Environmental Risks and Children's Mental Health Treatment Outcomes: A Person-Centered Analysis

A DISSERTATION SUBMITTED TO THE FACULTY OF THE UNIVERSITY OF MINNESOTA BY

Matthew Albion Witham

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Elizabeth Wieling Lindsey Weiler

October 2017

Acknowledgements

I want to thank my dissertation committee, Dr. Elizabeth Wieling, Dr. Lindsey Weiler, Dr. Tai Mendenhall, and Dr. Traci LaLiberte. Each committee member provided expertise and support in the successful completion of both my degree and this dissertation. I particularly want to thank my advisers, Drs. Wieling and Weiler, for their guidance throughout my graduate work. Dr. Wieling, I want to thank you for your unwavering support and encouragement of me since I started the degree program in 2010. It was an honor to be under your mentorship. I am hopeful we will have opportunities to collaborate in the future. Dr. Weiler, I want to thank you for pushing me through to the end. Your knowledge and commitment to me were invaluable.

I want to thank my friends, colleagues, and mentors at Washburn Center for Children. I am grateful for the willingness to find creative ways for me to maintain my employment at Washburn Center while attending school, which has helped me to link my academic and professional work. The persistent challenges and encouragement has guided me throughout this process.

My highest gratitude goes to my family and friends. Thank you for your continuous support, inspiration, and prayers as I pursued my PhD. Thank you for your patience, your understanding when I was stressed, your interest in my studies, and most importantly your love. I want to thank my mother, Cheryl Witham, my mother- and father-in-law, Dan and Barb Snyder, and my siblings. Most importantly, I want to thank my wife, Anna, and three wonderful children, Ruth, Josie, and Sam. It is not possible for me to tell you how much I have valued your love and support. Anna, you are my best

friend, thank you for helping me be my best self. I could not have asked for a better partner throughout each step of this journey.

Finally, I want to acknowledge my father, John Witham, who passed away a month before I started my PhD. I wish he were here to see me reach this milestone, but I know he is proud of me. I am grateful for the way he loved me, and inspired me to share that love with others.

This dissertation was supported by the Department of Family Social Science Waller Fellowship.

Abstract

Treatment outcomes for children receiving mental health services at communitybased clinics have been inconsistent. There is an urgent need to study treatment effectiveness and to identify factors that influence symptom changes. Previous research has demonstrated the impact of environmental risks on children's functioning, and research is needed to understand the effects of risks on mental health treatment outcomes. In partnership with a community-based mental health clinic, this study aimed to (a) determine whether a racially-diverse sample of children (N = 1176; 59.4% male; ages 4-17 years) demonstrated post-treatment symptom reduction, (b) identify environmental risk subgroups of children through latent class analysis, and (c) assess for subgroup differences on outcome change scores. Paired sample t-tests were used to test for significant change over time between pre- and post- treatment symptoms levels and between high- and post- treatment symptoms levels. Significant symptom reduction was observed over time, as assessed by the Strengths and Difficulties Questionnaire. Latent class analysis was used to identify and define environmental risk subgroups. Fit indices and theoretical constructs conjointly endorsed four parsimonious latent classes: Low-Risk, High-Poverty, High-Risk, and Low-Poverty with Maltreatment. An ANCOVA was used to test whether the four classes differed on their respective change scores; no significant differences were found. Findings indicate meaningful symptom reduction after treatment and the existence of meaningful subgroups of children based upon risks. However, there is inadequate evidence that symptom changes vary based upon environmental risk classes. Implications of findings for clinical practice and future research are discussed.

Table of Contents

List of Tables	vi
List of Figures	vii
Introduction	1
Theoretical Assumptions	2
Impact of Environmental Risks on Children's Functioning	3
Environmental Risk Classes	7
Impact of Environmental Risks on Mental Health Treatment	8
Current Study	10
Method	11
Data Source and Sample	11
Measures	13
Poverty	13
Homelessness	13
School mobility	13
Out-of-home placement	14
Maltreatment types	14
Strengths and Difficulties Questionnaire - Parent Report	15
Analysis Plan	15
Preliminary analyses	15
Symptom changes	16
Latent Class Analysis (LCA)	16

Class differences in treatment outcomes	18
Results	18
Preliminary Analyses	18
Symptom Changes	19
Latent Class Analysis (LCA)	19
Characteristics of environmental risks classes	20
Class Differences in Treatment Outcomes	21
Discussion	21
Understanding the Environmental Risk Classes	22
Strengths	24
Limitations	28
Clinical Implications and Future Directions	31
Implications for administrators	31
Implications for clinicians	33
Future directions	34
References	37
Appendix	59
Extended Literature Review	59
Dissertation Proposal	96

List of Tables

Table 1: Gender Differences in Baseline SDQ-P and Environmental Risk Variables5
Table 2: Race/Ethnicity Differences by Baseline SDQ-P and Environmental Risk Variables
Table 3: Prevalence and Means (Standard Deviations) for Latent Class Characteristics
Table 4: Rates of Latent Class Membership and Environmental Risk Rates within Latent Classes50
Table 5: Comparison of Three- and Four- Class LCA Models by Fit Indices5

List of Figures

Figure 1: Environmental Risk Probabilities within Latent Classes
58

Environmental Risks and Children's Mental Health Treatment Outcomes: A Person-Centered Analysis

There is inconsistent evidence that mental health treatment at community-based clinics successfully improves the functioning of children receiving services, and there remains limited understanding of the factors that impact the effects of treatment. Yet, the treatment need remains great. Up to 20% of children and adolescents in United States meet criteria for a mental health disorder (Kazak et al., 2010). This is nearly 15 million youth or roughly 1 out of every 5 children (U.S. Department of Health and Human Services, 2001). Of those children, only a fraction receive formal mental health treatment (Kataoka, Zhang, & Wells, 2002). Many children receive services at community-based mental health clinics. Community-based mental health centers often see more low-income children and families because they often rely, in part, on government assistance programs like Medicaid. As a result, they are often treating conditions related to economic disadvantage. Furthermore, they are often characterized by the supplemental services they provide like case management and group treatments (Warren, Nelson, Mondragon, Baldwin, & Burlingame, 2010).

Existing research has amplified the concerns about the effectiveness of community-based mental health treatment (Warren, Nelson, & Burlingame, 2009; Kazak et al., 2010; Warren, Nelson, Mondragon, Baldwin, & Burlingame, 2010; Warren, Nelson, Burlingame, & Mondragon, 2012), such that studies from community-based settings have produced results with effect sizes near zero (Weisz, 2004). Empirical evidence does not procure confidence that children will experience improvements when in treatment (Manteuffel, Stephens, Sondheimer, & Fisher, 2008; Warren et al., 2010). Given the pervasiveness of children's mental illness and the equivocality of treatment

effectiveness, outcomes research has undeniably become an urgent need in children's mental health care (Warren et al., 2010; Weisz & Gray, 2009).

Not all research is disparaging toward community-based mental health treatment for children. In a number of systematic reviews of research on children's mental health services, positive treatment effects have been observed (Hawley & Weisz, 2005; Trask & Garland, 2012; Weisz et al., 1995). Despite more favorable research outcomes, confidence in community-based mental health clinics remains low due to the use of fewer empirically-based methods, often called "usual care" (Garland et al., 2013; Weiss, Catron, Harris, & Phung, 1999; Weisz, 2004). Environmental risks have consistently been shown to impact children's functioning (American Psychological Association [APA], 2014; Rog & Buckner, 2007; Van Dorn, Volavka & Johnson, 2012). Researchers must look to understand factors (i.e., poverty, homelessness, school mobility, out-of-home placement, neglect, physical abuse, and sexual abuse) that impact treatment outcomes to better understand variables that may negatively impact treatment success.

Theoretical Assumptions

The design of the present study has ecological theory (Bronfenbrenner, 1979) as its cornerstone, although the full breadth of the theory is not utilized. For the purposes of this study, I focused upon environmental risks within the microsystem/mesosystem. Ecological theory highlights the interconnectivity and interdependence of individuals within their environmental contexts (Bubolz & Sontag, 1993). Determining whether there are positive changes (e.g., symptom reduction, improved functioning) after a child receives mental health treatment is valuable. However, only measuring these changes obfuscates what researchers can say about the conditions in which treatment success is

more or less likely. Additionally, simply looking at symptom reduction across the sample aggregates the findings so that an average effect is reported and researchers are not able to identify if there are individuals who are more or less impacted by treatment.

Investigating environmental factors will help to determine the relationship between experiences in a child's context and treatment related changes. Justification for this approach is intuitive as well as empirically-based. Difficult experiences in a child's life impact their functioning. Children raised in under-resourced environments with multiple chronic stresses logically have greater obstacles to overcome than children without such difficulties. Research is clear that children are impacted by the environments in which they live (Leventhal & Brooks-Gunn, 2000; Xue, Leventhal, Brooks-Gunn, & Earls, 2005; Hanson & Chen, 2007). Anda and others have consistently connected adverse childhood experiences (ACES) to negative behaviors and outcomes like smoking, teen pregnancy, and alcoholism (Anda et al., 1999; Anda et al., 2002; Anda et al., 2002). As a result, it seems likely that children with environmental risks have a propensity to make fewer gains in mental health treatment.

Impact of Environmental Risks on Children's Functioning

Children from low income families, children in the child welfare system, and children who experience significant stresses have disproportionally higher rates of mental health issues compared to children without these stresses (Burns et al., 2004).

Community-based children's mental health systems typically serve increasing large numbers of children and families with such experiences (Warren et al., 2010). As a result, researchers must take into consideration risk factors when both studying outcomes and disseminating their findings. Significant difficulties and chronic life stresses may impact

children and families differently than those without such challenges (Warren et al., 2010). It is reasonable to assume that baseline functioning, treatment trajectories, discharge functioning, and the retention of treatment benefits may all be unique for those with various constellations of chronic and persistent stresses. Take for example an impoverished, homeless young girl who has had several school transitions. The stresses associated with these environmental risks may differentiate her from her peer who was sexually abused, throughout their respective courses of treatment.

Environmental risks have consistently been linked to negative short-term and long-term consequences in children. Poverty has been shown to increase the likelihood of inadequate supervision, substandard nutrition, exposure to unsafe neighborhoods, and deficient access to health care (APA, 2014). Furthermore, academic challenges and psychological and physical health problems persist in the context of poverty. Poor children are at significant risk of dropping out of school, meeting criteria for a mental health disorder, entering the juvenile justice system, having asthma, engaging in risktaking behaviors like smoking and early sexual activity, and becoming overweight or obese (APA, 2014). Contemporary brain research has confirmed and extended previous research by identifying language delays, memory difficulties, social-emotional processing problems, and diminished cognitive functioning as neural correlates of poverty (Noble, Houston, Kan, & Sowell 2012). Chronic, severe poverty is the strongest predictor of homelessness (APA, 2014). Hunger, poor physical and mental health, diminished educational outcomes, witnessing violence, anxiety and depression in school-aged children, future residential instability, parental partner violence, and substance abuse problems are more probable for homeless children (APA, 2014; Rog & Buckner, 2007).

Research has documented numerous negative effects from school moves (Gruman, Harachi, Abbott, Catalano, & Fleming, 2008; Mantzicopoulos & Knutsen, 2000; Simpson & Fowler, 1994). The body of research on school mobility is limited (National Research Council, 2010), and isolating the unique effects of school mobility on children's functioning can be difficult (Fantuzzo, LeBoeuf, Chen, Rouse, & Culhane, 2012). The majority of the research on school mobility connects it to negative academic outcomes (Alexander, Entwisle, & Dauber, 1996; Reynolds, Chen, and Herbers, 2009; Temple & Reynolds, 1999). However, there is empirical evidence to show that school transitions can affect other areas of functioning in children (Haynie, South, and Bose, 2006). Even when school mobility is normative (e.g. children's transition into kindergarten), poor transitions can affect social adjustment in children (Cook & Coley, 2017).

Specifically looking at the effects of out-of-home placement on children may be challenging because it is difficult to separate out the unique effects of the placement from the effects of the reason for their placement (e.g., maltreatment). Furthermore, there is evidence that children who are placed out-of-home differ on factors like socioeconomic status and maltreatment severity and type when compared to children who remain with caregivers (Berger, Bruch, Johnson, James & Rubin, 2009). As a result, it is difficult to obtain unbiased evidence of the effects of out-of-home placement (Courtney, 2000; McDonald, Allen, Westerfelt, & Piliavin, 1996). More specifically, out-of-home placement is intended to reduce stress, provide protection, and assist in stabilizing the child. In some cases, out-of-home placement may be an indicator of the severity of the child's circumstances. For example, all substantiated incidents of maltreatment do not

result in placements. However, in cases where out-of-home placement is a result, research would be apt to describe the positive effects of the out-of-home placement.

Both the short- and long- term consequences of neglect have been well-documented. Children have shown to have increased risk for externalizing behaviors (e.g., aggression, less cooperation), more internalizing behaviors (e.g., withdrawal), and less ego control and ego resilience (Bolger & Patterson, 2001; Manly, Kim, Rogosch, & Cicchetti, 2001). Cognitive and emotional delays are also associated with neglected children (Hildyard & Wolfe, 2002). Manly et al. (2001) found that neglected children during infancy or early childhood showed signs of adaptation difficulties in middle childhood. Furthermore, there is evidence that neglect increases the likelihood of future substance use, economic hardship, employment challenges, lower education, violent behavior, disordered attachment style, unsafe sexual behavior, and an increased risk for posttraumatic stress disorder (Bifulco et al., 2002; Currie & Windom, 2010; Hussey, Change & Kotch, 2006; Wilson & Windom, 2010; Van Dorn, Volavka & Johnson, 2012).

Studies on physical abuse have reported increased aggressive behaviors, increased externalizing symptoms, and more disruptive behavior disorders than non-abused children (Aber, Allen, Carlson & Cicchetti, 1989; Bolger & Patterson, 2001; Kolko, 2002). Medical problems are also associated with physical abuse (National Research Council, 1993). Additionally, research has demonstrated elevated likelihood of depression and other internalizing mental health disorders (Ackerman, Newton, McPherson, Jones & Dykman, 1998). Lansford et al. (2002) compared abused and non-abused children to determine the long-term impact of abuse on children's functioning. They found that adolescents abused early in their lives miss school more often, had

greater displays of aggression, showed more symptoms consistent with a mental health disorder (e.g., anxiety, depression, PTSD), had more dissociation, social difficulties, cognitive problems, and social isolation.

There is resounding research to demonstrate a significant relationship between sexual abuse and negative outcomes. Hillberg, Hamilton-Giachristis, and Dixon (2011) reviewed meta-analyses on the connection between sexual abuse of children and future adult mental health problems. Wilson (2010) connected early sexual abuse to somatic health problems (e.g., gynecological, gastrointestinal, respiratory, neurological, and muscular). Additionally, she also provided evidence of long-term psychiatric disorders. Rates of depression, posttraumatic stress disorder, borderline personality disorder, eating disorders, suicidality, anxiety and sexual dysfunction were all higher for abuse victims (Wilson, 2010). There is evidence that long-term outcomes may be more severe when the perpetrator is someone expected to care for and protect the child (Trickett, Noll, Reiffman, & Putnam, 2001). This extreme contradiction in expectation for the child likely contributes to the strong residual effects. Empirical evidence supports negative medical, psychological, emotional, and behavioral short-term effects (Maniglio, 2009).

Environmental Risk Classes

Other scholars have examined environmental risks constellations (Anthony, 2008; Shelvin & Elklit, 2008). Such research endorses the value of investigating multiple risks at once from a person-centered approach in contrast to models based upon aggregated risks. Furthermore, identifying risk typologies helps to move the literature beyond the unidimensional aspects of risks (Armour, Elklit, & Christoffersen, 2014) and connect this to the co-occurring nature of risks (Berzenski & Yates, 2011). Studying risk

constellations that attend to multiple, co-occurring risks may help to reduce the tendency to over-attribute the impact of a given risk on an individual's functioning (Armour et al., 2014). For example, by studying multiple types of maltreatment (e.g., neglect, physical abuse, sexual abuse) together, one might attribute negative functioning disproportionally to one type of risk. Person-centered approaches to studying maltreatment have identified distinctive group qualities (Armour, Elklit, & Christoffersen, 2014; Berzenski & Yates, 2011; Nooner et al., 2008; Pears, Kim, & Fisher, 2008), and doing so may assist in applying specific interventions to clients based upon individual characteristics (Berzenski & Yates, 2011). Clinicians and researchers may more effectively partner together to tailor mental health treatment to unique subgroups of children in need.

Impact of Environmental Risks on Mental Health Treatment

As noted, poverty, homelessness, school mobility, out-of-home placement, and maltreatment have all been shown to negatively related to children's functioning. It is reasonable to assume that these impairments impact children's experience of mental health treatment when improved functioning is a desired outcome. Mental health treatment not only seeks to reduce symptoms by helping an individual more effectively cope or manage, but it also works to eliminate or reduce the impact of factors that have contributed to the mental health difficulties. For example, frequent school mobility may contribute to childhood anxiety because of the stress associated with regular transitions. A thoughtful therapist may address school mobility directly by helping the caregiver find a permanent school placement, while also increasing the child's use of coping strategies. Together, school stabilization and coping skills are likely to increase the chances of symptom amelioration. Other factors, however, are not as clearly addressed. For instance,

therapists have a limited ability to affect chronic poverty and because poverty is a significant contributor to mental health difficulties, treatment effects may be diminished. Children's mental health treatment outcomes, therefore, may be negatively affected by environmental risk factors, although more research is needed to improve our understanding of this.

Although the body of literature is small, there are studies that have found a relationship between environmental risks and mental health treatment outcomes. Lewis et al. (2010) investigated the impact of childhood trauma on the treatment of adolescents with depression. When children had a history of childhood trauma, cognitive-behavioral therapy (CBT) interventions were found to less effective. For example, Barbe et al. (2004) investigated the effectiveness of CBT for depressed adolescents with a history of sexual abuse; they also found CBT to be less effective for adolescents with an abuse history. These findings are consistent with other studies that have identified the negative impact of childhood history of trauma/stress on CBT treatment outcomes (Asarnow et al., 2009; Shamseddeen et al., 2011). Consistent negative effects were observed when CBT was administered.

Deviating from the outcomes above, Whitson and Connell (2016) found that children who had been exposed to traumatic events prior to treatment made gains at the same rate as peers without negative exposure. In this study, treatment was provided in a community-based mental health setting. In another study, children with a history of trauma or stress actually performed better in treatment than those without a trauma history when administered a family-based treatment (MacPherson, Algorta, Mendenhall, Fields, & Fristad, 2014). Although research has demonstrated consistency when CBT was

employed, diverging outcomes emerged when the setting was different (Whitson & Connell, 2016) and when an alternative treatment method was utilized (MacPherson et al., 2014). Continued research in this area will help to amass more knowledge about the effects of risks on treatment outcomes across a range of settings and with diverse interventions. This project is a significant contribution because it evaluates treatment outcomes in a community context. Furthermore, it seeks to understand factors that influence those outcomes through investigating the impact of environmental risks through a person-centered approach. Exploration of the factors that impact outcomes will help to better identify key treatment predictors and assist in more effectively targeting interventions.

Current Study

The foremost goal of this research is to take a person-centered approach to evaluating children's mental health treatment outcomes through exploring outcome differences between groups of children based upon environmental risks. In order to accomplish this goal, there are three principal aims, each with a corresponding working hypothesis.

- (1) Assess for changes in mental health symptomology among children who received mental health treatment at a community-based clinic. The working hypothesis is that children (ages 4 -17 years) who receive mental health treatment will show significant symptom reduction on pre- to post-treatment measures.
- (2) Identify meaningful homogeneous groups of children based upon environmental risk factors through latent class analysis (LCA). LCA will be used to identify subgroups of children by indicators of poverty, homelessness, school mobility,

- out-of-home placement, and three child maltreatment types (neglect, physical abuse, and sexual abuse). The working hypothesis is that discriminable groups will emerge from environmental risk indicators.
- (3) Determine whether changes in symptomology after mental health treatment differ by identified environmental risk groups. The working hypothesis is that symptom reduction will vary by identified environmental risk groups.

Method

Data Source and Sample

In cooperation with Minnesota-Linking Information for Kids (Minn-LInk), and with the University of Minnesota's Center for Advanced Studies in Child Welfare (CASCW), I utilized an existing secondary data set, which was truncated for the purposes of this study. The original data set matched mental health treatment center demographic data to other service sector's administrative data (i.e., Minnesota Department of Education, Minnesota Department of Health and Human Services, and the State Court Administrator's Office). Community-based mental health center's records were preliminarily matched to education records, the Minnesota Automated Reporting Student System (MARSS), through both probabilistic matching (via Registry Plus Link Plus (NCCCDPHP, 2010)) and hand matching. This resulted in a 95% match rate. Next, agency data was limited to those children based upon symptom measure criteria. In the original data set, treatment completion was required; children were excluded if they were still in treatment or if their treatment status was unknown. Beginning treatment symptom measures and an end of treatment symptom measures were also necessary for inclusion (to test hypotheses). This resulted in the original data set (N = 1338).

For the purposes of the secondary analysis in the current study, the original data set was used and linked to Minnesota Department of Health and Human Services data. Additionally, the original data set was altered because the collection of homelessness data started in Minnesota in 2008. Children served prior to 2008 were omitted because missing data for this variable were not at random. Finally, the symptom measure is validated for children 4-17 years. Children younger than 4 and older than 17 were excluded from the sample. The final sample for the current study resulted in 1176 children served from 2008-2012. Children in final sample were diverse by gender (40.6% female, 59.4% male), race/ethnicity (3.8% American Indian/Alaska Native, 2.3% Asian/Pacific Islander, 8.1% Hispanic, 31.5% Black, 54.3% White), and age (4-17; M=10.10, SD=3.24). Data were aggregated and stored in a data management system and later transferred to SPSS Statistics 24.0 and Mplus 7.2 for analyses.

The mental health treatment center primarily serves children and families in Minneapolis and the surrounding metropolitan area with multi-faceted mental health needs. Children may receive a range of services including individual and family therapy, individual and family skills, school-based therapy, day treatment, psychiatry, an early childhood therapeutic preschool, crisis services, and case management. These diverse services allow clinical teams to assess for children's needs to assign them to the appropriate services based upon symptom severity. Children may have a single service or a collection of them based upon their needs. For example, a child may begin with day treatment and case management services and transition into outpatient therapy services as their needs decrease.

Measures

Demographic data. Children's demographic information (i.e. gender, age, and ethnicity) were gathered from caregiver or guardian at the time of the child's intake into mental health treatment and recorded in treatment center's administrative records.

Demographic data for final sample are provided above.

Poverty. The poverty indicator is based upon eligibility for free or reduced lunch which is calculated by factoring household income and number of members. This is a three-item categorical variable: ineligible (0), eligible for reduced price (1), and eligible for free meal (2). Eligibility can vary year to year. Children were considered coded as eligible for free/reduced if they met criteria for this status at any point during the four year time span of this project.

Homelessness. Homelessness is a dichotomous (Yes = 1, No = 0) variable from the Department of Education's Minnesota Automated Reporting Student Systems (MARSS). Children were considered homeless by a predetermined set of criteria from federal law and Minnesota government statutes that is based upon their nighttime residence as sheltered, double-up, unsheltered, and hotel/motel. Children were coded as "Yes" if they were homeless for any period of time prior to or during the time they were receiving mental health services.

School mobility. The school mobility variable is in the Department of Education's Minnesota Automated Reporting Student Systems (MARSS) and determined by a change in the child's enrollment during a school year. This is differentiated from a move prior to the start of a school year. Circumstances for school moves included: transferred to another public school in the same district, transferred to an approved nonpublic school, student moved outside of the district, student moved outside of the

state or country, and student transferred to another district or state but did not move. School moves were coded as having no moves (No = 0) or having more than one move (Yes = 1). Alternative coding was explored, but only a small percentage of children in the sample moved 2 or more times, so any moves at all were considered disruptive to the child and considered an environmental risk.

Out-of-home placement. The MN DHS records incidents of child out-of-home placement. Children can be placed out of the home for a variety of reasons (e.g., foster or kinship placement). Many of these reasons are due to caregiver difficulties, but can also be a result of the child's own behaviors. Regardless of the reason, out-of-home placement is a dichotomous variable (Yes = 1, No = 0). Any incident of a child removed from their home, at any point in their life, and under any removal condition will result in a "Yes." Out of home placement was considered an environmental risk regardless of the circumstances of the placement.

Maltreatment types. The MN Department of Human Services (DHS) records substantiated instances of child maltreatment. Allegations of child maltreatment are recorded based upon type (e.g. physical abuse, sexual abuse, neglect). Once allegations are investigated, maltreatment can be substantiated or not. Data on substantiated maltreatment is derived from Minnesota Child Protective Services'(CPS) Social Service Information System (SSIS) via the Minn-LInK project (previously described). It is important to note that Minnesota's CPS is a two track system meaning that services can be delivered via either a(1) Traditional Investigation or (2) Family Assessment.

Traditional Investigations result in substantiations while Family Assessments do not. For the purposes of this project, substantiated incidents of maltreatment at any point in the

child's life were utilized. Therefore, cases in this study were served through the traditional CPS track and include the most severe cases in Minnesota. There were three types of maltreatment used: neglect (including medical), physical abuse, and sexual abuse. Each maltreatment type was coded as either "Yes" (1) or "No" (0); children with at least one substantiated incident of maltreatment were scored a '1'. Children with substantiated incidents across multiple types of maltreatment were scored as '1' for each type (i.e., neglect, physical abuse, and sexual abuse).

Strengths and Difficulties Questionnaire - Parent Report. The Strengths and Difficulties Questionnaire parent-report version (SDQ-P) is a 25-item questionnaire used to measure children's symptom levels at the beginning, during, at the end of treatment. It is a well-validated behavioral screening questionnaire administered to parents for children 4-17 year olds (Goodman, 1997, 2001). The SDQ produces a Total Difficulties score (0-40) which falls into three ranges: normal (0-13), borderline (14-16), and abnormal (17-40). Higher scores indicate elevated symptomology. The Total Difficulties score is comprised of four of the six subscales: conduct problems, inattention/hyperactivity, peer problems, and emotional problems. There are five items for each of the four subscales where "Not True," "Somewhat True," and "Certainly True" are selected to designate the degree to which a symptom description is present. Examples of symptom descriptions include: "Considerate of other people's feelings," "Often loses temper," and "Many worries or often seems worried."

Analysis Plan

Preliminary analyses. Descriptive statistics were examined prior to testing hypotheses. An examination of the normality of study variables, demographic

information, and variable relationships were analyzed. Interrelations between demographic variables, baseline SDQ-P scores, and environmental risk variables for the overall sample were reviewed. SPSS Statistics 24.0 was used for preliminary analysis of study variables and to assess for symptom changes.

Symptom changes. Paired samples t-tests were run to assess for significant mean differences between pre- and post- treatment measures from both first to last SDQ-P scores and high to last SDQ-P scores. The SDQ-P scores used in this project are from the client's initial intake at the center and the client's final SDQ-P score gathered at the time of their discharge from all services. High scores were gathered from the child's collection of SDQ-P measures. This could have been the child's initial intake SDQ-P if subsequent measures were not available to be used. Anecdotal reports from clinicians indicate that it is common for clients' symptoms to increase after the start of treatment. As such, high scores were also included to help measure change over time.

Latent Class Analysis (LCA). The current study implemented Latent Class Analysis (LCA) based upon children's experience (or non-experience) of a set of seven binary environmental risk factors. Most analyses of environmental risks rely on variable-centered approaches to ascertain associations between risks and outcomes. These analyses are one method for analyzing child's environmental risks and treatment outcomes. A more refined way of looking at differential treatment outcomes is through person-centered analyses, like LCA. Contemporary scholarship points to the need for increased consideration of individual latent characteristics that might influence treatment effects (Lanza & Rhoades, 2013). Person-centered analyses assist in determining if there are observable constellations of environmental risks for children seeking therapy, and

may better determine whether intervention strategies work the same or different for specific subgroups. LCA was used to identify children's environmental risk profiles and whether treatment outcomes varied among profile groups.

LCA models estimate the presence of categorical latent variables that can divide populations into discernable groups (McCutcheon, 1987). Simply, LCA helps to uncover unexpressed groups of children who share common attributes. LCA utilizes binary categorical indicators. This approach was taken in this study so that classes would emerge simply based on the presence or absence of an environmental risk. Environmental risk can also be characterized by continuous levels, measuring the degree or severity of environmental risk, but this method was not taken. Future analyses could consider using continuous variable to determine a more complex image of the continuum of environmental risks faced by young children. LCA seeks to maximize differences between groups and minimize differences within group. Model acceptance is grounded statistically and provides empirical evidence for group classifications (Schreiber, 2016).

LCA is depicted by two parameters: (a) probability of individual membership in determined classes and (b) the prevalence of each variable by class. The number of classes is determined by a combination of statistical output and theoretical considerations. This study used three statistical outputs to assist in determining the number of classes:

Akaike Information Criterion (AIC; Akaike, 1974), the Lo-Mendell-Rubin adjusted likelihood test (LMR) (Lo, Mendell & Rubin, 2001), and the entropy. The AIC and LMR give an estimate of model performance. Smaller AIC scores and a significant LMR (when deciding to select a larger class option compared to a smaller class option) indicate a superior model. Entropy ranges from 0-1 with optimum entropy closest to 1 (Celeux &

Soromenho, 1996). Latent class models were determined using Mplus 7.2 (Muthén & Muthén, 2007).

Class differences in treatment outcomes. After the most parsimonious latent class groups were decided, a one-way ANCOVA was conducted to determine statistically significant main effect group differences between classes by SDQ-P change scores after controlling for age, race/ethnicity, and gender. Covariates were chosen because of their associations with independent and dependent variables (see preliminary analysis). Age was used as a continuous variable. Race/ethnicity remained the five categories detailed in demographic descriptives (i.e., American Indian/Alaska Native, Asian/Pacific Islander, Hispanic, Black, and White). Gender was a binary categorical variable. Race/ethnicity and gender were both dummy-coded; White and male were used a reference groups respectively. ANCOVA was conducted using SPSS Statistics 24.0.

Results

Preliminary Analyses

Analyses revealed significant relationships between demographic variables and independent and dependent variables. Preliminary one-way ANOVAs were calculated and statistically significant group differences on baseline Strengths and Difficulties Questionnaire (SDQ-P) were found between genders (F(1,1174) = 32.54, p<.001) and race/ethnicity groups (F(4,1171) = 8.55, p<.001); see Table 1 and 2. Pearson's correlation coefficient was computed to assess for a relationship between age and baseline SDQ-P scores. Analysis did not reveal a statistically significant relationship, r = -.005, p = .860. An ANOVA was conducted to analyze differences in mean age among each environmental risk category. Statistically significant group differences were found.

Analyses justified including gender, age, and race/ethnicity as covariates in the analysis required for the third research aim.

Symptom Changes

Paired samples t-tests were conducted to compare symptom decreases. Mean changes from first to last SDQ-P and from highest to last SDQ-P were used. The first t-test showed a significant difference from first (M=18.08, SD=7.12) to last (M=15.25, SD=7.29) SDQ-P; t(1175) = 16.09, p<.001. The effect size (d = .39) is considered a small to medium effect (Cohen, 1992). The next t-test also showed a significant difference from highest (M=20.38, SD=6.84) and last (M=15.25, SD=7.29) SDQ-P; t(1175) = 36.23, p<<.001. The effect size (d = .72) is considered a medium to large effect (Cohen, 1992). These results provide evidence of significant symptom reduction for children from first to last SDQ-P and from high to last SDQ-P.

Latent Class Analysis (LCA)

Four alternative latent class models were compared to establish the ideal model. Using the fit indices described above (AIC, LMR, and entropy) and theory to interpret the results, a 4-class model of environmental risks which supports a parsimonious description was determined. One-, two-, three-, and four-class models were compared. The three- and four- class models were more viable options, based upon statistical comparisons. Table 3 presents a comparison between the one-, two-, three-, and four- class models. The AIC in these models (one class= 6178.808, two classes=5568.569, three classes =5527.60, four classes=5523.93) demonstrated nearly identical results between the superior three- and four-class model options. When comparing the three- and four- class models, the LMR and entropy scores provided evidence for the four-class model (LMR: three classes

(p)=.0002, four classes (p)=.0207; entropy: three classes=.657, four classes=.712) Overall, the two-class model had the highest entropy (.836), but other indices and theoretical considerations justified selecting the four-class model.

The four-class model of child environmental risk was initially selected based on fit indices, but theory needed to support model intelligibility. Characteristics emerged around the free and reduced lunch (poverty) variable. Two of four classes had participants with a high likelihood of eligibility for reduced or free lunch, while the remaining two did not share this trend. Within the two poorer classes (classes 2 and 3) differentiation appeared around the remaining environmental stresses. Most notably, children in class 3 showed elevated likelihood of maltreatment (neglect: 83.6%; physical abuse: 30.3%; sexual abuse: 16.3%) and out-of-home placement (73.6%), while individuals in class 2 were not as likely for these environmental (neglect: 0.6%; physical abuse: 3.1%; sexual abuse: 2.8%; out-of-home placement: 9.5%). A similar trend occurred between the more financially stable classes (classes 1 and 4); children in class 4 showed a higher likelihood of out-of-home placement (64.5%) and maltreatment overall (neglect: 24.4%; physical abuse: 26.2%; sexual abuse: 0.0%), while children in class 1 were noticeably less likely to experience these environmental stresses (neglect: 0.7%; physical abuse: 0.1%; sexual abuse: 0.0%; out-of-home placement: 0.0%); see Figure 1. Classes show evidence of both poor and non-poor children having increased likelihood of experiencing additional environmental stresses, and poor and non-poor children having a decreased chance of experiencing additional stresses.

Characteristics of environmental risks classes. The four environmental risk classes were termed: *Low-Risk* (Class 1: 47.3%), *High-Poverty* (Class 2: 36.8%), *High-*

Risk (Class 3: 13.0%), and Low-Poverty with Maltreatment (Class 4: 3.1%). The percentages of children in each class were calculated. Characteristics of children within each latent class are depicted in Table 4. Each class includes percentages of children in each dichotomous variable or means and standard deviations for continuous variables. Age and race/ethnicity were associated with environmental risk classes, and significant group differences between classes emerged on environmental risk indicators (except sexual abuse).

Class Differences in Treatment Outcomes

To learn more about differential effects of treatment on children's therapy outcomes by class, an analysis of variance was conducted controlling for age, gender, and race/ethnicity. ANCOVA revealed a non-significant effect of classes on SDQ-P change scores after controlling for age, gender, and race/ethnicity for both changes from first to last scores (F(3, 1166)=2.08, p=.101) and high to last scores (F(3,1166)=37.51, p=.188). This provides evidence that there are no statistically different treatment outcomes between classes when controlling for demographic characteristics.

Discussion

Research regarding children's mental health outcomes has produced equivocal results about the effectiveness of community-based treatment. Furthermore, where research has found positive results of treatment, it is important to expand this work by investigating the factors that influence positive outcomes. Informed by ecological theory, the principal aims of this study were to (a) determine if there was evidence of symptom reduction post-treatment for children at a community-based mental health clinic, (b) identify environmental risks groups through latent class analysis, and (c) assess for

outcome differences between risk groups. As expected, an examination of symptom reduction was conducted and significant differences from both first to last SDQ-P and high to last SDQ-P scores was observed. This outcome provides evidence that children made noteworthy improvements in treatment after receiving services at the community-based center. Latent class analysis (LCA) was performed on seven binary environmental risk variables. Fit indices and theoretical constructs conjointly endorsed four parsimonious classes: Low-Risk, High-Poverty, High-Risk, and Low-Poverty with Maltreatment. Patterns of environmental risks identified within classes illustrate the range of children seeking therapy services, and confirm that constellations of risks exist among children. Finally, differences between the four classes were assessed to determine if clinical outcomes were different. Results showed no significant differences between classes on post-treatment change scores (first to last SDQ-P and high to last SDQ-P). This result was unexpected, but provides evidence for consistent changes in treatment regardless of environmental risks.

Understanding the Environmental Risk Classes

Conducting a latent class analysis (LCA) helped to take a person-centered approach to understanding treatment outcomes. Fit indices and theory supported the selection of the four latent class models. Previous research has revealed strong associations between various risk categories, and the emergence of the four parsimonious groups supports the qualities of each group. A closer inspection of the environmental risk variables associated with each class is revealing. Children were classified into four groups: *Low-Risk* (47%), *High-Poverty* (37%), *High-Risk* (13%), and *Low-Poverty with Maltreatment* (3%). The emergence of both the *Low-Risk* and the *High-Risk* groups was

not unexpected. The characteristics of the *High-Risk* group are validated by previous research which has predictably shown a strong correlation between the various risk factors utilized in this study. For example, researchers have long identified the relationship between poverty and child maltreatment (Gil, 1970; Trickett, Aber, Carlson, and Cicchetti, 1991; Wolock & Horowitz, 1979), poverty and mobility (Garboden, Leventhal & Newman, 2017; Schafft, 2006), maltreatment and homelessness (Herman, Susser, Struening & Link, 1997; Ryan, Kilmer, Cauce, Watanabe, & Hoyt, 2000), and homelessness and school mobility (Fantuzzo, LeBoeuf, Chen, Rouse, & Culhane, 2012). As such, a high risk group was theoretically probable and is validated empirically.

The contrast between the *High-Risk* and *Low-Risk* groups helps to demonstrate the range of children who receive mental health treatment at the community-based center. If these were the only two groups, it would appear that children are either prone to experience risks or not. The *High-Poverty* and *Low-Poverty with Maltreatment* groups provide a more nuanced picture. Similar to the two previous groups, these two groups can be characterized by their relationship to poverty. *High-Poverty* has 98.6% of the children in this group experiencing poverty. This is higher than any other group. *Low-Poverty with Maltreatment* has no children living in poverty. The next highest category for *High-Poverty* had a school mobility prevalence of 25.6%, and the remaining risks did not exceed 9.9%. The emergence of *High-Poverty* class shows that although poverty is related to many of the other environmental risks in this study, poverty is not always associated with such risks.

School mobility (51.4%) and out-of-home placement (73.0%) were most prevalent for children in the remaining group, *Low-Poverty with Maltreatment*. There

were some children who have experience neglect (13.5%) and physical abuse (35.1%). No children in this group had experienced sexual abuse or homelessness. This group had the highest rates of physical abuse compared to other groups, which may account for the elevated out-of-home placements numbers. From this group, we can see evidence of the fact that economic advantages do not preclude one from child maltreatment (physical abuse or neglect) which may result in out-of-home placements for children.

Strengths

One noteworthy strength of this study relates to its use of ecological theory as a foundation for this study. There is strong theoretical and empirical evidence to rely on the tenants of ecological theory, and scholars have supported the use of socio-ecological factors in designing studies that use LCA (Coffman, Patrick, Palen, Rhoades, & Ventura, 2007; Lanza et al., 2010; Syvertsen, Cleveland, Gayle, Tibbits, & Faulk, 2010). Ecological theory is widely applied in social science research to hypothesize about the influence of environment on human functioning. Noted earlier, the full breadth of ecological theory was not utilized. Exclusively risks within the microsystem and mesosystems were investigated. A more narrow utilization of the theory makes sense for the purposes of this study. However, future research could include risks in the exosystem (e.g., negative caregiver experiences) or the macrosystem (e.g., risks in the larger political, economic, or cultural environments). For example, policies related to poverty can affect the functioning of economically disadvantaged caregivers and their children. Explicit inclusion of theory helps to build a connection between theory and research that can be easily neglected but provides validity to research design and aids in interpreting results.

Another strength is that this research connected administrative data from Minnesota Department of Human Services and Minnesota Department of Education to community-based mental health center data. This was possible through a partnership with MinnLink at the University of Minnesota's Center for Advanced Studies in Child Welfare. Depleted resources (McGuirk & Button, 2013), provider apprehension (Bickman, 2012), and an underestimation of data utility (Lipzin, 2009) have all been used to explain the absence of regular use of data to evaluate mental health services. Even if these reasons have strong legitimacy, community mental health organizations are facing mounting pressure to demonstrate treatment effectiveness and understand the factors associated with outcomes (Trask & Garland, 2012). Data should be used when it is available to assist in improving our understanding of and building confidence in therapy services. The present study was able to access valuable data and use it to extend the research on community-based mental health services for children.

The findings from my first principal aim represent a valuable contribution to the study of mental health treatment outcomes for children. As previously noted, there is inconsistent evidence that services at community-based clinics produce positive outcomes (Warren et al., 2009; Kazak et al., 2010; Warren et al., 2010; Warren et al., 2012). These trends reduce the confidence of parents, community members, and funding agents that place their trust in the hands of mental health professionals. However, the evidence of positive outcomes from this study can contribute to strengthening that trust. Both the results from the paired-sample t-tests and effect size calculations endorse the positive effects. The medium to large effect size markedly varied from those in a large meta-analytic review that found effect sizes near zero when comparing usual care and

control groups (Weisz, 2004). Even when statistical significance is observed in research findings, further validating results through reporting on effect size can help to demonstrate that magnitude of pre- and post-treatment change (Ferguson, 2009). The medium to large effect helps to show evidence for the practical significance of this study's findings and compliments the statistically significant group differences found.

Investigating change from both children's first SDQ-P to last SDQ-P scores and high SDQ-P to last SDQ-P scores provided valuable information about children's experience in treatment. Clinicians have informally reported an increase of children's symptoms after the start of treatment. However, this study provides empirical evidence of this phenomenon. On average, first SDQ-P scores (*M*=18.08, *SD*=7.12) were lower than children's highest SDQ-P scores (*M*=20.38, *SD*=6.84). There is good reason to believe the initial SDQ-P score may not be a true representation of the severity of the child's symptoms. After treatment has started, caregivers may be better equipped to identify symptoms, caregivers may trust the clinic more, or may pay closer attention to symptoms. Further research is needed to discern the reason for the increase. This observation provides strong justification for future researchers to measure symptom change using a similar methodological approach.

Conducting research outside of laboratories in community settings has been recommended among academics (Trask & Garland, 2012; Weisz et al., 1995). Doing so helps to provide real-world evidence for the research area of interest. This study extends literature on mental health treatment outcomes to show the value of community-based services and does so in the setting where the treatment occurred. This provides credence for the use and positive effects of treatment for a range of mental health conditions.

Research in controlled settings, often used to test the effectiveness of evidence-based practices, can help to gain greater clarity on the effects of independent variables.

However, when interventions researched in such ways are applied in community-based settings, the same level of control cannot regularly be applied and then same confidence cannot be given to the intervention. Both approaches are useful. However, Weisz, Jensen, & McLeod (2005), have suggested that the most valued means to both determine treatment effects and understand change processes come from real-world settings.

The second principal aim sought to better understand environmental risk typologies for children at the community-based center and did so by diverging from a cumulative risk approach. By using latent class analysis, patterns of environmental risk emerged for children. These patterns demonstrate the way risks can aggregate based upon their relation to one another, and thus provided a person-centered overview of those risks. This is a more refined, statistically tested, view of children's risks because it exposes clustering trends.

Contemporary scholarship is interested in better understanding characteristics of children who receive mental health treatment and then individualizing treatments based upon identified characteristics. Individual characteristics are often identified through subgroup analyses that have traditionally employed variable-centered approaches. It is common for treatment effects to be examined by including variable-centered moderators in multiple regression models (Lanza & Rhoades, 2013). LCA seeks to identify personcentered categorical groups, which can then be used to examine differential effects (Supplee, Kelly, MacKinnon, & Barofsky, 2013). Prevention and intervention researchers propose that comparative effectiveness can be conducted with LCA. "Such approaches

can facilitate targeting future intervention resources to subgroups that promise to show the maximum treatment response" (Lanza & Rhoades, 2013, p.157). Instead of amassing risk factors in a regression model, LCA can help to identify groups of individuals and determine if treatment outcomes differ between those groups. Recent scholarship suggests using LCA for a more complex approach where group homogeneity is not assumed and qualitatively different groups can emerge (Syvertsen et al., 2010). In other words, it is conceivable that a lone environmental risk factor can impact treatment differently than a collection of other environmental risk factors. Approaches like this are well-suited to differentiating treatment responses where the conditions under which children are more or less likely to make progress are elucidated.

Limitations

This study did not specifically examine treatment factors such as intervention models, service intensity, session frequency, or length of treatment that would likely impact treatment outcomes. For example, some children in the study may have received weekly office-based outpatient therapy for 12 months, while others may have received a combination of daily day treatment, weekly in-home therapy, and monthly case management services for the same period of time. Both groups of children were included in this study and their outcomes were not evaluated differently. An examination of treatment "dose" (i.e. frequency and length of treatment) and service-type can help to better attribute changes in SDQ-P to treatment. Failing to do so decreases the generalizability of the findings. There is intuitive reason to believe that treatment efficacy varies based upon time in treatment and treatment modality. By including all children, regardless of dose and service-type, into a single group for analysis, does not allow for a

nuanced look at treatment effectiveness. Finally, it may also be that a child's degree of risk informs service-type and treatment dosage. Higher risk children may be more or less likely to receive certain types of treatment. As a result, this makes analyses more problematic but still needed.

The study design was not experimental in design. As a result, it was not possible to specifically attributing the symptom changes to the therapeutic interventions. Without a control group and variable manipulation, there are fewer clear implications that be drawn from the results. Causal inferences about the relationship between mental health treatment and symptom reduction cannot be made.

Children who were not in clinically significant range were included in the study. Put another way, children in non-clinically significant, normal ranges on the SDQ-P (scores of 0-13), were included in the sample along with those who scored in the borderline (14-16) or abnormal ranges (17-40). Doing so fails to represent the symptoms changes of those with greater clinical needs. The internal validity may have been compromised through including these children. It is reasonable to believe that those with better functioning have less need for treatment and will therefore make less improvement. Including those who scored in the normal range may misrepresent the effects of treatment upon those who scored in the clinically significant ranges. Future research on treatment outcomes should take this into consideration.

The Strengths and Difficulties Questionnaire (SDQ) has been tested and validated as a reliable outcome measure (Lee, Jones, Goodman, & Heyman, 2005; Mathai, Anderson & Bourne, 2003; Vostanis, 2006). It is a broad questionnaire that allows for outcome evaluations within a clinic and between clinics. However, Lee and colleagues

(2005) has strongly cautioned against using it as the only measure of treatment progress because it could underestimate effectiveness. Despite the favorable results from the first principal aim, the magnitude of change may have been misrepresented through exclusively relying on the SDQ-P. Children are referred to mental health services for specific reasons. Uniquely utilizing outcome measures that focus on a specific set of symptoms could likely be more sensitive and detect smaller, yet meaningful changes. Future research on community-based mental health services should look to rely on measures that will best represent changes in symptomology and functionality.

Risk factors used in this study were not exhaustive. Therefore, we cannot assume that this study speaks more broadly about the entirety of risks children experience and the impact of those risks on mental health treatment. Parental substance abuse and community violence, for example, were not included in my model but there is evidence that both risks have been shown to negatively impact children (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009; Walsh, MacMillan, & Jamieson, 2003). With that said, it is important to recognize that although the included risks were not exhaustive, they represent a comprehensive set of risks. It is unreasonable to assume any study will include an exhaustive list of environmental risks.

Moreover, I only looked at risk variables, this study does not highlight anything about protective factors or how risk and protective factors impact one another during mental health treatment. There is value in evaluating the relationship between both risk and protective factors in the emergence, continuation, and treatment of problem behaviors so that the unique effects of mental health treatment can be exposed.

Clinical Implications and Future Directions

Results from this research have valuable implications for understanding mental health treatment at community-based centers and for understanding risk factors experienced by children and the impact those factors have on treatment outcomes. As a field, both researchers and practitioners are embracing complex understandings of people that include their individual histories, risks, and resources. With the rising demand for mental health treatment, the need for effective treatment has never been greater. The results from the first principal aim can build confidence that progress, for many children, can be achieved. However, the positive results found in this study are not representative of all community-based treatment. Researchers and interventionists need to do better. By uncovering distinctive risk profiles, we can begin to better understand factors that influence treatment and improve intervention approaches.

Implications for administrators. Results from this study are informative to clinicians and administrators at community-based mental health centers. For administrative leadership, using latent class analysis to understand unique risk profiles (client typologies) and the prevalence of each group can inform service design and administrative decision-making. For example, it would behoove community-based mental health centers, like the one in this study, to assist in connecting children and their families to services that can mitigate issues related to poverty and mobility. Services that can help people meet their most basic needs and improve stability could improve client engagement, support consistent service delivery, and improve client outcomes.

Researchers endorse the value of integrated care models that improve collaboration and connect diverse disciplines to improve mental health outcomes (Petterson, Miller, Payne-

Murphy, & Phillips, 2014). Unfortunately, services within a given community-based mental health center cannot meet every client's unique needs. However, by understanding client typologies, administrators can help to build internal capacities and form strategic alignment with external partners who can assist in meeting the multiple complex needs of clients.

Community-based mental health agency administrators could benefit from partnering with researchers/program evaluators to look more closely at the demographic and diagnostic characteristics of the children in each class. When it comes to clinical intervention, each child has different risks, needs, and resources that influence outcomes. Child heterogeneity in health and dysfunction relates to heterogeneity in treatment response. Administrators can gain from identifying the individual-level differences between children receiving mental health treatment and ensure programs are tailored to meet individualized needs and adjustments can be made when needs are not being met.

Furthermore, it will be important for administrators to look at the mental health services utilized by clients in each profile. By understanding which services children are accessing administrators can better expand service options and critique services. Perhaps children with certain risk constellations make greater gains in treatment when specific mental health treatment approaches are applied or when mental health services are connected to housing supports. Differentiating treatment progress by the service-type within groups can aid in the search for more refined person-centered interventions.

Adaptive treatment strategies are one approach built on the assumption that individuals have differing intervention needs (Collins, Murphy, & Bierman, 2004). Approaches like this vary based upon intervention composition and dosage and are continually adjusted

based upon an individual's need (Murphy & McKay, 2004). Employing LCA, and other similar analytic approaches, can uniquely aid in identifying client typologies and justify administrators' financial investment in programs that truly meet individual children's needs.

Implications for clinicians. For clinicians, becoming aware of unique client typologies has implications for assessment, treatment planning, and intervention selection. Environmental risk profiles may provide a structure for more thorough client assessment and serve as guide posts during this process. It is important that clinicians do not make assumptions about client risks, but awareness of risk constellations can guide questioning so that appropriate services are recommended and additional referrals are made when necessary. For example, children in classes 2 and 4 had higher rates of poverty and school mobility. Although poverty and school mobility are not causally connected, clinicians should be aware of these trends so that inquiry about each risk is included during initial and on-going assessment.

These typologies can be a tool for early and on-going identification of potential risks which could be critical in service selection and intervention planning.

Understanding how risk factors cluster in children provides insight into ways to promote improved functioning. This study provides further evidence that risks generally do not occur in isolation. A one-fits-all approach to treatment or single response approaches may not be able to meet children's diverse needs. Children with more intense needs usually get assigned to more intense services (e.g., day treatment, crisis services, multi-systemic therapy). Effective treatment planning, when using information about children's risk typologies, could include assigning children to services that can more appropriately meet

the full range of their individual needs. For example, children in class 1 would be less likely to need services that address improving access to economic assistance and housing support than those in class 4 which could benefit from more integrated services where multiple service providers across disciplines are regularly integrating services.

Linking children's environmental risk typologies closely to mental health treatment can create a clear argument for highly collaborative, multi-disciplined approaches to treatment (Dishion & Stormshak, 2007). Doing so logically connects both the positive and negative contributions of the extended environment on treatment outcomes. Additionally, these considerations promote professional awareness of, integration with, and participation in multiple systems when needed to enhance access to and use of supports in order to improve therapeutic outcomes. Here, client and family needs and resources, collaboration with multiple providers, and awareness of those environmental factors are used in order to formulate ecologically-minded treatment plans (Dishion & Stormshak, 2007). Therapists' awareness that environmental supports and stresses impact treatment outcomes becomes central to interventions instead of peripheral. As future research becomes more confident in the unique effects of environmental risks on children's treatment outcomes, multi-systemic interventionists can more successfully help the thousands of children in need.

Future directions. The final analysis conducted to address the third principal aim produced insufficient evidence of outcome differences between the four environmental risk classes. These results were unexpected. Although there were similar treatment outcomes across groups, we cannot assume that treatment is not affected by environmental variables. There is a strong empirical connection between environmental

risks and children's negative functioning (APA, 2014; Brooks-Dunn & Duncan, 1997; Hillberg, Hamilton-Giachristis & Dixon, 2011; Rog & Buckner, 2007; Shaw & Goode, 2008; Van Dorn, Volavka & Johnson, 2012), and the logical implications of this evidence demonstrate the probable connection between risks and negative mental health treatment outcomes. Future research should work to investigate the connection between these variables. For example, insufficient evidence to support the third principal aim may have occurred because of a strong positive association between elevated risks and the intensity of a child's services. In other words, children with greater environmental risks may have been appropriately assigned more intensive and more frequent services (e.g. daily day treatment), whereas children with fewer risks may have received less intensive services (e.g. weekly outpatient therapy). More intensive services may help to moderate the effects of environmental risks on children's outcomes. Treatment gains were not significantly different at the end of treatment, but it is unclear if treatment progress endured after treatment for any of the groups. Further longitudinal research is needed to understand the lasting effect of the change across environmental risk groups.

Results from studies have shown trends demonstrating negative effects of risk on treatment outcomes (Asarnow et al., 2009; Barbe et al., 2004; Lewis et al., 2010; Shamseddeen et al., 2011). Barbe et al. (2004) and Lewis et al. (2010) also studied children with mood disorders (depression) and found negative effects of risks on outcomes; both of these studies provided cognitive behavioral therapy (CBT). Still, others have found contrary results (MacPherson, Algorta, Mendenhall, Fields, and Fristad, 2014; Whitson and Connell, 2016). MacPherson et al. (2014) administered Multifamily Psychoeducation Psychotherapy (MF-PEP) to children with mood disorders.

Here, treatment fared better for those who also had a history of stress or trauma compared to children without such a history. Outcome divergence between these studies may be attributed to intervention-type. In Barbe et al. (2004) and Lewis et al. (2010) participants received cognitive behavioral therapy, while McPherson et al. (2014) studied participants who received a family-based intervention. It is possible some interventions may more successfully moderate the effects of environmental risks on mental health treatment. Further research is needed to understand the relationship between specific interventions and treatment progress.

References

- Aber, J. L., Allen, J. P., Carlson, V., & Cicchetti, D. (1989). The effects of maltreatment on development during early childhood: Recent studies and their theoretical, clinical, and policy implications. In D. Cicchetti & V. Carlson (Eds.), *Child Maltreatment: Theory and Research on the Causes and Consequences of Child Abuse and Neglect* (pp. 579-619). New York, NY: Cambridge University Press.
- Ackerman, P. T., Newton, J. E., McPherson, W., Jones, J. G., & Dykman, R. A. (1998).

 Prevalence of post-traumatic stress disorder and other psychiatric diagnoses in three groups of abused children (sexual, physical, and both). *Child Abuse & Neglect*, 22, 759-774. doi: 10.1016/S0145-2134(98)00062-3
- Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions* on Automatic Control, 19, 716-723. doi: 10.1109/TAC.1974.1100705
- Alexander, K. L., Entwisle, D. R., & Dauber, S. L. (1996). Children in motion: School transfers and elementary school performance. *Journal of Educational**Research*, 90, 3-12. doi: 10.1080/00220671.1996.9944438
- Altman, D. G., & Royston, P. (2006). The cost of dichotomising continuous variables. *British Medical Journal*, *332*, 1080. doi: 10.1136/bmj.332.7549.1080
- American Psychological Association. (2014). Effects of Poverty, Hunger, and

 Homelessness on Children and Youth. Retrieved from

 http://www.apa.org/pi/families/poverty.aspx
- Anda, R. F., Chapman, D. P., Felitti, V. J., Edwards, V., Williamson, D. F., Croft, J. B., & Giles, W. H. (2002). Adverse childhood experiences and risk of paternity in

- teen pregnancy. *Obstetrics & Gynecology*, 100, 37-45. doi: 10.1016/S0029-7844(02)02063-X
- Anda, R. F., Croft, J. B., Felitti, V. J., Nordenberg, D., Giles, W. H., Williamson, D. F., & Giovino, G. A. (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *JAMA*, 282, 1652-1658. doi: 10.1001/jama.282.17.1652
- Anda, R. F., Whitfield, C. L., Felitti, V. J., Chapman, D., Edwards, V. J., Dube, S. R., & Williamson, D. F. (2002). Adverse childhood experiences, alcoholic parents, and later risk of alcoholism and depression. *Psychiatric Services*, 53, 1001-1009. doi: 10.1176/appi.ps.53.8.1001
- Anthony, E. K. (2008). Cluster profiles of youths living in urban poverty: Factors affecting risk and resilience. *Social Work Research*, *32*, 6-17. doi: 10.1093/swr/32.1.6
- Armour, C., Elklit, A., & Christoffersen, M. N. (2014). A latent class analysis of childhood maltreatment: Identifying abuse typologies. *Journal of Loss and Trauma*, 19, 23-39. doi: 10.1080/15325024.2012.734205
- Asarnow, J. R., Emslie, G., Clarke, G., Wagner, K. D., Spirito, A., Vitiello, B., ... & Ryan, N. (2009). Treatment of selective serotonin reuptake inhibitor—Resistant depression in adolescents: Predictors and moderators of treatment response. *Journal of the American Academy of Child & Adolescent Psychiatry*, 48, 330-339. doi: 10.1097/CHI.Ob013e3181977476

- Barbe, R. P., Bridge, J. A., Birmaher, B., Kolko, D. J., & Brent, D. A. (2004). Lifetime history of sexual abuse, clinical presentation, and outcome in a clinical trial for adolescent depression. *Journal of Clinical Psychiatry*, 65, 77-83.
- Berger, L. M., Bruch, S. K., Johnson, E. I., James, S., & Rubin, D. (2009). Estimating the "impact" of out-of-home placement on child well-being: Approaching the problem of selection bias. *Child Development*, 80, 1856-1876. doi: 10.1111/j.1467-8624.2009.01372.x
- Berzenski, S. R., & Yates, T. M. (2011). Classes and consequences of multiple maltreatment: A person-centered analysis. *Child Maltreatment*, *16*, 250-261. doi: 10.1177/1077559511428353
- Bickman, L. (2012). Why can't mental health services be more like modern baseball?. *Administration and Policy in Mental Health and Mental Health Services Research*, 39, 1-2. doi: 10.1007/s10488-012-0409-9
- Bolger, K. E. & Patterson, C. J. (2001). Pathways from child maltreatment to internalizing problems: Perceptions of control as mediators and moderators. *Development and Psychopathology*, 13, 913-940.
- Bronfrenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press.
- Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *The Future of Children*, 55-71. doi: 10.2307/1602387
- Bubolz, M.M. & Sontag, M.S. (1993). Human ecology theory. In P. Boss, W. J. Doherty,
 R. LaRossa, W.R. Schumm, & K. Steinmetz (Eds.), Sourcebook of family theories
 and methods: A contextual approach (419-450). New York: Plenum Press.

- Burns, B. J., Phillips, S. D., Wagner, H. R., Barth, R. P., Kolko, D. J., Campbell, Y., & Landsverk, J. (2004). Mental health needs and access to mental health services by youths involved with child welfare: A national survey. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43, 960-970. doi: 10.1097/01.chi.0000127590.95585.65
- Celeux, G., & Soromenho, G. (1996). An entropy criterion for assessing the number of clusters in a mixture model. *Journal of Classification*, *13*, 195-212. doi: 10.1007/BF01246098
- Coffman, D. L., Patrick, M. E., Palen, L. A., Rhoades, B. L., & Ventura, A. K. (2007). Why do high school seniors drink? Implications for a targeted approach to intervention. *Prevention Science*, 8, 241-248. doi: 10.1007/s11121-007-0078-1
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155. doi: 10.1037/0033-2909.112.1.155
- Coley, R. & Baker, C (2013). Poverty and education: Finding the way forward. *Report of the ETS Center for Research on Human Capital and Education*. Retrieved from https://www.ets.org/s/research/pdf/poverty_and_education_report.pdf.
- Collins, L. M., Murphy, S. A., & Bierman, K. L. (2004). A conceptual framework for adaptive preventive interventions. *Prevention Science*, 5, 185-196. doi: 10.1023/B:PREV.0000037641.26017.00
- Cook, K. D., & Coley, R. L. (2017). School transition practices and children's social and academic adjustment in kindergarten. *Journal of Educational Psychology*, 109, 166-177. doi: 10.1037/edu0000139

- Courtney, M. E. (2000). Research needed to improve the prospects for children in out-of-home placement. *Children and Youth Services Review*, 22, 743-761. doi: 10.1016/S0190-7409(00)00115-8
- Currie, J., & Spatz Widom, C. (2010). Long-term consequences of child abuse and neglect on adult economic well-being. *Child Maltreatment*, *15*, 111-120. doi: 10.1177/1077559509355316
- Dishion, T. J., & Stormshak, E. A. (2007). *Intervening in children's lives: An ecological, family-centered approach to mental health care*. Washington, D.C.: American Psychological Association.
- Duncan, G. J., Yeung, W. J., Brooks-Gunn, J., & Smith, J. R. (1998). How much does childhood poverty affect the life chances of children?. *American Sociological Review*, 63, 406-423. Retrieved from http://shiftfiles.com/files/190667E_source_2.pdf
- Dupere, V., Archambault, I., Leventhal, T., Dion, E., & Anderson, S. (2015). School mobility and school-age children's social adjustment. *Developmental Psychology*, 51, 197-210. doi: 10.1037/a0038480
- Fantuzzo, J. W., LeBoeuf, W. A., Chen, C. C., Rouse, H. L., & Culhane, D. P. (2012).

 The unique and combined effects of homelessness and school mobility on the educational outcomes of young children. *Educational Researcher*, *41*, 393-402. doi: 10.3102/0013189X12468210
- Ferguson, C. J. (2009). An effect size primer: A guide for clinicians and researchers.

 *Professional Psychology: Research and Practice, 40, 532-538. doi: 10.1037/a0015808

- Fowler, P. J., Tompsett, C. J., Braciszewski, J. M., Jacques-Tiura, A. J., & Baltes, B. B. (2009). Community violence: A meta-analysis on the effect of exposure and mental health outcomes of children and adolescents. *Development and Psychopathology*, 21, 227-259. doi: 10.1017/S0954579409000145
- Garland, A. F., Haine-Schlagel, R., Brookman-Frazee, L., Baker-Erickson, M., Trask, E., & Fawley-King, K. (2013). Improving community-based mental health care for children: Translating knowledge into action. *Administration and Policy in Mental Health and Mental Health Services Research*, 40, 6-22. doi: 10.1007/s10488-021-0450-8
- Garboden, P. M., Leventhal, T., & Newman, S. (2017). Estimating the effects of residential mobility: A methodological note. *Journal of Social Service Research*, 43, 246-261. doi: 10.1080/01488376.2017.1282392
- Gil, D. 1970. Violence against Children: Physical Child Abuse in the United States.

 Cambridge, MA: Harvard University Press.
- Goodman, R. (1997). The strengths and difficulties questionnaire: A research note.

 Journal of Child Psychology, Psychiatry, and Allied Disciplines, 38, 581-586.

 doi: 10.1111/j.1469-7610.1997.tb01545.x
- Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties

 Questionnaire (SDQ). *Journal of the American Academy of Child and Adolescent*Psychiatry, 40, 1337-1345. doi: 10.1097/00004583-200111000-00015
- Gruman, D. H., Harachi, T. W., Abbott, R. D., Catalano, R. F., & Fleming, C. B. (2008).

 Longitudinal effects of student mobility on three dimensions of elementary school

- engagement. *Child Development*, 79, 1833-1852. doi: 10.1111/j.1467-8624.2008.01229.x
- Hanson, M.D. & Chen, E. (2007). Socioeconomic status and health behaviours in adolescence: A review of the literature. *Journal of Behavioral Medicine*, 25, 425-438. doi: 10.1007/s10865-007-9098-3
- Harman, J. S., Childs, G. E., & Kelleher, K. J. (2000). Mental health care utilization and expenditures by children in foster care. *Archives of Pediatrics & Adolescent Medicine*, 154, 1114-1117. doi: 10.1001/archpedi.154.11.1114
- Hawley, K.M. & Weisz, J.R. (2005). Youth versus parent working alliance in usual care:

 Distinctive associations with retention, satisfaction, and treatment outcome.

 Journal of Clinical Child and Adolescent Psychiatry, 34, 117-128. doi:

 10.1207/s15374424jccp3401_11
- Haynie, D. L., South, S. J., & Bose, S. (2006). The company you keep: Adolescent mobility and peer behavior. *Sociological inquiry*, 76, 397-426. doi: 10.1111/j.1475-682X.2006.00161.x
- Herman, D. B., Susser, E. S., Struening, E. L., & Link, B. L. (1997). Adverse childhood experiences: are they risk factors for adult homelessness? *American Journal of Public Health*, 87, 249-255. Retrieved from http://www.theannainstitute.org/ACE%20folder%20for%20website/41ACRH.pdf
- Hildyard, K.L. & Wolfe, D.A. (2002) Child neglect: Developmental issues and outcomes.

 Child Abuse & Neglect, 26, 679-695. doi: 10.1016/S0145-2134(02)00341-1
- Hillberg, T., Hamilton-Giachritsis, C., & Dixon, L. (2011). Review of meta-analyses on the association between child sexual abuse and adult mental health difficulties: A

- systematic approach. *Trauma, Violence, & Abuse, 12*, 38-49. doi: 10.1177/1524838010386812
- Hussey, J. M., Chang, J. J., & Kotch, J. B. (2006). Child maltreatment in the United States: prevalence, risk factors, and adolescent health consequences.

 *Pediatrics, 118, 933-942. doi: 10.1542/peds.2005-2452
- Kazak, A. E., Hoagwood, K., Weisz, J. R., Hood, K., Kratochwill, T. R., Vargas, L. A., & Banez, G. A. (2010). A meta-systems approach to evidence-based practice for children and adolescents. *American Psychologist*, 65, 85-97. doi: 10.1037/a0017784
- Kataoka, S. H., Zhang, L., & Wells, K. B. (2002). Unmet need for mental health care among US children: Variation by ethnicity and insurance status. *American Journal of Psychiatry*, *159*, 1548-1555. doi: 10.1176/appi.ajp.159.9.1548
- Kolko, D. J. (2002). Child physical abuse. In J. E. B. Myers (Ed.), *APSAC handbook on child maltreatment* (pp. 21-50). Thousand Oaks, CA: Sage.
- Lansford, J. E., Dodge, K. A., Pettit, G. S., Bates, J. E., Crozier, J., & Kaplow, J. (2002).

 A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. *Archives of Pediatrics & Adolescent Medicine*, 156, 824-830. doi: 10.1001/archpedi.156.8.824
- Lansford, J. E., Miller-Johnson, S., Berlin, L. J., Dodge, K. A., Bates, J. E., & Pettit, G. S. (2007). Early physical abuse and later violent delinquency: A prospective longitudinal study. *Child Maltreatment*, 12, 233-245. doi: 10.1177/1077559507301841

- Lanza, S. T., & Rhoades, B. L. (2013). Latent class analysis: An alternative perspective on subgroup analysis in prevention and treatment. *Prevention Science*, *14*, 157-168. doi: 10.1007/s11121-011-0201-1
- Lee, W., Jones, L., Goodman, R., & Heyman, I. (2005). Broad outcome measures may underestimate effectiveness: An instrument comparison study. *Child and Adolescent Mental Health*, 10, 143-144. doi: 10.1111/j.1475-3588.2005.00350.x
- Leventhal, T. & Brooks-Gunn, J. (2000). The neighborhood they live in: the effects of neighborhood residence on child and adolescent outcomes. *Psychology Bulletin*, 12, 309-337. doi: 10.1037/0033-2909.126.2.309
- Lewis, C. C., Simons, A. D., Nguyen, L. J., Murakami, J. L., Reid, M. W., Silva, S. G., & March, J. S. (2010). Impact of childhood trauma on treatment outcome in the treatment for adolescents with depression study (TADS). *Journal of the American Academy of Child & Adolescent Psychiatry*, 49, 132-140. doi: 10.1016/j.jaac.2009.10.007
- Lo, Y., Mendell, N., & Rubin, D., 2001. Testing the number of components in a normal mixture. *Biometrika*, 88, 767-778. Retrieved from http://www.jstor.org/stable/2673445
- MacPherson, H. A., Algorta, G. P., Mendenhall, A. N., Fields, B. W., & Fristad, M. A. (2014). Predictors and moderators in the randomized trial of multifamily psychoeducational psychotherapy for childhood mood disorders. *Journal of Clinical Child & Adolescent Psychology*, 43, 459-472. doi: 10.1080/15374416.2013.807735

- Maniglio, R. (2009). The impact of child sexual abuse on health: A systematic review of reviews. *Clinical Psychology Review*, 29, 647-657. doi: 10.1016/j.cpr.2009.08.003
- Manly, J. T., Kim, J. E., Rogosch, F. A., & Cicchetti, D. (2001). Dimensions of child maltreatment and children's adjustment: Contributions of developmental timing and subtype. *Development and Psychopathology*, *13*, 759-782.
- Manteuffel, B., Stephens, R. L., Sondheimer, D. L., & Fisher, S. K. (2008).
 Characteristics, service experiences, and outcomes of transition-aged youth in systems of care: Programmatic and policy implications. *Journal of Behavioral Health Services Research*, 35, 469-487. doi: 10.1007/s11414-008-9130-6
- Mantzicopoulos, P., & Knutson, D. J. (2000). Head Start children: School mobility and achievement in the early grades. *Journal of Educational Research*, 93, 305-311. doi: 10.1080/00220670009598722
- Mathai, J., Anderson, P., & Bourne, A. (2003). Use of the Strengths and Difficulties

 Questionnaire as an outcome measure in a child and adolescent mental health
 service. *Australasian Psychiatry*, 11, 334-337. doi: 10.1046/j.14401665.2003.00544.x
- McCutcheon, A. L. (1987). Latent class analysis. *Quantitative Applications in the Social Sciences Series No. 64*. Thousand Oaks, CA: Sage Publications.
- McDonald, T. P. (1996). Assessing the long-term effects of foster care: A research synthesis. Washington, D.C.: Child Welfare League of America.
- McGuirk, J., & Button, S. (2013). Commentary: Improving children's services: Building partnerships between providers and researchers. *Administration and Policy in*

- *Mental Health and Mental Health Services Research*, *40*, 42-45. doi: 10.1007/s10488-012-0458-0
- Murphy, S. A., & McKay, J. R. (2004). Adaptive treatment strategies: An emerging approach for improving treatment effectiveness. *Clinical Science*, *12*, 7-13.

 Retrieved from http://dept.stat.lsa.umich.edu/~samurphy/papers/newsletter.pdf
- Muthén, L. K., & Muthén, B.O. (2007). Mplus User's Guide (6th ed.). Los Angeles, CA: Muthén & Muthén.
- National Research Council (1993) *Understanding Child Abuse and Neglect*. Washington, DC: National Academies Press. doi: 10.17226/2117.
- National Research Council. (2010). Student Mobility: Exploring the Impacts of Frequent

 Moves on Achievement: Summary of a Workshop. Washington, DC: National

 Academies Press.
- Noble, K. G., Houston, S. M., Kan, E., & Sowell, E. R. (2012). Neural correlates of socioeconomic status in the developing human brain. *Developmental science*, *15*, 516-527. doi: 10.1111/j.1467-7687.2012.01147.x
- Nooner, K. B., Litrownik, A. J., Thompson, R., Margolis, B., English, D. J., Knight, E. D., ... & Roesch, S. (2010). Youth self-report of physical and sexual abuse: A latent class analysis. *Child Abuse & Neglect*, *34*, 146-154. doi: 10.1016/j.chiabu.2008.10.007
- Pears, K. C., Kim, H. K., & Fisher, P. A. (2008). Psychosocial and cognitive functioning of children with specific profiles of maltreatment. *Child Abuse & Neglect*, *32*, 958-971. doi: 10.1016/j.chiabu.2007.12.009

- Petterson, S., Miller, B., Payne-Murphy, J., & Phillips, R. (2014). Mental health treatment in the primary care setting: Patterns and pathways. *Families Systems & Health.*, 32(2), 157-166. doi: 10.1037/fsh0000036
- Reynolds, A. J., Chen, C. C., & Herbers, J. E. (2009). School mobility and educational success: A research synthesis and evidence on prevention. In *Workshop on the Impact of Mobility and Change on the Lives of Young Children, Schools, and Neighborhoods, June* (pp. 29-30).
- Rog, D. J., & Buckner, J. C. (2007). Homeless families and children. In *Toward understanding homelessness: The 2007 national symposium on homelessness research.* Washington, DC: US Department of Housing and Urban Development.
- Ryan, K. D., Kilmer, R. P., Cauce, A. M., Watanabe, H., & Hoyt, D. R. (2000).
 Psychological consequences of child maltreatment in homeless adolescents:
 Untangling the unique effects of maltreatment and family environment. *Child Abuse & Neglect*, 24, 333-352. doi: 10.1016/S0145-2134(99)00156-8
- Schafft, K. A. (2006). Poverty, residential mobility, and student transiency within a rural New York school district. *Rural Sociology*, 71, 212-231. doi: 10.1526/003601106777789710
- Schreiber, J. B. (2016). Latent class analysis: An example for reporting results. *Research* in *Social and Administrative Pharmacy*. doi: 10.1016/j.sapharm.2016.11.011
- Shamseddeen, W., Asarnow, J. R., Clarke, G., Vitiello, B., Wagner, K. D., Birmaher, B., ... & McCracken, J. T. (2011). Impact of physical and sexual abuse on treatment response in the Treatment of Resistant Depression in Adolescent Study

- (TORDIA). Journal of the American Academy of Child & Adolescent Psychiatry, 50, 293-301. doi: 10.1016/j.jaac.2010.11.019
- Shaw, E., & Goode, S. (2008). Fact sheet: Vulnerable young children. *The National Early Childhood Technical Assistance Center*. Retrieved from http://ectacenter.org/~pdfs/pubs/factsheet_vulnerable.pdf
- Shevlin, M., & Elklit, A. (2008). A latent class analysis of adolescent adverse life events based on a Danish national youth probability sample. *Nordic Journal of Psychiatry*, 62, 218-224. doi: 10.1080/08039480801983992
- Simpson, G. A., & Fowler, M. G. (1994). Geographic mobility and children's
 emotional/behavioral adjustment and school functioning. *Pediatrics*, *93*,
 Retrieved from
 http://pediatrics.aappublications.org.ezp1.lib.umn.edu/content/pediatrics/93/2/303
 .full.pdf
- Supplee, L. H., Kelly, B. C., MacKinnon, D. M. & Barofsky, M. Y. (2013). Introduction to the special issue: Subgroup analysis in prevention and intervention research.

 Prevention Science, 14, 107-110. doi: 10.1007/s11121-021-0335-9
- Syvertsen, A. K., Cleveland, M. J., Gayles, J. G., Tibbits, M. K., & Faulk, M. T. (2010).

 Profiles of protection from substance use among adolescents. *Prevention Science*,

 11, 185-196. doi: 10.1007/s11121-009-0154-9
- Temple, J. A., & Reynolds, A. J. (1999). School Mobility and Achievement: Longitudinal Findings From an Urban Cohort. *Journal of School Psychology*, *37*, 355-377. doi: 10.1016/S0022-4405(99)00026-6

- Trask, E. V. & Garland, A. F. (2012). Are children improving? Results from outcome measurement in a large mental health system. *Administration and Policy in Mental Health and Mental Health Services Research*, *39*, 210-220. doi: 10.1007/s10488-011-0353-0
- Trickett, P. K., Aber, J., Carlson, L., and Cicchetti, D. (1991). Relationship of socioeconomic status to the etiology and developmental sequelae of physical child abuse. *Developmental Psychology*, 27, 148-158. doi: 10.1037/0012-1649.27.1.148
- Trickett, P. K., Noll, J. G., Reiffman, A., & Putnam, F. W. (2001). Variants of intrafamilial sexual abuse experience: Implications for short-and long-term development. *Development and Psychopathology*, 13, 1001-1019.
- U.S. Department of Health and Human Services. (2001). *Mental health: Culture, race,*and ethnicity A supplement to Mental Health: A Report of the Surgeon General.

 Rockville, MD: U.S. Public Health Service.
- Van Dorn, R., Volavka, J., & Johnson, N. (2012). Mental disorder and violence: is there a relationship beyond substance use?. Social Psychiatry and Psychiatric Epidemiology, 47, 487-503. doi: 10.1007/s00127-011-0356-x
- Vostanis, P. (2006). Strengths and difficulties questionnaire: Research and clinical applications. *Current Opinion in Psychiatry*, *19*, 367-372. doi: 10.1097/01.yco.0000228755.72366.05
- Walsh, C., MacMillan, H. L., & Jamieson, E. (2003). The relationship between parental substance abuse and child maltreatment: findings from the Ontario Health Supplement. *Child Abuse & Neglect*, 27, 1409-1425. doi: 10.1016/j.chiabu.2003.07.002

- Warren, J.S., Nelson, P.L., & Burlingame, G.M. (2009). Identifying Youth at Risk for Treatment Failure in Outpatient Mental Health Services. *Journal of Child and Family Studies*, 18, 690-701. doi: 10.1007/s10826-009-9275-9
- Warren, J.S., Nelson, P.L., Mondragon, S.A., Baldwin, S.A., & Burlingame, G.M.
 (2010). Youth psychotherapy change trajectories and outcomes in usual care:
 Community mental health versus managed care settings. *Journal of Consulting*and Clinical Psychology, 78, 144-155. doi: 10.1037/a0018544
- Warren, J. S., Nelson, P. L., Burlingame, G. M., & Mondragon, S. A. (2012). Predicting patient deterioration in youth mental health services: community mental health vs. managed care settings. *Journal of Clinical Psychology*, 68, 24-40. doi: 10.1002/jclp.20831
- Weiss, B., Catron, T., Harris, V., & Phung, T. M. (1999). The effectiveness of traditional child psychotherapy. *Journal of Consulting and Clinical Psychology*, 67, 82-94. doi: 10.1037/0022-006X.67.1.82
- Weisz, J. R. (2004). *Psychotherapy for children and adolescents: Evidence-based treatments and case examples*. Cambridge, UK: Cambridge University Press.
- Weisz, J. R., & Gray, J. S. (2008). Evidence-based psychotherapy for children and adolescents: Data from the present and a model for the future. *Child and Adolescent Mental Health*, *13*, 54-65. doi: 10.1111/j.1475-3588.2007.00475.x
- Weisz, J. R., Jensen, A. L., & McLeod, B. D. (2005). Development and dissemination of child and adolescent psychotherapies: Milestones, methods, and a new deployment-focused model. In E. D. Hibbs & P. S. Jensen (Eds.), *Psychosocial treatments for child and adolescent disorders: Empirically based strategies for*

- *clinical practice* (2nd ed., pp. 9-39). Washington, DC: American Psychological Association.
- Weisz, J.R., Weiss, B., Han, S.S., Granger, D.A., & Morton, T. (1995). Effects of psychotherapy with children and adolescents revisited: A meta-analysis of treatment outcome studies. *Psychological Bulletin*, 3, 450-468. doi: 10.1037/0033-2909.117.3.450
- Wilson, D. R. (2010). Health consequences of childhood sexual abuse. *Perspectives in psychiatric care*, 46, 56-64. doi: 10.1111/j.1744-6163.2009.00238.x
- Wilson, H. W., & Widom, C. S. (2010). The role of youth problem behaviors in the path from child abuse and neglect to prostitution: A prospective examination. *Journal of Research on Adolescence*, 20, 210-236. doi: 10.1111/j.1532-7795.2009.00624.x
- Whitson, M. L., & Connell, C. M. (2016). The relation of exposure to traumatic events and longitudinal mental health outcomes for children enrolled in systems of care: results from a national system of care evaluation. *American Journal of Community Psychology*, *57*, 380-390. doi: 10.1002/ajcp.12058
- Wolock, I., & Horowitz, B. (1979). Child maltreatment and material deprivation among AFDC-recipient families. *Social Service Review*, *53*, 175-194. doi: 10.1086/643725
- Xue Y., Leventhal T., Brooks-Gunn J., Earls F. J. (2005). Neighborhood residence and mental health problems of 5- to 11-year-olds. Archives of General Psychiatry, 62, 554-63. doi: 10.1001/archpsyc.62.5.554

 Table 1 Gender Differences in Baseline SDQ-P and Environmental Risk Variables

	Total (N =	Male (<i>N</i> =699)	Female (<i>N</i> =477)	F/x^2	df	p
	1176)					
SDQ-P - Baseline	18.08 (7.12)	19.05 (6.89)	16.67 (7.22)	32.54	1	<.001
Environmental Risks						
Poverty	556 (47.3%)	327 (27.8%)	229 (19.5%)	.17	1	.679
Homelessness	65 (5.5%)	43 (3.7%)	22 (1.9%)	1.29	1	.257
School Mobility	268 (22.8%)	159 (59.3%)	109 (40.7%)	.00	1	.967
Out-of-Home Placement	179 (15.2%)	110 (9.4%)	69 (5.9%)	.36	1	.551
Neglect	154 (13.1%)	100 (8.5%)	54 (4.6%)	2.22	1	.136
Physical Abuse	72 (6.1%)	48 (4.1%)	24 (2.0%)	1.66	1	.197
Sexual Abuse	35 (3.0%)	11 (1.0%)	24 (2.0%)	11.74	1	.001

 Table 2 Race/Ethnicity Differences by Baseline SDQ-P and Environmental Risk Variables

	Total	Amer. Ind./ AK	Asian/Pac.	Hispanic	Black	White	F/x^2	d	p
	(N = 1176)	Native (<i>N</i> =45)	Islander (<i>N</i> =27)	(N=95)	(N=370)	(N=639)		f	
SDQ-P - Baseline	18.08 (7.12)	16.93 (6.86)	15.93 (6.56)	16.56 (6.83)	19.79 (6.73)	17.48 (7.12)	8.55	4	<.001
Environmental Risks									
Poverty	556 (47.3%)	$32(2.7\%)_{a,b}$	$10 (.90\%)_{c, d}$	$57 (4.9\%)_{b,d}$	282 (24.0%) _a	175 (14.9%) _c	243.30	4	<.001
Homelessness	65 (5.5%)	$7(.60\%)_{a}$	$0(0.0\%)_{a, b, c}$	$2(.17\%)_{c}$	$44 (3.7\%)_a$	$12(1.0\%)_{b, c}$	57.38	4	<.001
School Mobility	268 (22.8%)	$22(1.9\%)_a$	$3(.02\%)_{b,c}$	$32(2.7\%)_{a,c}$	$104 (8.8\%)_{c}$	107 (9.1%) _b	45.14	4	<.001
Out-of-Home	179 (15.2%)	$17(1.5\%)_{a}$	$2(.17\%)_{b,c}$	$16(1.4\%)_{a,c}$	$98 (8.3\%)_{a, c}$	$46 (3.9\%)_{b}$	87.47	4	<.001
Placement									
Neglect	154 (13.1%)	$18(1.5\%)_{a}$	$2(.17\%)_{b, c}$	$14 (1.2\%)_{c}$	$83 (7.1\%)_{a, c}$	$37(3.2\%)_{b}$	87.92	4	<.001
Physical Abuse	72 (6.1%)	$6(.51\%)_{a}$	$1(.09\%)_{a, b}$	$3(.26\%)_{a,b}$	$42(3.6\%)_a$	$20 (1.7\%)_{b}$	33.36	4	<.001
Sexual Abuse	35 (3.0%)	$4(.34\%)_{a}$	$2(.17\%)_{a}$	$7(.60\%)_{a}$	$17(1.5\%)_{a}$	5 (.43%) _b	27.64	4	<.001

Each subscript letter denotes a subset of class categories whose column proportions do not differ significantly from each other at the .05 level.

Table 3 Comparison of LCA Models by Fit Indices

Fit Indices	Model						
	1-Class	2-Class	3-Class	4-Class			
Akaike Information Criterion (AIC)	6178.808	5568.569	5527.597	5523.929			
Lo-Mendell-Rubin adjusted likelihood test (LMR)		p = .0000	p = .0002	p = .0207			
Entropy		.836	.657	.712			

Table 4 Prevalence and Means (Standard Deviations) for Latent Class Characteristics

	Total Sample	Class 1: (<i>n</i> =	Class 2: (<i>n</i> =	Class 3: (<i>n</i> =	Class 4: (<i>n</i> =			
	(N=1176)	553; 47.0%)	433; 36.8%)	153; 13.0%)	37; 3.1%)			
						F/x^2	df	p
Age	10.10 (3.24)	10.13 (3.39)	10.37 (3.00)	9.33 (3.06)	9.51 (3.80)	4.39	3	0.004
Gender						2.45	3	0.484
Male	59.4%	41.0%	42.0%	36.6%	32.4%			
Female	40.6%	59.0%	58.0%	63.4%	67.6%			
Race/Ethnicity						298.82	12	< 0.001
American Indian/Alaska Native	3.8%	$2.2\%_a$	3.2% _a	12.4% _b	$0.0\%_{\mathrm{a}}$			
Asian/Pacific Islander	2.3%	2.7%	2.1%	1.3%	2.7%			
Hispanic	8.1%	5.6% _a	11.1% _b	$9.2\%_{a, b}$	$5.4\%_{a, b}$			
Black	31.5%	11.6% _a	47.1% _b	57.5% _c	37.8% _b			
White	54.3%	$77.9\%_a$	36.5% _b	19.6% _c	54.1% _d			
Environmental Risks								
Poverty	47.3%	$0.0\%_a$	98.6% _b	84.3% _c	$0.0\%_{\mathrm{a}}$	1071.08	3	< 0.001
Homelessness	5.5%	$0.0\%_{\mathrm{a}}$	$9.9\%_{\rm b}$	14.4% _b	$0.0\%_a$	73.56	3	< 0.001
School Mobility	22.8%	14.6% _a	25.6% _b	37.3% _c	51.4% _c	58.18	3	< 0.001
Out-of-home Placement	15.2%	$0.0\%_{\mathrm{a}}$	8.1% _b	$76.5\%_{c}$	73.0% _c	656.81	3	< 0.001
Neglect	13.1%	1.1% _a	$0.0\%_{\rm b}$	93.5% _c	13.5% _d	1003.72	3	< 0.001
Physical Abuse	6.1%	0.0% a	$2.1\%_{\rm b}$	32.7% _c	35.1% _c	290.32	3	< 0.001
Sexual Abuse	3.0%	$0.0\%_{\mathrm{a}}$	1.8% _b	17.6% _c	$0.0\%_{a, b}$	134.05	3	< 0.001

Each subscript letter denotes a subset of class categories whose column proportions differ significantly from each other at the .05 level.

 Table 5 Rates of Latent Class Membership and Environmental Risk Rates within Latent Classes

	Environmental risk rates within latent classes						
	Class 1	Class 2	Class 3	Class 4			
Rates of latent class membership	47.0%	36.8%	13.0%	3.1%			
Environmental Risks							
Poverty	0.0%	98.6%	84.3%	0.0%			
Homelessness	0.0%	9.9%	14.4%	0.0%			
School Mobility	14.6%	25.6%	37.3%	51.4%			
Out-of-Home Placement	0.0%	8.1%	76.5%	73.0%			
Neglect	1.1%	0.0%	93.5%	13.5%			
Physical Abuse	0.0%	2.1%	32.7%	35.1%			
Sexual Abuse	0.0%	1.8%	17.6%	0.0%			

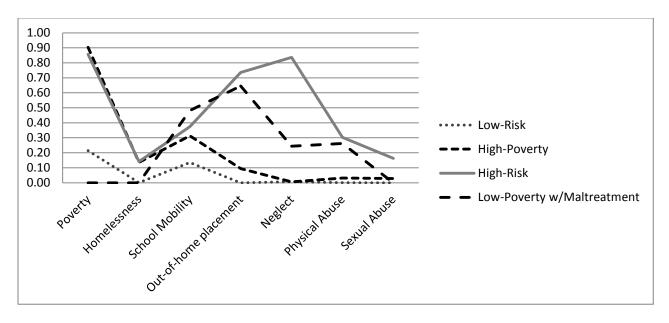


Figure 1. Graph of Environmental Risk Probabilities within Latent Classes

Appendix

Extended Literature Review: Environmental risks and children's mental health treatment outcomes: A person-centered analysis

There is inconsistent evidence that mental health treatment at community-based clinics successfully improves the functioning of children receiving services, and there remains limited understanding of the factors that impact the effects of treatment. Yet, the treatment need remains great. About 10% to 20% of children and adolescents in United States meet criteria for a mental health disorder (Kazak et al., 2010). This is nearly 15 million youth or roughly 1 out of every 5 children (US Department of Health and Human Services, 2001). Of those children, only a fraction receives formal mental health treatment (Kataoka, Zhang, & Wells, 2002). Children's mental health issues not only impact those directly involved but dramatically affect broader communities. Children's mental health treatment and related services cost the United States an estimated \$247 billion annually (The National Research Council and the Institute of Medicine of the National Academies, 2009).

Existing research has amplified the concerns about the effectiveness of community-based mental health treatment (Warren, Nelson, & Burlingame, 2009; Kazak et al., 2010; Warren, Nelson, Mondragon, Baldwin, & Burlingame, 2010; Warren, Nelson, Burlingame, & Mondragon, 2012), such that studies from community-based settings have produced results with effect sizes near zero (Weisz, 2004). Empirical evidence does not procure confidence that children will experience improvements when in treatment (Manteuffel, Stephens, Sondheimer, & Fisher, 2008; Warren et al., 2010). Given the pervasiveness of children's mental illness and the equivocality of treatment

effectiveness, outcomes research has undeniably become an urgent need in children's mental health care (Warren et al., 2010; Weisz & Gray, 2008).

Not all research is disparaging toward community-based mental health treatment for children. In a number of systematic reviews of research on children's mental health services, positive treatment effects have been observed (Hawley & Weisz, 2005; Trask & Garland, 2012; Weisz, Weiss, Han, Granger, & Morton, 1995). Despite more favorable research outcomes, confidence in community-based mental health clinics remains low due to the use of fewer empirically-based methods, often called "usual care" (Garland et al., 2013; Weiss, Catron, Harris, & Phung, 1999; Weisz, 2004). Researchers must look to understand factors that impact treatment outcomes to better understand variables that may negatively impact treatment success. Environmental risk have been shown to impact children's functioning (American Psychological Association [APA], 2014; Rog & Buckner, 2007; Van Dorn, Volavka & Johnson, 2012) and in some cases shown to impact mental health treatment outcomes (Barbe, Bridge, Birmaher, Kolko & Brent, 2004; Lewis et al., 2010). Improving our understanding the impact of such risks can help clinicians and researchers build more successful approaches to treatment.

The purpose of this study is to evaluate children's mental health treatment outcomes and to assess for outcome differences between children grouped based upon environmental risks (i.e. poverty, homelessness, school mobility, out-of-home placement, neglect, physical abuse, sexual abuse). This project will be a significant contribution because it evaluates treatment outcomes in a community context. Furthermore, it seeks to understand factors that influence those outcomes through investigating the impact of environmental risks. There is a critical need for more research to both evaluate treatment

outcomes and to understand the factors that are connected to outcomes (Trask & Garland, 2012). Exploration of the factors that impact outcomes will help to better identify key treatment predictors and assist in targeting intervention.

Theoretical Framework

The nature versus nurture debate has long been resolved and it has become conventional that both an individual's biological characteristics and their ecological context shape their development. There is ample evidence of this throughout our day to day lives. It is not uncommon to hear informal biologically-driven statements from parents who talk about their children's unique characteristics and how discipline strategies effective with one child seem to fail miserably when applied to their other child. Ecologically-minded comments are just as frequent. For example, parents often talk about the ways their children's peers' impact their attitudes and behaviors, always hoping for positive peer influence as children increasingly differentiate from their family-of-origin.

The design of the present study has ecological theory (Bronfenbrenner, 1979) as its cornerstone. Ecological theory highlights the interconnectivity and interdependence of individuals within their environmental contexts (Bubolz & Sontag, 1993). Determining whether there are positive changes (e.g. symptom reduction, improved functioning) after a child receives mental health treatment is valuable. However, only measuring these changes presents a limited picture. Doing so obfuscates what researchers can say about the conditions in which treatment success is more or less likely. Additionally, simply looking at symptom reduction across the sample aggregates the findings so that an

average effect is reported and researchers are not able to identify if there are individuals who are more or less impacted by treatment.

Investigating environmental factors will help to determine the relationship between experiences in a child's context and treatment related changes. Justification for this approach is intuitive as well as empirically-based. Difficult experiences in a child's life impact their functioning. Children raised in under-resourced environments with multiple chronic stresses logically have greater obstacles to overcome than children without such difficulties. Research is clear that children are impacted by the environments in which they live (Leventhal & Brooks-Gunn, 2000; Xue, Leventhal, Brooks-Gunn, & Earls, 2005; Hanson & Chen, 2007). Robert Anda and others have consistently connected adverse childhood experiences (ACES) to negative behaviors and outcomes like smoking, teen pregnancy, and alcoholism (Anda et al., 1999; Anda et al., 2002a; Anda et al., 2002b). As a result, it seems likely that children with environmental risks have a propensity to make fewer gains in mental health treatment.

Assumptions of Ecological Theory

The formal packaging of a theory based upon the notion that one's environment affects functioning came through Uri Bronfenbrenner's development of ecological theory (1979). Ecological theory posits that micro- and macro-level contexts mutually influence and interact with each other. In other words, throughout development children and their families are interdependent with their context; environments affect and are affected by the family. Children, families, and environments do not have predictable, consistent causal influence, but instead each affects one another in varying degrees. For example,

homelessness and poverty can be highly related to maltreatment for children, but do not necessarily cause maltreatment.

Environments do not decide functioning, but they can impose restrictions as well as generate opportunities for children. For instance, economic resource can support health family functioning, whereas poverty can increase family stress and increase the likelihood of parent-child conflict. People are adaptive in their environments and have varying degrees of freedom and control (Bubolz & Sontag, 1993). The availability of resources mediates the effects of negative experiences. Resources and supports are necessary for development, coping, and adaptations of individuals, families, and environments. Conversely, depleted resources and stress can stifle development and create deleterious effects for individuals and families (Sheidow, Henry, Tolan & Strachan, 2013).

Implications of Ecological Theory for Mental Health Treatment

Supports within individuals' environments that promote individual and family well-being are diverse. These can be material (housing, food, money), relational (parental supports, friends, family members), internal (personal physical and psychological health), or informational (knowledge). Furthermore, supports can be both proximal and distal, with the more proximal supports having a greater impact on an individual or family's ability to thrive, cope, and survive (Bronfenbrenner, 1979). Linking ecological factors closely to children's mental health treatment can create a clear argument for highly collaborative, multi-disciplined approaches to treatment (Dishion & Stormshak, 2007). Furthermore, doing so logically connects both the positive and negative contributions of the extended environment on treatment outcomes. Furthermore, ecological considerations

promote professional awareness of, integration with, and participation in multiple systems to enhance access to and use of supports in order to improve therapeutic outcomes. Ecological models encourage thorough assessment of client and family needs and resources, collaboration with multiple providers, and awareness of those environmental factors in order to formulate ecologically-minded treatment plans (Dishion & Stormshak, 2007). Therapists' awareness that environmental supports and stresses impact treatment outcomes becomes central to interventions instead of peripheral.

In summary, ecological theory outlines a framework for looking at the relationship between individual, family and environmental factors. More specifically, it informs one about the ways risk factors can contribute to problems for children and negatively impact their ability to successfully manage symptoms. Therefore, it is likely that children who experience significant environmental risks will have greater difficulty making gains in mental health treatment. There is a clear link between ecological theory and the justification of my research aims, methodology, and hypotheses.

Literature Review

Environmental Impacts on Children's Functioning

Children from low income families, children in the child welfare system, and children who experience significant stresses have disproportionally higher rates of mental health issues compared to children without these stresses (Burns et al., 2004).

Community-based children's mental health systems typically serve increasing large numbers of children and families with such experiences (Warren et al., 2010). As a result, researchers must take into consideration risk factors when both studying outcomes and disseminating their findings. Significant difficulties and chronic life stresses may impact

children and families differently than those without such challenges (Warren et al., 2010). It is reasonable to assume that baseline functioning, treatment trajectories, discharge functioning and the retention of treatment benefits may all be unique for those with various constellations of chronic and persistent stresses. Take for example an impoverished, homeless young girl who has had several school transitions. The stresses associated with these environmental risks may differentiate her from her peer who was sexually abused throughout their respective courses of treatment.

Child therapists assess children's functioning across domains (e.g., home, school, neighborhood, community), and consider the impact of those environments in the development and maintenance of social, emotional, and behavioral problems. The importance of this assessment is justified through the copious research studies that connect children's functioning to the experiences they have in external environments. Consequently, children's contact with certain environmental experiences may predict how they respond to mental health treatment (Loeber, Brinthaupt, & Green, 1990).

Poverty (APA, 2014; Brooks-Dunn & Duncan, 1997), homelessness (Rog & Buckner, 2007; Shaw & Goode, 2008), school mobility (Dupere, Archambault, Leventhal, Dion, & Anderson, 2015), out-of-home placement (Harman, Childs & Kelleher, 2000) and maltreatment (Hillberg, Hamilton-Giachristis & Dixon, 2011; Lansford, Miller-Johnson, Berlin, Dodge, Bates, & Pettit, 2007; Van Dorn, Volavka & Johnson, 2012) have all been shown to negatively related to children's functioning. It is reasonable to assume that these impairments impact children's experience of mental health treatment when improved functioning is a desired outcome. Mental health treatment not only seeks to reduce symptoms by helping an individual more effectively

cope or manage, but it also works to eliminate or reduce the impact of factors that have contributed to the mental health difficulties. For example, frequent school mobility may contribute to childhood anxiety because of the stress associated with regular transitions. A thoughtful therapist may address school mobility directly by helping the caregiver find a permanent school placement, while also increasing the child's use of coping strategies. Together, school stabilization and coping skills are likely to increase the chances of symptom amelioration. Other factors, however, are not as clearly addressed. For instance, therapists have a limited ability to affect chronic poverty and because poverty is a significant contributor to mental health difficulties, treatment effects may be diminished. Children's mental health treatment outcomes, therefore, may be negatively affected by environmental risk factors, although more research is needed to improve our understanding of this.

Although the body of literature is small, there are studies which have found a relationship between environmental risks and mental health treatment outcomes. Lewis et al (2010) investigated the impact of childhood trauma on the treatment of adolescents with depression. In the study, adolescents received cognitive behavioral therapy (CBT). When children had a history of childhood trauma, CBT interventions were found to less effective. Barbe et al (2004) investigated the effectiveness of CBT for depressed adolescents with a history of sexual abuse. In support of the previous research, they also found CBT to less effective for adolescents with an abuse history. These findings are consistent with other studies that have identified the negative impact of childhood history of trauma/stress on treatment outcomes (Asarnow et al., 2009; Shamseddeen et al., 2011). Findings from other studies are not consistent with this. Whitson and Connell (2016)

found that children who had been exposed to traumatic events prior to treatment made gains at the same rate as peers without negative exposure. In one identified case, children with a history of trauma or stress actually performed better in treatment than those without a trauma history (MacPherson, Algorta, Mendenhall, Fields, and Fristad, 2014). Continued research in this area will help to build a larger body of research on which to build confidence in understanding the effects of environmental risk on children's mental health treatment outcomes.

In the sections that follow, I will review extant literature on the effects of environmental risk factors on children's functioning. This review represents justification for including these variables as environmental risk indicators in my latent class analysis (LCA).

The Effect of Poverty on Children

In the United States, childhood poverty affects the lives of over 16.4 million children and costs an estimated \$500 billion a year (Coley & Baker, 2013; US Census Bureau, 2011). In 2010, \$22,314 or less for the annual income of a family of four was considered living in poverty (APA, 2014). Income poverty is the circumstance of having insufficient financial means to meet basic needs (Brooks-Gunn & Duncan, 1997). There are racial and ethnic disparities among these children. The majority of children in poverty are Black (38.3%) with Asian children being the least likely to live in poverty (13%) (US Census Bureau, 2011). Seven out of 10 children living in single-mother households are considered poor or low-income, and roughly 35% of Hispanic and 66% of Black female-headed families with children live in poverty (Mather, 2010).

Poverty has been connected to a number of short-term consequences for children and families, such as inadequate supervision, substandard nutrition, exposure to unsafe neighborhoods, and deficient access to health care (APA, 2014). These numerous negative outcomes likely feedback into future generations and reinforce intergenerational cycles of poverty. Poverty predicts concentration difficulties and memory challenges, which can also adversely affect their educational performance (APA, 2014). Poorer children have greater difficulty in school and more often have social, emotional, or behavioral problems.

The long-term repercussions of poverty can be conceptualized as extensions of the short term effects. Academic challenges and psychological and physical health problems persist in the context of poverty. Poor children are at significant risk of dropping out of school, meeting criteria for a mental health disorder, entering the juvenile justice system, having asthma, engaging in risk-taking behaviors like smoking and early sexual activity, and becoming overweight or obese (APA, 2014). Contemporary brain research has confirmed and extended previous research by identifying language delays, memory difficulties, social-emotional processing problems, and diminished cognitive functioning as neural correlates of poverty (Noble, Houston, Kan, & Sowell, 2012).

Poverty is also related to family process attributes. Adjustment difficulties related to family economics can negatively impact the relationship between parents and their children (Conger, Conger, & Martin, 2010). Assumptions from ecological theory (i.e. general systems theory) theoretically endorse these findings. Positive and negative functioning in the parental subsystem impacts functioning in the child subsystem. This functioning can lead to the emergence of patterns of functioning if relationship trends

persist. Harsh, under-involved, and unreliable parenting trends can result from poverty and the stresses associated with poverty (Conger & Conger, 2002; Conger et al., 2002). Patterns of interpersonal difficulties within caregiving dyads and between children are not restrictive to families with biological parents, but also true of other parenting configurations (e.g. step-families; Conger et al., 2002). Kiser and Black (2005) used a family systems framework to examine family processes in relation to urban poverty and chronic trauma. Across studies they identified that the effects of poverty were more severe when families had diminished social networks. Additionally, increased mental health issues, diminished parental warmth, and limited parental capacities were more likely for poorer families. Overall, there is consistent empirical support to show negative family process attributes can emerge or be exacerbated by the stresses of poverty.

Homelessness. Chronic, severe poverty is the strongest indicator of homelessness (APA, 2014). Of the 16.4 million children living in poverty, at least 11% of them are homeless. The racial disparities that exist in poverty are evident also in homelessness: 47% of homeless children are black, 38% are White, 13% are Hispanic, and 2% are Native American (APA, 2014). Hunger, poor physical and mental health, diminished educational outcomes, witnessing violence, anxiety and depression in school-aged children, future residential instability, parental partner violence, and substance abuse problems are more probable for homeless children (APA, 2014; Rog & Buckner, 2007). One common, but regularly uninvestigated topic related to homelessness is the increased likelihood of parent-child separation (Rog & Buckner, 2007). There are often child restrictions in shelters or parents try to avoid going to shelters with their children and leave them with family or friends. The impact of separations like these is not often

investigated and is a unique challenge to homeless families. Although this study does not specifically investigate parent-child separation associated with homelessness, highlighting this helps to show the multi-dimensional impact of environmental risks.

Although the correlation between poverty and homelessness is significant, it is important to highlight the fact that all homeless youth are not necessarily poor and that all poor youth are not necessarily homeless. Ziesemer, Marcoux and Marwell (1994) differentiated homeless children from low-income children. Although the stresses related to homelessness can negatively impact children, they distinguish poverty as a more substantial indicator of risk.

School Mobility

Children transition between schools for diverse reasons. Some mobility can be for more benign reasons like parental employment changes or a positive move to a new neighborhood. On the other hand, school mobility could also be for more unplanned, negative reasons like school removal for behavior, moves related to Individualized Education Plan (IEP) needs, parental divorce, escaping partner violence, or out-of-home placement. In such cases, research has documented numerous negative effects (Gruman, Harachi, Abbott, Catalano, & Fleming, 2008; Mantzicopoulos & Knutsen, 2000; Simpson & Fowler, 1994). It is conceivable that the reason for the school move could impact the reaction of the child to the move. School mobility in this study is related to "disruptive" moves that occur during a school year. Planned and expected transitions are probably less difficult to children, whereas reactive and unplanned transitions may be more unsettling and confusing. However, each school move is a transition nonetheless and can have negative consequences for a child.

The body of research on school mobility is limited (National Research Council, 2010) and isolating the unique effects of school mobility on children's functioning can be difficult (Fantuzzo, LeBoeuf, Chen, Rouse, & Culhane, 2012). The strong correlation between school mobility and other environmental risk indicators requires multi-variable analyses to help to isolate the unique effects of school mobility. Alexander, Entwisle and Dauber (1996) tracked children across 20 schools in Baltimore public schools. After controlling for alternative risk factors, they found some evidence of decline in academic achievement as a result of school transitions. Similarly, Temple and Reynolds (1999) found that school moves resulted in lower education achievement when analyzing children in Chicago. Children who moved frequently between their kindergarten and seventh grade years performed approximately one academic year behind their peers, with half of the performance difference explained by school movement. In a meta-analysis reviewing research since 1990, Reynolds, Chen, and Herbers (2009) isolated studies they considered methodologically robust to further link school transitions to academic success. They also highlighted the relationship between school mobility and eventual school dropout. Negative outcomes were most pronounced for those students with more school transitions.

Although the vast majority of research connects school mobility to academic outcomes, there is also empirical evidence to show that school transitions can affect other areas of functioning in children (Haynie, South, and Bose, 2006). Even when school mobility is normative (e.g. children's transition into kindergarten), poor transitions can affect social adjustment in children (Cook & Coley, 2017). School moves when numerous and when for negative reasons can affect other domains of functioning. Social

relationships (Dupere, Archambault, Leventhal, Dion, & Anderson, 2015) and emotional, psychological, and behavioral well-being (Jelleyman & Spencer, 2008; Simpson & Fowler, 1994; Rumberger & Larson, 1998) are all impacted by the stress of transitions, school mobility included. The significance of linking school mobility to academic success is amplified when logically connected to the research that connects academic achievement to long-term outcomes for adults. Academic performance builds a foundation by which many future successes are based (Kern & Friedman, 2009).

Out-of-Home Placement

The reasons for children to be placed outside the home are diverse: physical or sexual abuse, neglect, and parental incarceration, abandonment, or death. Specifically looking at the effects of out-of-home placement on children may be challenging because it is difficult to separate out the unique effects of the placement from the effects of the reason for their placement (e.g. maltreatment). Furthermore, there is evidence that children who are placed out-of-home differ on factors like socioeconomic status and maltreatment severity and type when compared to children who remain with caregivers (Berger, Bruch, Johnson, James & Rubin, 2009). As a result, it is difficult to obtain unbiased evidence of the effects of out-of-home placement (Courtney, 2000; McDonald, 1996). More specifically, out-of-home placement is intended to reduce stress, provide protection, and assist in stabilizing the child. In some cases, out-of-home placement may be an indicator of the severity of the child's circumstances. For example, all substantiated incidents of maltreatment do not result in placements. However, in cases where out-ofhome placement is a result, research would be apt to describe the positive effects of the out-of-home placement.

With that said, there is research on the characteristics of children placed out-of-home. In 2015, there were an estimated 427,910 children who were placed in foster care (Child Welfare Information Gateway, 2017). Among families who received federal assistance though Aid to Families with Dependent Children (AFDC), diagnosable mental health disorders were more likely in children who have received out-of-home placement (Harman, Childs & Kelleher, 2000). Harman, Childs & Kelleher (2000) found that children in foster care had 6.5 times more mental health claims and were 7.5 times more likely to receive inpatient hospitalization for mental health disorders than maltreated children not placed out of the home. Raviv et al (2010) found that children in out-of-home placement for maltreatment had cumulative risks where over half of them came from single parent homes, had caregivers with a substance abuse history and/or a criminal history, and had been previously exposed to partner violence. Here, the most notable risk may not be the out-of-home placement. The children's maltreatment history in combination with the other environmental risks may be more substantial.

Effects of Maltreatment on Children

In this present study, the inclusion of maltreatment as an environmental risk indicator is related to the fact that there are profuse amounts of research highlighting the sequelae of maltreatment for children's individual and family functioning. Consequently, it is reasonable to assume that maltreatment could have a unique impact on mental health treatment. Maltreatment effects are broad and impact children's functioning across intrapersonal and interpersonal domains. Research approaches have generally taken two strategies when studying the impact of maltreatment on children's health and well-being: (1) compare characteristics of maltreated and non-maltreated children or (2) examine

maltreatment subtypes (e.g. physical abuse, neglect, sexual abuse, emotional/psychological abuse). Grouping subtypes of maltreatment into a single group is often done because of the propensity for multiple types of maltreatment to co-occur for abused children.

Maltreatment rates can be misrepresentative since many cases go unreported. The United States Department of Health and Human Services (USDHHS, 2009) reported that in 2007 there were over 3 million reported incidents of child maltreatment, and of those cases almost 800,000 were substantiated incidents of maltreatment. In 2014 (USDHHS, 2016) the number of reported cases rose to 3.6 million. The majority of children were very young (less than 3 years old) with caregivers as the perpetrator the vast majority of the time. Mothers were more likely to perpetrate than fathers. Over 1,500 children died from maltreatment. Neglect was mostly commonly related child fatalities (USDHHS, 2016).

In the literature reviews below about neglect, physical abuse, and sexual abuse, there are obvious trends. First, the sequelae of maltreatment include both short-term and long-term effects. Second, maltreatment effects are not restrictive in their manifestation. Social, emotional, behavioral and relational functioning all seem to be affected by maltreatment. Third, maltreatment is not a simple set of phenomena. Maltreatment occurs in an intricate interconnected context, and context must be considered to best understand it. Finally, maltreatment is not deterministic in its effects. Abuse and neglect do not guarantee negative outcomes, yet the risk is real and it can be profound. Although it is not clear below, it is conceptually viable to see how deprivation (neglect), pain and hurt

(physical abuse), and sexual violation effect the mind in unique ways although the manifestations are similarly observed.

Effects of neglect on children. Neglect is the most frequent form of child maltreatment (Gaudin, Polansky, Kilpatrick, & Shilton, 1996; Stoltenborgh, Bakermans-Kranenburg & van IJzendoorn, 2013). However, it seems to be neglected in the empirical research. Neglect is characterized by the failure to provide for the needs of a child across developmental domains (World Health Organization [WHO], 1999). This includes, but is not limited to, health, education, nutrition, and shelter. Neglect is the failure to provide adequate care to support the nurturance and development of a child.

There are numerous documented short-term effects for neglected children. The consequences of neglect impact children's thoughts, emotions, behaviors, and relationships across all areas of functioning. Children have shown to have increased risk for externalizing behaviors (e.g. aggression, less cooperation), more internalizing behaviors (e.g. withdrawal), and less ego control and ego resilience (Bolger & Patterson, 2001; Manly, Kim, Rogosch, & Cicchetti, 2001). Cognitive and emotional delays are also associated with neglected children (Hildyard & Wolfe, 2002). These children also tend to report higher levels of perceived external control (Bolger & Patterson, 2001). Finally, facial expression discrimination is also more difficult for neglected children than their non-neglected counterparts (Pollak, Cicchetti, Hornung & Reed, 2000). Quickly and accurately discriminating between facial expressions helps children to successfully navigate social interactions.

Neglect also has recognized long-term effects. These effects are evident when young children move into adolescence and are also present when children become adults.

Manly et al (2001) found that neglected children during infancy or early childhood showed signs of adaptation difficulties in middle childhood. Furthermore, there is evidence that neglect increases the likelihood of future substance use, economic hardship, employment challenges, lower education, violent behavior, disordered attachment style, unsafe sexual behavior, and an increased risk for posttraumatic stress disorder (Currie & Windom, 2010; Hussey, Change, & Kotch, 2006; Wilson & Windom, 2010; Van Dorn et al., 2012). Neglect has been shown to have larger effects for women as compared to men (Currie & Windom, 2010). The long-term effects vary and show the ways neglect can diversely affect individual and social functioning years later.

There are also unique characteristics of neglectful families compared to nonneglectful families. It unclear if these characteristics beget neglect toward children or if
these characteristics are repercussions of neglect in family systems. Gaudin et al (1996)
video-taped families, observed interactions and coded behaviors. They found that
neglectful families were less organized, showed less verbal expression, were more
chaotic, displayed less positive emotions, and exhibited more negative emotions. In the
same study, neglectful mother self-reported high degrees of conflict and diminished
emotional expression. In another study, family poverty, low parental affection, and use of
physical discipline were predictive of neglect (Slack, Holl, McDaniel, Yoo, & Bolger,
2004). Neglected children are less inclined to seek caregiver support and expect more
maternal conflict when they show negative emotions which leads to a proclivity to inhibit
those emotions (Shipman, Edwards, Brown, Swisher, & Jennings, 2005). Depressed
caregivers and family isolation are also found to be characteristics of neglectful family
systems (Wilson, Kuebli, & Hughes, 2005). Family characteristics may or may not be a

focus of clinical intervention when treating children depending upon the interventionist's clinical orientation. Nevertheless, he dynamics associated with neglect between people and within systems should be highlighted when investigating the relationship between maltreatment and treatment outcomes in order to most accurately interpret results.

Effects of physical abuse on children. An estimated 17% of Child Protection cases are reported as physical abuse (Child Welfare Information Gateway, 2016). It is the second most likely form of abuse to occur. Physical abuse is characterized by intention and effect. It is a physical injury to a child that is deliberate. It can include any action that could result in injuries like bruises, cuts, burns, or broken bones. The aftermath of physical abuse provides physical effects which justifies reporting. The non-physical effects of physical abuse are more challenging to observe and track, although there is a wealth of empirical studies which help to identify non-physical characteristic of physically abused children. Studies have reported increased aggressive behaviors, increased externalizing symptoms, and more disruptive behavior disorders than nonabused children (Aber, Allen, Carlson & Cicchetti, 1989; Bolger & Patterson, 2001; Kolko, 2002). Medical problems are also associated with physical abuse (National Research Council, 1993). Additionally, research has demonstrated elevated likelihood of depression and other internalizing mental health disorders (Ackerman, Newton, McPherson, Jones & Dykman, 1998). Physically abused children are more likely to misread facial expressions and label them as angry compared to neglected children (Pollack et al., 2000). Manifestation of effects like these can contribute to negative functioning in home, school, and communities settings altering a child's trajectory for future success.

There has been a steady rise on research linking early experiences of physical abuse to problematic functioning later in life. This research has provided continued justification for local and national prevention efforts and helped interventionists target their treatment strategies. Lansford et al. (2002) compared abused and non-abused children to determine the long-term impact of abuse on children's functioning. They found that adolescents abused early in their lives miss school more often, had greater displays of aggression, showed more symptoms consistent with a mental health disorder (i.e. anxiety, depression, PTSD), had more dissociation, social difficulties, cognitive problems, and social isolation. Teenage delinquency, violent behaviors, running away, substance abuse problems, and self-harming behaviors have also been linked to physical abuse (National Research Council, 1993). Finally, chances are greater for teen parenting, dropping out of high school, and employment termination (Lansford et al., 2007).

Targeted services can be informed by this research and renewed efforts to interrupt the sequelae of physical abuse can continue.

Characteristic of physically abusive families can illuminate the relational interplay that initiates and sustains abusive tendencies between family members. Abusive parents are likely to report higher levels of externalizing behaviors problems in their children as compared to non-abusive parents (Lau, Valeri, McCarthy & Weisz, 2006). Parents are also more likely to be aversive, negative, and less involved with their children (Wilson, Rack, Shi & Norris, 2008). Parent-child sequences of interactions have also been observed. Studies like this, informed by social interaction theory, recognize the behaviors as a product of complex interactions. During observations, abusive parents were seen to be more coercive, prone to give commands, and less inclined to make

neutral comments during a structured play activity (Timmer, Borrego Jr. & Urquiza, 2002).

Effects of sexual abuse on children. Sexual abuse of children accounts for 8.3% of national child protection reports (Child Welfare Information Gateway, 2016; Kellogg, 2005). Sexual abuse is defined as when a child is involved in sexual activity in a manner in which he or she is developmentally unfit and cannot give consent (Kellogg, 2005). The link between early experiences of sexual abuse and the short- and long-term consequences have not brought a clear picture of the variables of greatest impact.

Agreement is not reached on the relationship between key demographic variables of the perpetrator and victim and the severity, chronicity, and type of incident. Despite these uncertainties, there is resounding research to demonstrate a significant relationship between sexual abuse and negative outcomes.

Hillberg, Hamilton-Giachristis & Dixon (2011) reviewed meta-analyses on the connection between sexual abuse of children and future adult mental health problems. Wilson (2010) connected early sexual abuse to somatic health problems (i.e. gynecological, gastrointestinal, respiratory, neurological, and muscular). Additionally, she also provided evidence of long-term psychiatric disorders. Rates of depression, post-traumatic stress disorder, borderline personality disorder, eating disorders, suicidality, anxiety and sexual dysfunction were all higher for abuse victims (Wilson, 2010). There is evidence that long-term outcomes may be more severe when the perpetrator is someone expected to care for and protect the child (Trickett, Noll, Reiffman & Putnam, 2001). This extreme contradiction in expectation for the child likely contributes to the strong residual effects.

Empirical evidence supports negative medical, psychological, emotional, and behavioral short-term effects (Maniglio, 2009). In one of the first studies of its kind, Garnefski and Diekstra (1997) looked at the difference between male and female sexual abuse victims and compared them based upon emotional, behavioral, and suicidal indicators. They identified a significant relationship between each variable and sexual abuse for both genders; however, male victims reported problems more often than female victims. Later, Feiring, Taska and Lewis (1999) found divergent results where girls were more likely to report problems in functioning across a broad range of categories. Regardless of whether sexual abuse affects girls and boys differently, the evidence of short-term effects is resounding.

Investigating the interpersonal dynamics within families where sexual abuse has occurred can help to understand the context of sexual abuse. Families with a history of sexual abuse were observed to have more difficulties managing anger, were more chaotic, showed less role clarity, and used more rigid means to manage their relationships with one another (Howes, Cicchetti, Toth & Rogosch, 2000). Alexander and Lupfer (1987) found difficulties with family cohesion and family adaptability across their sample. These emotional and organizational indicators provide evidence for the more macro-level relational nature of sexual abuse.

References

- Aber, J. L., Allen, J. P., Carlson, V., & Cicchetti, D. (1989). The effects of maltreatment on development during early childhood: Recent studies and their theoretical, clinical, and policy implications. In D. Cicchetti & V. Carlson (Eds.), *Child Maltreatment: Theory and Research on the Causes and Consequences of Child Abuse and Neglect* (pp. 579-619). New York, NY: Cambridge University Press.
- Ackerman, P. T., Newton, J. E., McPherson, W., Jones, J. G., & Dykman, R. A. (1998).

 Prevalence of post-traumatic stress disorder and other psychiatric diagnoses in three groups of abused children (sexual, physical, and both). *Child Abuse & Neglect*, 22, 759-774. doi: 10.1016/S0145-2134(98)00062-3
- Alexander, K. L., Entwisle, D. R., & Dauber, S. L. (1996). Children in motion: School transfers and elementary school performance. *Journal of Educational Research*, 90, 3-12. doi: 10.1080/00220671.1996.9944438
- Alexander, P. C., & Lupfer, S. L. (1987). Family characteristics and long-term consequences associated with sexual abuse. *Archives of Sexual Behavior*, *16*, 235-245. doi: 10.1007/BF01541611
- American Psychological Association. (2014). Effects of Poverty, Hunger, and

 Homelessness on Children and Youth. Retrieved from

 http://www.apa.org/pi/families/poverty.aspx
- Anda, R. F., Chapman, D. P., Felitti, V. J., Edwards, V., Williamson, D. F., Croft, J. B., & Giles, W. H. (2002). Adverse childhood experiences and risk of paternity in teen pregnancy. *Obstetrics & Gynecology*, 100, 37-45. doi: 10.1016/S0029-7844(02)02063-X

- Anda, R. F., Croft, J. B., Felitti, V. J., Nordenberg, D., Giles, W. H., Williamson, D. F., & Giovino, G. A. (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *JAMA*, 282, 1652-1658. doi: 10.1001/jama.282.17.1652
- Anda, R. F., Whitfield, C. L., Felitti, V. J., Chapman, D., Edwards, V. J., Dube, S. R., & Williamson, D. F. (2002). Adverse childhood experiences, alcoholic parents, and later risk of alcoholism and depression. *Psychiatric Services*, 53, 1001-1009. doi: 10.1176/appi.ps.53.8.1001
- Asarnow, J. R., Emslie, G., Clarke, G., Wagner, K. D., Spirito, A., Vitiello, B., ... & Ryan, N. (2009). Treatment of selective serotonin reuptake inhibitor—Resistant depression in adolescents: Predictors and moderators of treatment response. *Journal of the American Academy of Child & Adolescent Psychiatry*, 48, 330-339. doi: 10.1097/CHI.Ob013e3181977476
- Barbe, R. P., Bridge, J. A., Birmaher, B., Kolko, D. J., & Brent, D. A. (2004). Lifetime history of sexual abuse, clinical presentation, and outcome in a clinical trial for adolescent depression. *Journal of Clinical Psychiatry*, 65, 77-83.
- Berger, L. M., Bruch, S. K., Johnson, E. I., James, S., & Rubin, D. (2009). Estimating the "impact" of out-of-home placement on child well-being: Approaching the problem of selection bias. *Child Development*, 80, 1856-1876. doi: 10.1111/j.1467-8624.2009.01372.x
- Bolger, K. E. & Patterson, C. J. (2001). Pathways from child maltreatment to internalizing problems: Perceptions of control as mediators and moderators. *Development and Psychopathology*, 13, 913-940.

- Bronfrenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press.
- Brooks-Gunn, J., & Duncan, G. J. (1997). The effects of poverty on children. *The Future of Children*, 55-71. doi: 10.2307/1602387
- Bubolz, M.M. & Sontag, M.S. (1993). Human ecology theory. In P. Boss, W. J. Doherty,
 R. LaRossa, W.R. Schumm, & K. Steinmetz (Eds.), Sourcebook of family theories
 and methods: A contextual approach (419-450). New York: Plenum Press.
- Burns, B. J., Phillips, S. D., Wagner, H. R., Barth, R. P., Kolko, D. J., Campbell, Y., & Landsverk, J. (2004). Mental health needs and access to mental health services by youths involved with child welfare: A national survey. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43, 960-970. doi: 10.1097/01.chi.0000127590.95585.65
- Child Welfare Information Gateway. (2016). *Child Maltreatment 2014: Summary of Key Findings*. Washington, DC: U.S. Department of Health and Human Services, Children's Bureau.
- Coley, R. & Baker, C. (2013). Poverty and education: Finding the way forward. *Report of the ETS Center for Research on Human Capital and Education*. Retrieved from https://www.ets.org/s/research/pdf/poverty_and_education_report.pdf.
- Conger, R. D., & Conger, K. J. (2002). Resilience in Midwestern families: Selected findings from the first decade of a prospective, longitudinal study. *Journal of Marriage and Family*, 64, 361 373. doi: 10.1111/j.1741-3737.2002.00361.x

- Conger, R. D., Conger, K. J., & Martin, M. J. (2010). Socioeconomic status, family processes, and individual development. *Journal of Marriage and Family*, 72(3), 685-704. doi: 10.1111/j.1741-3737.2010.00725.x
- Conger, R. D., Wallace, L. E., Sun, Y., Simons, R. L., McLoyd, V. C., & Brody, G. (2002). Economic pressure in African American families: A replication and extension of the family stress model. *Developmental Psychology*, *38*, 179 193. doi: 10.1037/0012-1649.38.2.179
- Cook, K. D., & Coley, R. L. (2017). School transition practices and children's social and academic adjustment in kindergarten. *Journal of Educational Psychology*, 109, 166. doi: 10.1037/edu0000139
- Courtney, M. E. (2000). Research needed to improve the prospects for children in out-of-home placement. *Children and Youth Services Review*, 22, 743-761. doi: 10.1016/S0190-7409(00)00115-8
- Currie, J., & Widom, C.S. (2010). Long-term consequences of child abuse and neglect on adult economic well-being. *Child Maltreatment*, *15*(2), 111-120.
- Dishion, T. J., & Stormshak, E. A. (2007). *Intervening in children's lives: An ecological, family-centered approach to mental health care*. Washington, D.C.: American Psychological Association.
- Dupere, V., Archambault, I., Leventhal, T., Dion, E., & Anderson, S. (2015). School mobility and school-age children's social adjustment. *Developmental Psychology*, *51*, 197-210. doi: 10.1037/a0038480
- Fantuzzo, J. W., LeBoeuf, W. A., Chen, C. C., Rouse, H. L., & Culhane, D. P. (2012).

 The unique and combined effects of homelessness and school mobility on the

- educational outcomes of young children. *Educational Researcher*, *41*, 393-402. doi: 10.3102/0013189X12468210
- Feiring, C., Taska, L., & Lewis, M. (1999). Age and gender differences in children's and adolescents' adaptation to sexual abuse. *Child Abuse & Neglect*, 23, 115-128. doi: 10.1016/S0145-2134(98)00116-1
- Garland, A. F., Haine-Schlagel, R., Brookman-Frazee, L., Baker-Erickson, M., Trask, E., & Fawley-King, K. (2013). Improving community-based mental health care for children: Translating knowledge into action. *Administration and Policy in Mental Health and Mental Health Services Research*, 40, 6-22. doi: 10.1007/s10488-021-0450-8
- Garnefski, N., & Diekstra, R. (1997). Child sexual abuse and emotional and behavioral problems in adolescence: Gender differences. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 323-329. doi: 10.1097/00004583-199703000-00010
- Gaudin, J.M., Polansky, N.A., Kilpatrick, A.C., & Shilton, P. (1996). Family functioning in neglectful families. *Child Abuse & Neglect*, 20, 363-377. doi: 10.1016/0145-2134(96)00005-1
- Gruman, D. H., Harachi, T. W., Abbott, R. D., Catalano, R. F., & Fleming, C. B. (2008).

 Longitudinal effects of student mobility on three dimensions of elementary school engagement. *Child Development*, 79, 1833-1852. doi: 10.1111/j.1467-8624.2008.01229.x

- Hanson, M.D. & Chen, E. (2007). Socioeconomic status and health behaviours in adolescence: A review of the literature. *Journal of Behavioral Medicine*, 25, 425-438. doi: 10.1007/s10865-007-9098-3
- Harman, J. S., Childs, G. E., & Kelleher, K. J. (2000). Mental health care utilization and expenditures by children in foster care. *Archives of Pediatrics & Adolescent Medicine*, 154, 1114-1117. doi: 10.1001/archpedi.154.11.1114
- Hawley, K.M. & Weisz, J.R. (2005). Youth versus parent working alliance in usual care:

 Distinctive associations with retention, satisfaction, and treatment outcome.

 Journal of Clinical Child and Adolescent Psychiatry, 34, 117-128. doi:

 10.1207/s15374424jccp3401_11
- Haynie, D. L., South, S. J., & Bose, S. (2006). The company you keep: Adolescent mobility and peer behavior. *Sociological inquiry*, 76, 397-426. doi: 10.1111/j.1475-682X.2006.00161.x
- Hildyard, K.L. & Wolfe, D.A. (2002) Child neglect: developmental issues and outcomes.

 Child Abuse & Neglect, 26, 679-695. doi: 10.1016/S0145-2134(02)00341-1
- Hillberg, T., Hamilton-Giachritsis, C., & Dixon, L. (2011). Review of meta-analyses on the association between child sexual abuse and adult mental health difficulties: A systematic approach. *Trauma, Violence, & Abuse*, 12, 38-49. doi: 10.1177/1524838010386812
- Howes, P.W., Cicchetti, D., Toth, S.L., & Rogosch, F.A. (2000). Affective, organizational, and relational characteristics of maltreating families: A systems perspective. *Journal of Family Psychology*, 14, 95-110. doi: 10.1037/0893-3200.14.1.95

- Hussey, J. M., Chang, J. J., & Kotch, J. B. (2006). Child maltreatment in the United States: prevalence, risk factors, and adolescent health consequences. *Pediatrics*, *118*, 933-942. doi: 10.1542/peds.2005-2452
- Jelleyman, T., & Spencer, N. (2008). Residential mobility in childhood and health outcomes: a systematic review. *Journal of Epidemiology & Community*Health, 62, 584-592. doi: 10.1136/jech.2007.060103
- Kazak, A. E., Hoagwood, K., Weisz, J. R., Hood, K., Kratochwill, T. R., Vargas, L. A., & Banez, G. A. (2010). A meta-systems approach to evidence-based practice for children and adolescents. *American Psychologist*, 65, 85-97. doi: 10.1037/a0017784
- Kataoka, S. H., Zhang, L., & Wells, K. B. (2002). Unmet need for mental health care among US children: Variation by ethnicity and insurance status. *American Journal of Psychiatry*, *159*, 1548-1555. doi: 10.1176/appi.ajp.159.9.1548
- Kellogg, N. (2005). The evaluation of sexual abuse in children. *Pediatrics*, 116, 506-512.
- Kern, M. L., & Friedman, H. S. (2009). Early educational milestones as predictors of lifelong academic achievement, midlife adjustment, and longevity. *Journal of Applied Developmental Psychology*, 30, 419-430. doi: 10.1016/j.appdev.2008.12.025
- Kiser, L. J., & Black, M. M. (2005). Family processes in the midst of urban poverty:

 What does the trauma literature tell us? *Aggression and Violent Behavior*, *10*,

 715-750. doi: 10.1016/j.avb.2005.02.003
- Kolko, D. J. (2002). Child physical abuse. In J. E. B. Myers (Ed.), APSAC handbook on child maltreatment (pp. 21-50). Thousand Oaks, CA: Sage.

- Lansford, J. E., Dodge, K. A., Pettit, G. S., Bates, J. E., Crozier, J., & Kaplow, J. (2002).

 A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. *Archives of Pediatrics & Adolescent Medicine*, 156, 824-830. doi: 10.1001/archpedi.156.8.824
- Lansford, J. E., Miller-Johnson, S., Berlin, L. J., Dodge, K. A., Bates, J. E., & Pettit, G. S. (2007). Early physical abuse and later violent delinquency: A prospective longitudinal study. *Child Maltreatment*, 12, 233-245. doi: 10.1177/1077559507301841
- Lau, A.S., Valeri, S.M. McCarty, C.A. & Weisz, J.R. (2006). Abusive parents' reports of child behavior problems: Relationship to observed parent-child interactions. *Child Abuse & Neglect*, *30*(6), 639-655. doi: 10.1016/j.chiabu.2005.11.009
- Leventhal, T. & Brooks-Gunn, J. (2000). The neighborhood they live in: the effects of neighborhood residence on child and adolescent outcomes. *Psychology Bulletin*, 12, 309-337. doi: 10.1037/0033-2909.126.2.309
- Lewis, C. C., Simons, A. D., Nguyen, L. J., Murakami, J. L., Reid, M. W., Silva, S. G., & March, J. S. (2010). Impact of childhood trauma on treatment outcome in the treatment for adolescents with depression study (TADS). *Journal of the American Academy of Child & Adolescent Psychiatry*, 49, 132-140. doi: 10.1016/j.jaac.2009.10.007
- Loeber, R., Brinthaupt, V. P., & Green, S. M. (1990). Attention deficits, impulsivity, and hyperactivity with or without conduct problems: Relationship to delinquency and

- unique contextual factors. In R. J. McMahon & P. D. V. Peters (Eds.), *Behavior disorders of adolescence* (pp. 39-61). New York: Plenum
- MacPherson, H. A., Algorta, G. P., Mendenhall, A. N., Fields, B. W., & Fristad, M. A. (2014). Predictors and moderators in the randomized trial of multifamily psychoeducational psychotherapy for childhood mood disorders. *Journal of Clinical Child & Adolescent Psychology*, 43, 459-472. doi: 10.1080/15374416.2013.807735
- Maniglio, R. (2009). The impact of child sexual abuse on health: A systematic review of reviews. *Clinical Psychology Review*, 29, 647-657. doi: 10.1016/j.cpr.2009.08.003
- Manly, J. T., Kim, J. E., Rogosch, F. A., & Cicchetti, D. (2001). Dimensions of child maltreatment and children's adjustment: Contributions of developmental timing and subtype. *Development and Psychopathology*, *13*, 759-782.
- Manteuffel, B., Stephens, R. L., Sondheimer, D. L., & Fisher, S. K. (2008).
 Characteristics, service experiences, and outcomes of transition-aged youth in systems of care: Programmatic and policy implications. *Journal of Behavioral Health Services Research*, 35, 469-487. doi: 10.1007/s11414-008-9130-6
- Mantzicopoulos, P., & Knutson, D. J. (2000). Head Start children: School mobility and achievement in the early grades. *The Journal of Educational Research*, 93, 305-311. doi: 10.1080/00220670009598722
- Mather, M. (2010). U.S. Children in single-mother families. *Population Reference*Bureau. Retrieved from http://www.prb.org/pdf10/single-motherfamilies.pdf

- National Research Council (1993) *Understanding Child Abuse and Neglect*. Washington, DC: The National Academies Press. doi: 10.17226/2117.
- National Research Council. (2010). Student Mobility: Exploring the Impacts of Frequent

 Moves on Achievement: Summary of a Workshop. Washington, DC: National

 Academies Press.
- National Research Council and the Institute of Medicine of the National Academies.

 (2009). Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities. Washington, DC: National Academies Press.
- Noble, K. G., Houston, S. M., Kan, E., & Sowell, E. R. (2012). Neural correlates of socioeconomic status in the developing human brain. *Developmental science*, *15*, 516-527. doi: 10.1111/j.1467-7687.2012.01147.x
- Pollak, S. D., Cicchetti, D., Hornung, K., & Reed, A. (2000). Recognizing emotion in faces: Developmental effects of child abuse and neglect. *Developmental Psychology*, *36*, 679. doi: 10.1001/archpedi.156.8.824
- Raviv, T., Taussig, H. N., Culhane, S. E., & Garrido, E. F. (2010). Cumulative risk exposure and mental health symptoms among maltreated youth placed in out-of-home care. *Child abuse & neglect*, *34*, 742-751. doi: 10.1016/j.chiabu.2010.02.011
- Reynolds, A. J., Chen, C. C., & Herbers, J. E. (2009). School mobility and educational success: A research synthesis and evidence on prevention. In *Workshop on the Impact of Mobility and Change on the Lives of Young Children, Schools, and Neighborhoods, June* (pp. 29-30).

- Rog, D. J., & Buckner, J. C. (2007). Homeless families and children. In *Toward*understanding homelessness: The 2007 national symposium on homelessness

 research. Washington, DC: US Department of Housing and Urban Development.
- Rumberger, R. W., & Larson, K. A. (1998). Student mobility and the increased risk of high school dropout. *American Journal of Education*, 107, 1-35. doi: 10.1086/444201
- Shamseddeen, W., Asarnow, J. R., Clarke, G., Vitiello, B., Wagner, K. D., Birmaher, B., ... & McCracken, J. T. (2011). Impact of physical and sexual abuse on treatment response in the Treatment of Resistant Depression in Adolescent Study (TORDIA). *Journal of the American Academy of Child & Adolescent Psychiatry*, 50, 293-301. doi: 10.1016/j.jaac.2010.11.019
- Shaw, E., & Goode, S. (2008). Fact sheet: Vulnerable young children. *The National Early Childhood Technical Assistance Center*. Retrieved from http://ectacenter.org/~pdfs/pubs/factsheet_vulnerable.pdf
- Sheidow, A.J., Henry, D.B., Tolan, P.H., & Strachan, M.K. (2013). The role of stress exposure and family functioning in internalizing outcomes of urban families.

 **Journal of Child and Family Studies*, 23, 1351-1365. doi: 10.1007/s10826-013-9793-3
- Shipman, K., Edwards, A., Brown, A., Swisher, L., & Jennings, E. (2005). Managing emotion in a maltreating context: A pilot study examining child neglect. *Child Abuse & Neglect*, 29, 1015-1029. doi: 10.1016/j.chiabu.2005.01.006
- Simpson, G. A., & Fowler, M. G. (1994). Geographic mobility and children's emotional/behavioral adjustment and school functioning. *Pediatrics*, 93,

- Retrieved from
- http://pediatrics.aappublications.org.ezp1.lib.umn.edu/content/pediatrics/93/2/303 .full.pdf
- Slack, K. S., Holl, J. L., McDaniel, M., Yoo, J., & Bolger, K. (2004). Understanding the risks of child neglect: An exploration of poverty and parenting characteristics. *Child Maltreatment*, 9, 395-408. doi: 10.1177/1077559504269193
- Stoltenborgh, M., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2013). The neglect of child neglect: a meta-analytic review of the prevalence of neglect. *Social psychiatry and psychiatric epidemiology*, 48, 345-355. doi: 10.1007/s00127-012-0549-y
- Temple, J. A., & Reynolds, A. J. (1999). School Mobility and Achievement: Longitudinal Findings From an Urban Cohort. *Journal of School Psychology*, *37*, 355-377. doi: 10.1016/S0022-4405(99)00026-6
- Timmer, S. G., Borrego, J., & Urquiza, A.J. (2002). Antecedents of coercive interactions in physically abusive mother-child dyads. *Journal of Interpersonal Violence*, *17*, 836-853. doi: 10.1177/0886260502017008003
- Trask, E. V. & Garland, A. F. (2012). Are children improving? Results from outcome measurement in a large mental health system. Administration and Policy in Mental Health and Mental Health Services Research, 39, 210-220. doi: 10.1007/s10488-011-0353-0
- Trickett, P. K., Noll, J. G., Reiffman, A., & Putnam, F. W. (2001). Variants of intrafamilial sexual abuse experience: Implications for short-and long-term development. *Development and Psychopathology*, 13, 1001-1019.

- U.S. Department of Health and Human Services. (2001). *Mental health: Culture, race,*and ethnicity—A supplement to Mental Health: A Report of the Surgeon General.

 Rockville, MD: U.S. Public Health Service.
- U.S. Department of Health and Human Services, Administration on Children, Youth and Families. (2009). *Child Maltreatment 2007*. Washington, D.C.: U.S. Government Printing Office.
- U.S. Department of Health and Human Services, Administration on Children, Youth and Families. (2016). Child Maltreatment 2014. Washington, D.C.: U.S. Government Printing Office.
- Van Dorn, R., Volavka, J., & Johnson, N. (2012). Mental disorder and violence: is there a relationship beyond substance use?. Social Psychiatry and Psychiatric Epidemiology, 47, 487-503. doi: 10.1007/s00127-011-0356-x
- Warren, J.S., Nelson, P.L., & Burlingame, G.M. (2009). Identifying Youth at Risk for Treatment Failure in Outpatient Mental Health Services. *Journal of Child and Family Studies*, 18, 690-701. doi: 10.1007/s10826-009-9275-9
- Warren, J.S., Nelson, P.L., Mondragon, S.A., Baldwin, S.A., & Burlingame, G.M.
 (2010). Youth psychotherapy change trajectories and outcomes in usual care:
 Community mental health versus managed care settings. *Journal of Consulting and Clinical Psychology*, 78, 144-155. doi: 10.1037/a0018544
- Warren, J. S., Nelson, P. L., Burlingame, G. M., & Mondragon, S. A. (2012). Predicting patient deterioration in youth mental health services: community mental health vs. managed care settings. *Journal of Clinical Psychology*, 68, 24-40. doi: 10.1002/jclp.20831

- Weiss, B., Catron, T., Harris, V., & Phung, T. M. (1999). The effectiveness of traditional child psychotherapy. *Journal of Consulting and Clinical Psychology*, 67, 82-94. doi: 10.1037/0022-006X.67.1.82
- Weisz, J. R. (2004). *Psychotherapy for children and adolescents: Evidence-based treatments and case examples*. Cambridge, UK: Cambridge University Press.
- Weisz, J. R., & Gray, J. S. (2008). Evidence-based psychotherapy for children and adolescents: Data from the present and a model for the future. *Child and Adolescent Mental Health*, *13*, 54-65. doi: 10.1111/j.1475-3588.2007.00475.x
- Weisz, J.R., Weiss, B., Han, S.S., Granger, D.A., & Morton, T. (1995). Effects of psychotherapy with children and adolescents revisited: A meta-analysis of treatment outcome studies. *Psychological Bulletin*, 3, 450-468. doi: 10.1037/0033-2909.117.3.450
- Wilson, D. R. (2010). Health consequences of childhood sexual abuse. *Perspectives in psychiatric care*, 46, 56-64. doi: 10.1111/j.1744-6163.2009.00238.x
- Wilson, S. L., Kuebli, J. E., & Hughes, H. M. (2005). Patterns of maternal behavior among neglectful families: implications for research and intervention. *Child abuse* & Neglect, 29, 985-1001. doi: 10.1016/j.chiabu.2005.03.007
- Wilson, S. R., Rack, J. J., Shi, X., & Norris, A. M. (2008). Comparing physically abusive, neglectful, and non-maltreating parents during interactions with their children: A meta-analysis of observational studies. *Child abuse & neglect*, *32*(9), 897-911. doi: 10.1016/j.chiabu.2008.01.003
- Wilson, H. W., & Widom, C. S. (2010). The role of youth problem behaviors in the path from child abuse and neglect to prostitution: A prospective examination. *Journal*

- *of Research on Adolescence*, 20, 210-236. doi: 10.1111/j.1532-7795.2009.00624.x
- Whitson, M. L., & Connell, C. M. (2016). The relation of exposure to traumatic events and longitudinal mental health outcomes for children enrolled in systems of care:

 Results from a national system of care evaluation. *American Journal of Community Psychology*, *57*, 380-390. doi: 10.1002/ajcp.12058
- World Health Organization (1999) *Report of the consultation on child abuse prevention*, 29-31 March 1999, WHO, Geneva. World Health Organization, Geneva
- Xue, Y., Leventhal, T., Brooks-Gunn, J., Earls, F. J. (2005). Neighborhood residence and mental health problems of 5- to 11-year-olds. *Archives of General Psychiatry*, 62, 554-63. doi: 10.1001/archpsyc.62.5.554
- Ziesemer, C., Marcoux, L., & Marwell, B. E. (1994). Homeless children: Are they different from other low-income children? *Social Work, 39*, 658-668. doi: 10.1093/sw/39.6.6

Dissertation Proposal: Profiles of risk for children's mental health service outcomes

SPECIFIC AIMS

There is inconsistent evidence that mental health treatment successfully improves the functioning of children receiving services, and there remains limited understanding of the factors that impact the effect of treatment. Yet, the treatment need remains great. In the United States, it is estimated that nearly 1 out of every 5 children have a mental health disorder (US Department of Health and Human Services, 2001), and children from low income families, children in the child welfare system, and children who experience high degrees of stress have disproportionally higher rates of mental health issues compared to children without these stresses (Burns et al., 2004). Receipt of mental health treatment, however, does not reliably translate into successful treatment outcomes (Garland et al., 2013; de Voursney et al., 2013; Warren et al., 2010). Consequently, it cannot be assumed that children with significant risks are benefiting from the services received. As a result, there remains a *critical need* to further evaluate the impact of children's mental health treatment and the impact of environmental risks (e.g., socio-economic status, involvement with child protective services) on treatment outcomes. In the absence of such knowledge, future children's mental health providers will neglect to incorporate these environmental factors into treatment programs.

The long-term goal of this research is to evaluate the impact of children's mental health treatment and to identify key predictors of treatment outcomes, so that treatment strategies can be refined to improve effectiveness, particularly for those children who experience significant hardships. The *overall objective* in this proposal is to assess changes in symptomology for children receiving mental health treatment at a communitybased mental health agency and to determine whether stresses in children's care environments are related to changes in symptomology. My central hypothesis is that there will be significant reduction of symptoms for children when comparing pre- and post-treatment measures and treatment progress will be associated with children's environmental risks. The rationale for this project is that, upon successful completion of this study, I will have demonstrated a connection between a decrease in children's symptomology and receipt of mental health treatment. Additionally, I will work to determine whether environmental risks predict children's treatment outcomes. Doing so provides evidence for the continued need to design and test intervention approaches that specifically address the challenges children face in their environmental contexts. As a result, crucial environmental factors that impact outcomes can be more successfully targeted by clinicians treating children.

The objective of this project will be accomplished by pursuing two specific aims.

Specific Aim 1: To assess changes in mental health symptomology among children who received mental health treatment at a community-based clinic. The working hypothesis is that children (ages 5-18) who receive mental health treatment will show significant symptom reduction from pre- to post-treatment.

Specific Aim 2: To determine whether risks in children's care environment predict changes in symptomology after mental health treatment. Latent profile analysis will be used to identify groups of children by risks in their care environment (i.e. child maltreatment, homelessness, economic status, caregiver mental health, caregiver substance abuse, incarceration of a caregiver, changes in residence, and out of home placement). The working hypothesis is that symptom reduction will vary by identified environmental risk profiles.

With respect to <u>expected outcomes</u>, the work proposed in aims 1 and 2 are anticipated to identify changes in children's symptomology after mental health treatment, and to help ascertain the connection between stresses in children's care environment (via latent profiles) on those symptom changes. Such results are expected to have an important <u>positive impact</u> on the effect of mental health treatment for children in community-based settings, such that treatment effects for high-risk children may be more robust and consistent. As such, results will inform the development of therapeutic interventions or strategies that better account for the environmental risks children experience.

RESEARCH STRATEGY

SIGNIFICANCE

Children's mental health issues not only impact those directly involved but dramatically affect broader communities. These effects are social, but are also financial. Children's mental health treatment and related services cost the United States an estimated \$247 billion annually (The National Research Council and the Institute of Medicine of the National Academies, 2009). Unfortunately, previous research does not show that our financial investments are getting the results our children need. Numerous studies have called into question the effectiveness of children's mental health treatment. In other words, of the millions of children in the United States who are getting mental health treatment, empirical evidence does not confidently show that these children will make improvements during treatment (Manteuffel et al., 2008; Warren et al., 2010). Given the pervasiveness of children's mental illness and the equivocality of treatment effectiveness, research efforts must increase so that the best services are provided to our nation's children. In order to address this problem, there is a critical need for more research to both evaluate treatment outcomes and to understand the factors that are connected to positive outcomes (Trask & Garland, 2012).

Evaluating changes associated with mental health treatment can establish evidence for its positive impact. Systematic reviews of research on mental health care services for children have demonstrated positive treatment effects (Hawley & Weisz, 2005; Trask & Garland, 2012; Weisz et al., 1995). However, empirical evidence does not unanimously support the value of these services. This is particularly true for community-based mental health clinics where children tend to receive fewer empirically-based methods, often called "usual care" (Garland et al., 2013; Weiss et al., 1999; Weisz, 2004). The concern about these results is amplified as the need for treatment availability increases and more and more children are served in community-based mental health clinics. Indeed, extant literature has revealed disparate results for treatment studies conducted in laboratory settings compared to those in community settings (Weisz et al.,

1995). External validity is promoted by conducting outcome research in settings where treatment occurs. This project will be a significant contribution because it evaluates treatment outcomes and does so in a community setting.

There are limitations inherent in only measuring symptoms changes. When changes in symptomology are evaluated alone, the factors that impact treatment are neglected. Doing so obfuscates the depth of what researchers can say about treatment and the conditions in which success is more or less likely. Research is clear that children are impacted by the environments in which they live (Leventhal & Brooks-Gunn, 2000; Xue, Leventhal, Brooks-Gunn, & Earls, 2005; Hanson & Chen, 2007). Broad, variable-centered analysis that looks across samples is one method for analyzing the connection between a child's environment and treatment outcomes. A more refined way of looking at differential treatment outcomes is through person-centered analyses. Contemporary scholarship points to the need for increased consideration of individual characteristics that might influence treatment effects (Lanza & Rhoades, 2013). In other words, both academics and clinicians want to know whether strategies work the same for specific subgroups. This project aims to use latent profile analysis to develop children's environmental risk profiles, and then determine whether treatment outcomes vary between profile groups.

Completing both aim 1 and aim 2 will produce information necessary for developing and refining mental health intervention models for children. Knowledge about symptom changes connected to mental health treatment will be invaluable as we seek to improve our confidence in children's treatment. Assessing for the impact of stress in a child's care environment will help future researchers develop intervention models that can be tailored to the unique needs of children. Harvard University professor John R. Weisz said, "The 'pathology' the child therapist's treats may reside as much in a disturbed environment from which the child cannot escape as in the child's personality" (1999, p.51). Assessing for the relationship between stresses in a child's environment and their progress in treatment will undoubtedly highlight the unique environmental obstacles many of our nation's most vulnerable children face and then individualize treatments to specifically address those concerns.

INNOVATION

Many academics have implored future researchers to assess whether differential treatment effects are impacted by individual characteristics. Contemporary scholarship is interested in better understanding this question and then individualizing treatments based upon identified characteristics. Individual characteristics are often identified through subgroup analyses that have traditionally employed variable-centered approaches. It is common for treatment effects to be examined by including moderators in multiple regression models (Lanza & Rhoades, 2013). This project uses latent profile analysis (LPA), which is a person-centered analytic strategy. LPA is a considered a mixed model that suggests that there are unseen latent subgroups within populations. LPA seeks to identify these categorical groups, which can then be used to examine differential effects (Supplee et al., 2013). Prevention and intervention researchers propose that comparative effectiveness can be conducted with LPA through identifying these unique groups. "Such approaches can facilitate targeting future intervention resources to subgroups that promise to show the maximum treatment response" (Lanza & Rhoades, 2013, p.157).

Instead of amassing many variables in a regression model, LPA can help to identify groups of individuals and determine if treatment outcomes differ between those groups. Regression models endorse a cumulative risk factor approach (i.e., the more risks, the more difficulty). Recent scholarship suggests using LPA for a more complex approach where group homogeneity is not assumed and qualitatively different groups can emerge (Syvertsen et al., 2010). In other words, it is conceivable that a lone environmental risk factor impact treatment differently than a collection of other environmental risk factors. Approaches like this are well-suited to differentiating treatment responses where the conditions under which children are more or less likely to make progress are elucidated.

A priori theoretical frameworks must be employed to help guide methodology. This is particularly true when using LPA. There is strong theoretical and empirical evidence to rely on the tenants of ecological theory, and scholars have supported the use of socio-ecological factors in designing studies that use LPA (Arthur et al., 2002; Coffman et al., 2007; Lanza et al., 2010; Syvertsen et al., 2010). Ecological theory is widely applied in social science research to hypothesize about the influence of environment on human functioning. Ecological theory acknowledges the ways children are affected by the contexts in which they live (Bronfrenbrenner, 1979). Child therapists assess children's functioning across domains of functioning (e.g., home, school, neighborhood, community), and consider the impact of those environments in the development and maintenance of social, emotional, and behavioral problems. The importance of this assessment is axiomatically justified through the copious research studies that connects children's functioning to the experiences they have in external environments. Consequently, children's contact with certain environmental experiences may predict how they respond to mental health treatment (Loeber, 1990). Caregiver mental health (Cummings & Davies, 1994), caregiver incarceration (Miller, 2006), type of child maltreatment (Garland et al., 1996), homelessness (Buckner, 2008), and out-ofhome placements (Tarren-Sweeney, 2008) have all been shown to impact children's mental health. Therefore, it is reasonable to assume that these conditions also impact children's receipt of mental health treatment. The research proposed in this application is innovative because it uses latent profile analysis guided by ecological theory to understand a poorly understood area of research. This study will provide foundational knowledge that can be used in the development of intervention programs that meet unique children's needs.

APPROACH

Integrated data from a community-based children's mental health clinic, Minnesota Department of Education, Minnesota Department of Human Services, Minnesota Department of Juvenile Justice, and Minnesota Department of Health will be used to accomplish the following research study aims: (1) assess changes in symptomology among children who received mental health treatment at a community-based clinic, and (2) determine whether stresses in children's care environment predict changes in symptomology after mental health treatment.

Design

Quantitative demographic and treatment outcome data has already been collected prior to the start of this project. I will use data collected by the community-based children's mental health center in Minneapolis, MN, over a five-year period (July 1, 2007)

through June 30, 2012). This data will be linked with Minnesota Department of Education and Minnesota Department of Human Services for analysis.

Procedure

All children who were eligible for receiving mental health treatment, as determined by a diagnostic assessment by a mental health provider, at the community-based children's mental health center within the five year span were initially included in the sample for analysis. Demographic data were gathered at the outset of treatment by the clinician or intake worker. Child's parent or guardian provided information during initial intake, and any necessary demographic updates were gathered throughout treatment. Outcomes measures were collected at the start of treatment and every three months during treatment. Gathering this frequently is compliant with Minnesota Department of Human Resources expectations.

Through Minnesota-Linking Information for Kids (Minn-LInK), in cooperation with the University of Minnesota's Center for Advanced Studies in Child Welfare (CASCW), therapy data will be linked with data from the Minnesota Department of Education and Minnesota Department of Human Services. Therapy information will be first matched to corresponding education records (Minnesota Automated Reporting Student Systems [MARSS]). Matching will be done through a combination of probabilistic matching (via Registry Plus Link Plus (NCCDPHP, 2010)) and hand matching processes. After completing this match, data will be matched with Department of Human Services data using the aforementioned matching processes.

Sample

Participants (about 1000 children) were all school-aged children served at the community-based children's mental health center who received mental health treatment during the five year span with both a beginning of treatment symptom measures and an end of treatment symptom measures. Children without both sets of measures will be excluded from the study. All children in the sample need to have received a diagnostic assessment from the mental health center so that variables for the latent profile analysis can be obtained. Children are racially diverse. Previous agency demographics reveal that nearly half the children served are White (non-Hispanic), a quarter of the children are Black, and the remaining are Hispanic, Asian, Asian/Pacific Islander, and American Indian. Hispanic children make up the largest percentage of the remaining children in the sample. Slightly more males are served than females. Children have wide variety of mental health needs such as attention deficit disorders, adjustment disorders, acute and chronic trauma, behavioral problems, anxiety disorders, learning difficulties, and depression. Roughly 55% served were from families who self-reported as low income. Specific demographic information will be provided when sample is officially constructed.

As noted, in order to most accurately assess the research questions, the sample from the community-based children's mental health center will be restricted to children who have at least two symptom measures so that there are both pre- and post-treatment scores. The dependent variable to test hypothesis 3 is change in Strengths and Difficulties Questionnaire - Parent (SDQ-P) scores (see below).

Children's Mental Health Treatment Center

The community-based children's mental health center where the data was gathered serves Minnesota children and families primarily in the Minneapolis and Saint Paul metro area. The mental health center serves children with multi-faceted needs. In

order to meet those needs, children may receive a range of services including psychiatry, individual and family therapy, individual and family skills, school-based therapy, day treatment, an early childhood therapeutic preschool, crisis services, case management. These diverse services allow clinical teams to assess for children's needs to assign them to the appropriate services based upon symptom severity. Children may have a single service or a collection of them based upon their needs. For example, a child may begin with day treatment and case management services and transition into outpatient therapy services as their needs decrease. Children served at the center are demographically and diagnostically diverse (see sample description).

Hypotheses

To achieve these aims, I will test the following working hypotheses:

- (1) There will be significant reduction of symptoms for children when comparing pre- and post-treatment measures, and
- (2) Meaningful profiles will emerge in sample, and membership in a subgroup will differentiate children based upon environmental risks.
- (3) Treatment outcomes for children will differ by environmental risk profiles.

I will test my working hypothesis by using the approach of comparing pre- and post-treatment measures to determine symptom changes, and latent profile analysis (LPA) to determine environmental risk profiles and then later assess for a relationship between symptoms changes and children's risk profiles.

Measures

Children's demographic information (i.e. gender, age, and ethnicity) were gathered when the child and his or her caregiver initiated mental health treatment and recorded in treatment center's administrative records.

Strengths and Difficulties Questionnaire - Parent Report. The Strengths and Difficulties Questionnaire parent-report version (SDQ-P) is a brief 25-item questionnaire used to measure children's symptom levels at the beginning, during, at the end of treatment. It is a well-validated behavioral screening questionnaire administered to parents for children 4-17 year olds (Goodman 1997, 2001). The SDQ produces a Total Difficulties score (0 - 40) which falls into three ranges: normal (0-13), borderline (14-16), and abnormal (17-40). Higher scores indicate elevated symptomology. The Total Difficulties score is comprised of four of the six subscales: conduct problems, inattention/hyperactivity, peer problems, and emotional problems. There are five items for each of the four subscales where "Not True," "Somewhat True," and "Certainly True" are selected to designate the degree to which a symptom description is present. Examples of symptom descriptions include: "Considerate of other people's feelings," "Often loses temper," and "Many worries or often seems worried." The SDQ-P scores used in this project are from the client's initial intake at the center and the client's final SDQ-P score gathered at the time of their discharge from all services.

Maltreatment Types. The MN Department of Human Services (DHS) records substantiated instances of child maltreatment. Allegations of child maltreatment are recorded based upon type (e.g. physical abuse, sexual abuse, neglect). For the purposes of this project, substantiated incidences of maltreatment at any point in the child's life will be categorized. There will be 5 types of maltreatment used (neglect (not medical),

physical abuse, sexual abuse, mental injury and emotional harm, and other). Each child will be coded with either "Yes" (1) or "No" (0) if there is a substantiated incident of a given type of maltreatment. Consequently, children with multiple substantiated incidents of different types of maltreatment will receive a "Yes" for each type.

Homelessness. Homelessness is a dichotomous (Yes = 1, No = 0) variable from the Department of Education's Minnesota Automated Reporting Student Systems (MARSS). Children are considered homeless by a predetermined set of criteria from the Minnesota State Government Statutes that is based upon their nighttime residence as sheltered, double-up, unsheltered, and hotel/motel. Children will be coded as "Yes" if they were homeless for any period of time during the time they were receiving mental health services.

Economic Status. The economic indicator is based upon eligibility for free or reduced lunch which is calculated by factoring household income and number of members. This is a three-item categorical variable: ineligible (0), eligible for reduced price (1), and eligible for free meal (2). If there are students with missing data, they will be considered ineligible. Eligibility can vary year to year. Children will be considered coded as eligible for free/reduced if they met criteria for this status at any point during the five year time span of this project.

Caregiver Mental Health. Indication of a caregiver having mental health issues is recorded during the child's initial diagnostic assessment and during required annual diagnostic assessment updates. Caregiver mental health status is either "Yes" (1) or "No (0), and indicates mental health difficulties for one or both of the child's caregivers. The child does not need to be currently residing with the caregiver with mental health issues for a "Yes" to be recorded.

Caregiver Substance Abuse. Caregiver substance abuse is recorded during diagnostic assessment sessions when the child first starts mental health treatment and during their annual diagnostic assessment. Substance abuse is recorded as "Yes" (1) or "No" (0). "Yes" is recorded if the reporting caregiver indicates their own substance abuse or substance abuse by the child's other caregiver.

Incarceration of a Caregiver. During the child's initial diagnostic assessment the reporting caregiver indicates whether or not one or both of the child's caregivers have been incarcerated at any point during the child's life. Responses are recorded as "Yes" (1) or "No" (0).

Changes in Residence. Changes in residence is a numerical, continuous variable which indicates the number of times a child changed residences within a three year period prior to coming to the mental health center. A value of "5" would mean the child moved 5 times in the 3-year period before coming for treatment. Changes in residence during treatment are not included.

Out of Home Placement. The MN DHS records incidents of child out-of-home placement. Children can be placed out of the home for a variety of reasons. Many of these reasons are due to caregiver difficulties, but can also be a result of the child's own behaviors. Regardless of the reason, out-of-home placement is a dichotomous variable (Yes = 1, No = 0). Any incident of a child removed from their home, at any point in their life, and under any removal condition will result in a "Yes." Out of home placement will be considered an environmental risk regardless of the circumstances of the placement.

Data Analysis Plan

Descriptive statistics will be examined prior to testing hypotheses. An examination of the normality of study variables, demographic information, and variable correlations will be analyzed. Specifically, interrelations between demographic variables, SDQ-P scores, and environmental risk variables for the overall sample will be reviewed.

In order to assess for change in symptoms over time (Specific Aim 1), I will use paired sample t-tests, unless review of descriptive statistics suggest the need for including control variables. Paired sample t-tests will help to assess for the significance of pre to post-treatment changes. Changes from both first and last scores as well as high to last score will be used. Two separate analyses will be run to assess for result variability based upon these different approaches. Previous investigation into this sample has shown that children's symptoms tended to increase shortly after the start of treatment. In the cases where children only have two measures, their first score will also be considered their high score. Effect sizes will also be calculated and compared against effect sizes (e.g. small, medium, large) typical in social science research.

Next, latent profile analysis (LPA) will be employed to determine latent groups based upon select variables (child maltreatment, homelessness, economic status, caregiver mental health, caregiver substance abuse, incarceration of a caregiver, changes in residence, and out of home placement). Highly correlated variables from preliminary data analysis may be excluded from the LPA if necessary. LPA will be used to assess for the optimal number of environmental risk profiles. Determination of groups will be based upon an evaluation of statistical measures of model fit and the theoretical interpretability of the groups. The following fit indices will be used to help determine environmental profile models: Consistent Akaike Information Criterion (cAIC), the Bayesian Information Criterion (BIC), and the sample size Adjusted BIC (aBIC). Since it is not unusual for fit indices to support more than one model solutions, delineated groups will then be assessed for theoretical and conceptual interpretability. This process will help to produce the most fit model solution (Nylund et al., 2007).

Finally, an ANOVA will be used to determine differences in SDQ-P change scores, for both first to last SDQ-P change scores and high to last SDQ-P change scores. An ANOVA will allow for comparing mean change scores among the multiple risk profile groups. If it was determined that control variables were necessary when comparing pre and post-treatment scores, the same variables will be included and an ANCOVA will be run, unless the control variable was used as a variable in the LPA. ANOVA calculations will provide evidence for differential difference scores based upon children's environmental risk profiles.

Expected/Alternative Outcomes

It is expected that there will be quantitative evidence for a significant reduction in symptoms after a child completes treatment at the mental health center. Reduction will be significant when first and last SDQ-P scores as analyzed, as well as when high and last SDQ-P scores are analyzed. Additionally, it is expected that the Latent Profile Analysis (LPA) will produce children's environmental risk profiles that support a person-centered analysis of the clinical outcomes. LPA model solutions will be supported by both fit indices and theory. Finally, there will be evidence that resulting environmental risk profile groups can be differentiated by treatment outcomes. Results will help to provide a rationale for unique, person-specific treatment strategies.

Potential Problems

One initial problem is that experimental design was not feasible since this is a retrospective study using existing outcomes from the community-based children's mental health center. Utilizing a control group and random assignment would allow for causative implications to be drawn from the study. Future service evaluation should work to use experimental design to demonstrate the direct effects of treatment. Next, many of the independent variables are dichotomous and do not capture the intensity of a given environmental risk. There appears to be an intuitive connection the chronicity and intensity of a person's experiences to mental health severity. It is conceivable that those with the most intense environmental risks will have the most difficulty making progress in mental health treatment. This idea will not be able to be tested from the current study design. Additionally, it is a limitation that some of the environmental risk variables (i.e. caregiver incarceration, caregiver substance use, and caregiver mental health) were not necessarily self-report. In some cases, caregivers were reporting on themselves, but they may have also been reporting on a caregiver not involved in treatment. This means that there were instances when variables verification could not be achieved. Another potential problem is that the environmental risk factors that will be used in this project are not comprehensive. As such, it is possible that including additional environmental risk factors may produce entirely unique profiles. Finally, only environmental risk factors are included in this project. The impact of environmental protective factors, which likely have a noteworthy impact on treatment outcomes, is not taken into consideration.

References

- Bronfrenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press.
- Buckner, J. C. (2008). Understanding the impact of homelessness on children: Challenges and future research directions. *American Behavioral Scientist*, *51*, 721-736. doi: 10.1177/0002764207311984
- Burns, B. J., Phillips, S. D., Wagner, H. R., Barth, R. P., Kolko, D. J., Campbell, Y., & Landsverk, J. (2004). Mental health needs and access to mental health services by youths involved with child welfare: A national survey. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43, 960-970. doi: 10.1097/01.chi.0000127590.95585.65
- Coffman, D. L., Patrick, M. E., Palen, L. A., Rhoades, B. L., & Ventura, A. K. (2007). Why do high school seniors drink? Implications for a targeted approach to intervention. *Prevention Science*, 8, 241-248. doi: 10.1007/s11121-007-0078-1
- Cummings, E.M & Davies, P.T. (1994). Maternal depression and child development. *Journal of Child Psychology and Psychiatry*, *35*, 73-122. doi: 10.1111/j.1469-7610.1994.tb01133.x
- de Voursney, D., Sondheimer, D., Drumm, A., Jordan, P., Christopher, O., Lulow, E., & Blau, G. (2013). Improving community-based mental health care for children: A

- commentary. *Administration and Policy in Mental Health and Mental Health Services Research*, 40, 33-38. doi: 10.1007/s10488-021-0457-1
- Garland, A.F., Landsverk, J.L., Hough, R.L. & Ellis-MacLeod, E. (1996). Type of maltreatment as a predictor of mental health service use for children in foster care. *Child Abuse & Neglect*, 20, 675-688. doi: 10.1016/0145-2134(96)00056-7
- Garland, A. F., Haine-Schlagel, R., Brookman-Frazee, L., Baker-Erickson, M., Trask, E., & Fawley-King, K. (2013). Improving community-based mental health care for children: Translating knowledge into action. *Administration and Policy in Mental Health and Mental Health Services Research*, 40, 6-22. doi: 10.1007/s10488-021-0450-8
- Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. Journal of Child Psychology, Psychiatry, and Allied Disciplines, 38, 581-586. doi: 10.1111/j.1469-7610.1997.tb01545.x
- Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire (SDQ). Journal of the American Academy of Child and Adolescent Psychiatry, 40, 1337-1345. doi: 10.1097/00004583-200111000-00015
- Hanson, M.D. & Chen, E. (2007). Socioeconomic status and health behaviours in adolescence: A review of the literature. *Journal of Behavioral Medicine*, 25, 425-438. doi: 10.1007/s10865-007-9098-3
- Hawley, K.M. & Weisz, J.R. (2005). Youth versus parent working alliance in usual care: Distinctive associations with retention, satisfaction, and treatment outcome. Journal of Clinical Child and Adolescent Psychiatry, 34, 117-128. doi: 10.1207/s15374424jccp3401_11
- Lanza, S. T., & Rhoades, B. L. (2013). Latent class analysis: An alternative perspective on subgroup analysis in prevention and treatment. *Prevention Science*, *14*, 157-168. doi: 10.1007/s11121-011-0201-1
- Lanza, S. T., Rhoades, B. L., Nix, R. L., Greenberg, M. T., & the Conduct Problems Prevention Research Group. (2010). Modeling the interplay of multilevel risk factors for future academic and behavior problems: A person-centered approach. *Development and Psycholopathology*, 22, 313-335. doi: 10.1017/S0954579410000088
- Leventhal, T. & Brooks-Gunn, J. (2000). The neighborhood they live in: the effects of neighborhood residence on child and adolescent outcomes. *Psychology Bulletin*, 12, 309- 337. doi: 10.1037/0033-2909.126.2.309
- Manteuffel, B., Stephens, R. L., Sondheimer, D. L., & Fisher, S. K. (2008). Characteristics, service experiences, and outcomes of transition-aged youth in

- systems of care: Programmatic and policy implications. *Journal of Behavioral Health Services Research*, *35*, 469-487. doi: 10.1007/s11414-008-9130-6
- Miller, K. M. (2006). The impact of parental incarceration on children: An emerging need for effective interventions. *Child and Adolescent Social Work Journal*, *23*, 472-486. doi: 10.1007/s10560-006-0065-6
- Modecki, K. L. (2016). Do risks matter? Variable and person-centered approaches to adolescents' problem behavior. *Journal of Applied Developmental Psychology*, 42, 8-20. doi: 10.1016/j.appdev.2015.11.001
- Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*, 535-569. http://dx.doi.org/10.1080/10705510701575396
- Supplee, L. H., Kelly, B. C., MacKinnon, D. M., & Barofsky, M.Y. (2013). Introduction to the special issue: Subgroup analysis in prevention and intervention research. *Prevention Science*, *14*, 107-110. doi: 10.1007/s11121-021-0335-9
- Syvertsen, A. K., Cleveland, M. J., Gayles, J. G., Tibbits, M. K., & Faulk, M. T. (2010). Profiles of protection from substance use among adolescents. *Prevention Science*, 11, 185-196. doi: 10.1007/s11121-009-0154-9
- Tarren-Sweeney, M. (2008) The mental health of children in out-of-home care. *Current Opinion in Psychiatry*, 21, 345-349. doi: 10.1097/YCO.0b013e32830321fa
- The National Research Council and the Institute of Medicine of the National Academies. (2009). Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities. Washington, DC: National Academies Press.
- Trask, E. V. & Garland, A. F. (2012). Are children improving? Results from outcome measurement in a large mental health system. *Administration and Policy in Mental Health and Mental Health Services Research*, *39*, 210-220. doi: 10.1007/s10488-011-0353-0
- U.S. Department of Health and Human Services. (2001). *Mental health: Culture, race, and ethnicity—A supplement to Mental Health: A Report of the Surgeon General*. Rockville, MD: U.S. Public Health Service.
- Warren, J.S., Nelson, P.L., Mondragon, S.A., Baldwin, S.A., & Burlingame, G.M. (2010). Youth psychotherapy change trajectories and outcomes in usual care: Community mental health versus managed care settings. *Journal of Consulting and Clinical Psychology*, 78, 144-155. doi: 10.1037/a0018544

- Weiss, B., Catron, T., Harris, V., & Phung, T. M. (1999). The effectiveness of traditional child psychotherapy. *Journal of Consulting and Clinical Psychology*, 67, 82-94. doi: 10.1037/0022-006X.67.1.82
- Weisz, J. R. (2004). Psychotherapy for children and adolescents: Evidence-based treatments and case examples. Cambridge, UK: Cambridge University Press.
- Weisz, J.R., Weiss, B., Han, S.S., Granger, D.A., & Morton, T. (1995). Effects of psychotherapy with children and adolescents revisited: A meta-analysis of treatment outcome studies. *Psychological Bulletin*, *3*, 450-468. doi: 10.1037/0033-2909.117.3.450
- Weisz, J. R., Donenberg, G. R., Han, S. S., & Weiss, B. (1995). Bridging the gap between laboratory and clinic in child and adolescent psychotherapy. *Journal of Consulting and Clinical Psychology*, 63, 688-701. doi: 10.1037/0022-006X.63.5.688
- Xue Y, Leventhal T, Brooks-Gunn J, Earls FJ. (2005). Neighborhood residence and mental health problems of 5- to 11-year-olds. *Archives of General Psychiatry*, 62, 554-63. doi: 10.1001/archpsyc.62.5.554