a sample of 606 families in Minneapolis, Minnesota, who agreed to participate in research during their early childhood screening with the Minneapolis Public School (MPS) district. At the time of screening, children who participated were 3- to 6-years-old ($Mage = 4.58$, $SD = 0.81$). Children were screened at multiple community-based sites to ensure the sample was representative of children in MPS. Children were 37% White, 32% Black, 10% Asian, 6% Native, and 9% Multiracial; 13% of the sample identified as Hispanic. Many children spoke more than one language, and 18% of the sample completed screening in a language other than English. Approximately 12% ($n = 70$) of the sample were screened while staying in emergency homeless shelters. The mean annual income based on census tract data for children who were not screened in shelters was \$53,645 ($SD = \$25,309$). Through Minn-LInK, participating children's screening and assessment data were integrated with data from the Minnesota Departments of Education (MDE) and Human Services, and the Homeless Management Information System (HMIS). Each study included in this brief had different inclusion criteria, which are described in more detail below.

Study One

Infants and toddlers are twice as likely as older children to experience maltreatment and enter foster care (Williams & Sepulveda, 2019), increasing their risk for life-long mental health, cognitive, and academic challenges (Dunn et al., 2017; Kovan et al., 2014). Pre-kindergarten screening measures of developmental readiness may be an early indicator of risks to academic success from early childhood experiences associated with CPS involvement and could partially explain its relationship with later academic skills. Such measures typically assess children's preparedness for learning in a school context, including processes of self-regulation and executive function (Blair & Raver, 2015; Eisenberg et al., 2010). If screening assessments provide an early indication of risk for school success among children involved with CPS, then it would be important to prioritize early access to screening for these children in order to connect them with services or programs that can enhance their academic skills before entering kindergarten.

Study One Tested the Following Hypotheses:

1. Early childhood CPS involvement and confirmed maltreatment will be associated with lower developmental readiness skills measured by the Minneapolis Preschool Screening Instrument-Revised (MPSI-R).
2. Third-grade reading and math achievement on benchmark tests will be lower for children with CPS involvement compared to children who were not involved with CPS.
3. The relation between early CPS involvement and maltreatment on 3rd grade math and reading achievement test outcomes will be explained, at least in part, by developmental readiness skills.

PARTICIPANTS AND METHODS

Study one included a subsample of 465 children who completed the MPS district developmental readiness screening measure in English. Children in this sub-sample were 54% female, four years old on average, and racially diverse (Black 34%; White 44%; American Indian/Alaskan Native 6%; Multiracial/Other Native 16%). DHS Social Services Information System (SSIS) data were integrated with the screening data to identify children with CPS involvement before participating in screening. Most children had no CPS involvement ($n=413$; 89%), but 11% ($n=52$) of screening study participants had CPS involvement before they were three years old, and of those children, 15 children (3%) had substantiated maltreatment.

Study one also included screening measures that are a part of the standard early childhood

screening protocol for the district. This includes the Minneapolis Preschool Screening Instrument-Revised (MPSI-R; Minneapolis Public Schools, 2007), which the MPS district developed and uses as its primary developmental kindergarten readiness screener. This assessment measures developmental skills that are foundational to future learning, including motor skills, cognitive skills, language, and literacy. Total MPSI-R scores from this particular sample ranged from 2 to 64 with a mean score of 46.32 ($SD = 14.60$).

Third-grade academic achievement data, measured via the Minnesota Comprehensive Assessments (MCAs), were integrated. The MCAs are Minnesota’s state-wide online adaptive tests in reading and mathematics that are used to meet federal and state legislative requirements for education. Children completed the MCA in the 3rd grade (between the 2015-2016 and 2018-2019 academic year). Scores ranged from 1 to 99 on reading with a mean score of 47.57 and ranged from 15 to 92 on math with a mean of 52.11. Level of academic achievement for each child also was coded according to the state benchmark criteria into one of four categories, “Does Not Meet Standards” (0-24), “Partially Meets Standards” (25-49), “Meets Standards” (50-74), and “Exceeds Standards” (75-99). Both MCA reading and mathematics data were missing for about 20% of the sample. Study one questions were assessed using a three-step path analysis while controlling for census block group income estimates, ethnicity/race, and age at screening, with multiple imputations to account for missing 3rd grade MCA data.

FINDINGS

Descriptive analyses revealed that 69% of the children who experienced CPS in early childhood did not meet or only partially met standards for 3rd grade mathematics achievement compared to 35% of children who did not experience CPS (Figure 1). There was a similar pattern for 3rd grade reading achievement (Figure 2).

However, early CPS involvement did not predict MPSI-R scores during screening, with age, ethnicity/race, and income estimates all controlled ($F[6, 458] = 101.90, p > .05$). Confirmed maltreatment also was not a significant predictor of MPSI-R scores with the same controls ($F[7, 457] = 88.81, p > .05$). For aim two, we found that early CPS involvement was related to lower 3rd grade reading ($F[7, 457] = 78.94, p < .001$) and math ($F[7, 457] = 81.57, p < .001$) achievement compared to those without early CPS involvement. Further, consistent with previous findings (Ryan et al., 2018), an exploratory analyses confirmed that early childhood maltreatment also was a significant predictor of 3rd grade reading, ($F[8, 456] = 68.92, p < .05$) and

math, ($F[8, 456] = 71.23, p < .05$) achievement compared to CPS involvement without substantiated maltreatment.

CONCLUSION

Overall, findings suggest that early CPS involvement and developmental readiness at screening each have a unique association with with math and reading achievement in third grade. CPS involvement was not associated with with developmental readiness at screening although it was associated with

3rd grade academic achievement. It will be important to study why early CPS involvement is associated with later achievement. In addition, results are consistent with literature suggesting that improving developmental readiness skills in early childhood may promote later academic achievement. It will also be important to bolster early childhood developmental readiness skills as they have demonstrated an overall positive effect on later academic achievement for the population included in this study.

Figure 2: MCA 3rd Grade Reading Achievement by Early Childhood Child Protective Services Involvement

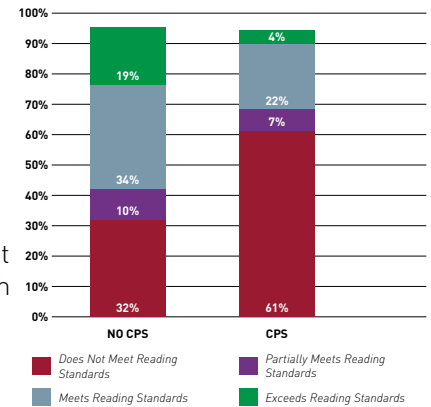
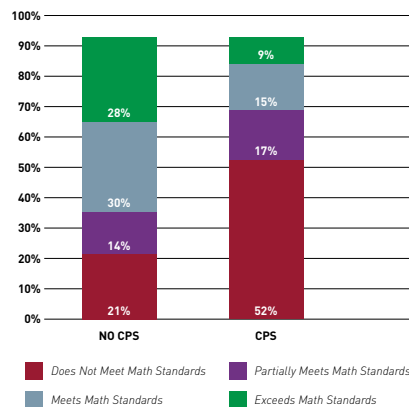


Figure 1: MCA 3rd Grade Math Achievement by Early Childhood Child Protective Services Involvement



Study Two

Like CPS involvement, homelessness confers risk for later academic difficulties. However, prior research indicates that children experiencing homelessness with greater executive function (EF) skills perform better on assessments of math and reading (Distefano et al., 2021; Masten et al., 2012). Still, it is not clear from previous research, whether EF is a promotive factor (helpful at any level of risk) or a protective factor (more helpful for those experiencing risk), or both (Benson et al., 2013). Differentiating the role of EF as a protective factor (i.e., a statistical interaction effect) from a promotive factor (i.e., a statistical main effect) is important for understanding who may benefit the most from early EF assessment and intervention. This study adds to the existing literature by allowing us to explore the protective effect of EF because the sample includes children who vary in their exposure to socioeconomic risk and housing instability.

Study Two Tested the Following Hypotheses:

1. Early childhood experiences of homelessness will be associated with lower 3rd grade math and reading performance.
2. Better EF scores will predict higher 3rd grade math and reading skills.
3. There will be a protective effect (reflecting a

statistical interaction) of EF on the relation of childhood homelessness to later academic achievement, such that there is a weaker association between experiences of homelessness with later math and reading performance for children with higher EF skills.

PARTICIPANTS AND METHODS

Participants included a subsample of 496 children who received all early childhood screening measures in English. Children were 52% female, 4.5 years old on average, and primarily identified their race as Black (35%) or White (37%). Early childhood homelessness was measured at or before screening. Children were denoted as experiencing homelessness prior to screening if they participated in screening in an emergency homeless shelter or if they were identified as staying in emergency or transitional housing before the date of their screening through the Homeless Management Information System (HMIS) administrative records. There were 91 children (18%) who met this criterion. For sensitivity analyses, we also calculated how many children used emergency or transitional housing services during their 3rd grade year—when children would be completing their benchmark tests of achievement (i.e., MCA reading and math). Ten children (2%) appeared in the HMIS system that year.

Three EF tasks were used to create an EF composite. One was a hands-on table top task: Peg-Tapping (Diamond & Taylor, 1996) assesses a child’s ability to hold different rules in mind by asking children to tap a dowel once when the administrator tapped twice and to tap twice when the administrator tapped once. The other two tasks were drawn from the NIH Toolbox tasks of executive function with developmental extensions. Flanker Inhibitory Control and Attention Task with Developmental Extension (Flanker-Dext; Anderson et al., 2021) is a computer-based measure that assesses a child’s ability to pay attention and ignore distractions (Rueda et al., 2004). Children are presented with five fish on a screen and told to touch an arrow that matches the way the middle fish is pointing. The flanking fish either point in the same or opposite direction as the middle fish. Dimensional Change Card Sort with Developmental Extension (DCCS-Dext; Carlson et al., 2021) is a computer-based measure that assesses a child’s ability to flexibly follow different rules. Children are presented with pairs of pictures that can vary by shape and color. Children are asked to first sort pictures by shape and then directed to sort pictures by color. To assess study two aims we used structural equation modeling, with full information maximum likelihood to account for missing data.

FINDINGS

Descriptive analyses found that 68% of children who experienced homelessness in early childhood did not meet or only partially met standards for 3rd grade mathematics achievement compared to 35% of children

who did not experience homelessness (Figure 3). There was a similar pattern for 3rd grade reading achievement (Figure 4). Results for aim one confirmed the hypothesis that early childhood homelessness was a risk factor, predicting lower 3rd grade math ($B = -0.14, SE = 0.04, p < .01$) and reading ($B = -0.12, SE = 0.04, p < .01$) performance, controlling for the effects of race and age.

As expected, based on prior research with a similar sample (Palmer et al., 2022), EF scores predicted higher 3rd grade math ($B = 0.52, SE = 0.06, p < .001$) and reading ($B = 0.47, SE = 0.03, p < .001$) performance, controlling for race, age, and homelessness experiences. Results for aim three did not support the hypothesis that EF would

have protective effects on the risk associated with early homelessness experiences for 3rd grade math or reading. Instead, results were consistent with research indicating EF is a promotive factor, and generally predicts higher academic achievement for children. As a sensitivity analysis, we evaluated whether early homelessness had a unique effect on later academic achievement when accounting for concurrent experiences of homelessness. Results remained consistent for math but were less robust for reading ($B = -0.09, SE = 0.05, p = 0.05$).

CONCLUSION

Overall, findings indicate that EF skills predict future academic success in similar ways for children who have and have not experienced homelessness. Children from all socioeconomic backgrounds may benefit from additional support or interventions targeting early EF development.

Figure 3: MCA 3rd Grade Math Achievement by Early Childhood Emergency or Transitional Housing Use

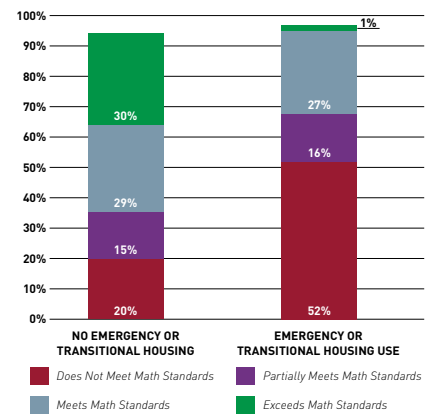
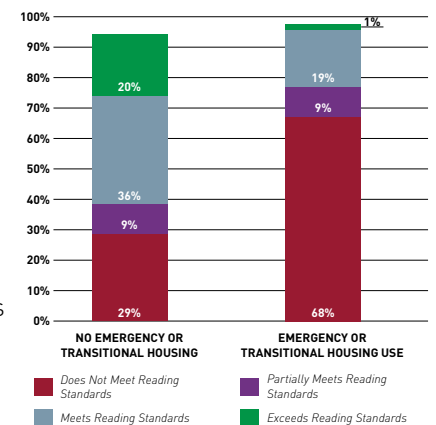


Figure 4: MCA 3rd Grade Reading Achievement by Early Childhood Emergency or Transitional Housing Use



Conclusion and Recommendations

Overall, the results presented in this brief indicate a need for cross-system collaborations among child protection, homelessness services, public schools, and other service providers to facilitate early childhood screening and access to services and supports for those who are most at risk for later academic challenges, including children experiencing CPS involvement and homelessness. Our research indicates that:

- Early CPS involvement and homelessness are related to later math and reading achievement outcomes. Almost 70% of children with either CPS involvement or homeless did not meet or partially met MCA math standards.
- Children, in particular young children, who experience CPS involvement or homelessness are at greater long-term risk for academic difficulties. Moreover, many disadvantaged families are involved with both these systems at various times (Palmer et al., 2023). While referrals to early childhood screening are required in substantiated cases of maltreatment, staff working in CPS (regardless of substantiation outcomes) and those working with families experiencing homelessness could partner with local early childhood educators to facilitate easy access to early childhood screening and intervention services.
- Early CPS involvement was not associated with poorer developmental readiness at screening. This may suggest that risks associated with early CPS involvement are unrelated to early developmental readiness.
- There were no mediating effects of MPSI-R screening scores on the association of early CPS involvement and childhood maltreatment with 3rd grade reading and math achievement outcomes, suggesting that there is a unique association of both early CPS and developmental readiness with later reading and math achievement.
- EF is a promotive factor for academic achievement. These skills predict achievement, regardless of early childhood experiences of homelessness. Future work could investigate the universal implementation of early childhood preventive interventions that bolster EF, as would likely be beneficial for improving academic performance for all children who struggle with EF. Access to high quality early childhood education may be an effective “intervention” for nurturing EF as well as other developmental readiness skills (Diamond & Ling, 2020).

CONCLUSION ABSTRACT

Young children who experience early CPS involvement or homelessness are at greater long-term risk for academic difficulties. Further research is needed to understand the mechanisms of risk and resilience connecting CPS and homelessness to learning, as well as the interplay of these two adversities in early childhood, which often co-occur. It is important for the workforce who carry out the missions of

CPS, housing and shelter providers, and related programs to support families with young children involved in these services to collaborate and coordinate their work with each other and early childhood educational professionals, in order to reach and facilitate engagement of parents in developmental readiness screening and planning for additional academic support services.

LIMITATIONS

These findings should be interpreted in light of several limitations. Our results may not generalize to children who speak languages other than English. Despite having translations of questionnaire measures, computer task-based measures were only programmed in English. Further, due to the small number of participants in these studies who were Asian, Native American, Multiracial, or Hispanic, we could not assess the relationship of race/ethnicity beyond that of Black, White, and Native American children for study one, and Black and White children for study two. Additionally, the EF measures included here were not yet normed, so there are no specific cutoff

scores representing atypical functioning. Considering the small number of participants in study one that had confirmed child maltreatment determinations, and small number of children involved who experienced homelessness, we were unable to assess whether risk for academic challenges increased with greater use of these systems. Finally, the associations observed in this study do not indicate casual effects. Measures of CPS and HMIS involvement likely overlap with numerous unmeasured adversities and challenges faced by families that could account for the associations found here.

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