

Growing Up in the Face of Economic Hardship: The Effects of Job Loss, Material  
Deprivation, and Subjective Financial Stress on Children and Parents

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Dissertation submitted in partial fulfillment of  
the requirements for the degree of Doctor  
of Philosophy in  
Public Policy Studies in the Graduate School  
of Duke University

2018

ABSTRACT

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## **Abstract**

The purpose of this dissertation is to provide a more nuanced and global perspective to a growing body of literature on the multiple dimensions of economic hardship at the family and community level and their impacts on children and parents. The first chapter uses data from the Millennium Cohort Study to examine the multiple possible manifestations of economic hardship at the family level and their associations with children's social-emotional outcomes. I find that half of the families who experienced economic hardship were not income poor, but nevertheless experienced material deprivation, subjective financial stress, or both. Moreover, all manifestations of economic hardship, including those without income poverty, were associated with higher levels of behavior problems for children.

The second chapter more deeply investigates the association between material deprivation and children's social-emotional outcomes holding income constant using data from the Parenting Across Cultures Project on families in nine diverse countries in Europe, North and South America, Africa, and Asia. I find that even when income remained stable, parents' perceived material deprivation was associated with children's externalizing behavior problems. I also find that parents' disciplinary practices explain a small but significant share of the association between parents' perceived material deprivation and children's behavior problems. There were no differences in these associations between mothers and fathers or between high- and low- and middle-

income countries. The third chapter uses state-level US administrative data to examine the effect of economic hardship on child maltreatment at the community, rather than family, level. I show that job losses are associated with a significant increase in investigations for physical abuse, but not in the overall rate of investigations. Moreover, job losses also predict an increase in the share of reports that was substantiated. Together, these findings indicate that income poverty at the family-level is a necessary but insufficient measure of economic hardship and that future research on the effects of economic hardship should consider all of the possible manifestations of economic hardship at both the family- and community-level.

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## Acknowledgements

I would like to express my deepest appreciation and gratitude to my advisor Anna Gassman-Pines for her tireless mentorship and encouragement. I thank her for inviting me to collaborate on exciting projects, for teaching me the skills of research and teaching me to trust in my own capabilities, and for always supporting me in my pursuit of new challenges and opportunities. Her guidance, support, and kindness have been the key for my success at Duke University.

I would also like to thank Kenneth (Ken) Dodge for challenging me to think big and to find my contribution to the field without “missing the trees for the forest.” His support, advice, and insight have been invaluable in my journey toward becoming an independent scholar.

I am very grateful to Candice Odgers for her support and for continuously challenging me to strengthen my research. Her honesty and her wisdom have helped me grow enormously as a scholar and will continue to inform my research for years to come.

I would also like to thank Maria-Giovanna (Giovanna) Merli for being such an invested supporter of my research and career. Her thoughtful feedback and perspective have helped to strengthen and transform each of my research projects and her encouragement and coaching have made it possible for me to achieve the career goal I had set for myself when I arrived at Duke University.

Finally, I wish to express my gratitude for Lidia Panico for her openness, guidance, and support. She has been an instrumental, if unofficial, part of my advising team.

I acknowledge the funding I have received to support my research: the James B. Duke Fellowship, the Education and Human Development Scholars award through the Duke University Social Science Research Institute, and the Doris Duke Foundation for the Promotion of Child Well-Being dissertation fellowship. I also acknowledge the extensive data support I have received from Jennifer Lansford and Ann Skinner.

On a personal note, I want to thank the many wonderful people who have carried me through my lows and celebrated my highs. Thank you to the Ladies Brain Trust (Rebecca Lehrman, Adebola Olayinka, Emily Pechar, and Sierra Smucker) for pushing me beyond my limits and toward my dreams. You are my family and you have made me a stronger researcher, a better friend, and a happier human. Thank you to my lab mates Laura Bellows, Danton Noriega-Goodwin, and Zoelene Hill for your work and life advice. Thank you to my parents for teaching me to trust in my intuition and for always encouraging me to follow my own path. Thank you to my family-in-law for your love and unshakable trust in my abilities and strength. Thank you to my friends both near and far, with special thanks to Lindsay Kishter, Mandy Glorioso, and Lindsay Petty for knowing me and my dreams even when I felt lost.

Most of all, I want to express my fierce love and gratitude for my husband, Ari Schenck, who has never wavered in his support of my dreams and aspirations, no matter where in the world these take us. This ride would not have been nearly as fun or as delicious without him.

# Introduction

Economic hardship in childhood has long been a critical target for intervention and policy because of its adverse immediate and long-term impacts on children's development and well-being. Despite evidence that these three dimensions of economic hardship are distinct and independent, most research on the effects of economic hardship on children and parents has only considered the effects of income poverty, while ignoring the roles of two other dimensions of economic hardship – subjective financial stress and material deprivation. In this dissertation, I fill that gap in the literature by examining the effects of these underexamined dimensions of economic hardship on children's social-emotional outcomes from an international perspective. I also expand on the extant literature by examining the effects of economic hardship on parenting at the community, rather than the family, level. Together, the three chapters of this dissertation add a more nuanced and global perspective to a growing body of literature on the multiple dimensions of economic hardship and their impacts on children and parents.

The first chapter examines the multiple possible manifestations of economic hardship at the family level and their associations with children's social-emotional outcomes. Using data from the Millennium Cohort Study, a nationally representative longitudinal study of children born between 2000 and 2001 in the United Kingdom, I find that half of the families who experienced economic hardship were not income poor,

but nevertheless experienced material deprivation, subjective financial stress, or both. Moreover, all manifestations of economic hardship, including those without income poverty, were associated with higher levels of behavior problems for children. I interpret these findings to indicate that income poverty is a necessary but insufficient measure of economic hardship and that future research on the effects of economic hardship should consider all of the possible manifestations of economic hardship.

The second chapter more deeply investigates the association between material deprivation and children's social-emotional outcomes holding income constant. I use data from the Parenting Across Cultures Project to identify whether the association between material deprivation and children's behavior problems found in the first paper is also observable among families in nine diverse countries in Europe, North and South America, Africa, and Asia. I find that even when income remained stable, parents' perceived material deprivation was associated with children's externalizing behavior problems. I also find that parents' disciplinary practices explain a small but significant share of the association between parents' perceived material deprivation and children's behavior problems. There were no differences in these associations between mothers and fathers or between high- and low- and middle-income countries. These results provide further evidence that material deprivation influences children's social-emotional outcomes at any income level and suggest that this association is significant in diverse political, cultural, and economic contexts.

The third chapter examines the effect of economic hardship on parenting

behavior at the community, rather than family, level. Using longitudinal state-level US administrative data on mass layoffs and child maltreatment investigations, this chapter tests whether economic shocks at the state level are associated with community-wide increases in child maltreatment. I show that job losses are associated with a significant increase in investigations for physical abuse, but not in the overall rate of investigations. Moreover, job losses also predict an increase in the share of reports that was substantiated. These findings underscore the need to consider economic hardship at the community level in addition to the family level when studying economic disparities in children's outcomes and experiences.

# **Chapter 1. More Than One Kind of Poverty: Three Dimensions of Economic Hardship, their Combinations, and Children's Mental Health**

## ***1.1 Introduction***

Economic hardship in childhood has long been a critical target for intervention and policy, in part because of its adverse immediate and long-term impacts on children's mental health. Children and adolescents who experience economic hardship present higher levels of mental health problems, including both internalizing symptoms, such as depression and anxiety, and externalizing symptoms, such as hyperactivity or aggression (Conger et al., 1992; Costello, Compton, Keeler, & Angold, 2003; Dearing, McCartney, & Taylor, 2006; Kaiser, Li, Pollmann-Schult, & Song, 2017; McLeod & Shanahan, 1993; Zilanawala & Pilkauskas, 2012). Moreover, there is evidence that these effects of economic hardship on mental health endure into adulthood (Evans & Cassells, 2013). Though most of these findings come from studies using samples of U.S. children, the same patterns exist in other high-income countries, including those with far stronger social safety net policies (Bradbury, Corak, Waldfogel, & Washbrook, 2015; Kaiser et al., 2017; Washbrook, Waldfogel, Bradbury, Corak, & Ghangro, 2012).

Increasingly, social scientists are taking a more nuanced approach to the study of economic hardship, recognizing that this construct refers to at least three independent, but related, dimensions: income poverty, material deprivation, and subjective financial stress (Bradshaw & Finch, 2003; Gauthier & Furstenberg, 2010; Marks, 2007). Income

poverty refers to an inflow of income available to a family from earnings and other sources of income that is below the poverty threshold. Income poverty captures the resource dimension of economic hardship. Material deprivation refers to inadequate material conditions, such as inadequate housing, food insecurity, or the inability to pay for other basic living expenses. As such, material deprivation captures the lived conditions of economic hardship. Subjective financial stress refers to the subjective evaluation of economic circumstances, capturing the psychological experience of economic hardship. These three dimensions may overlap and occur together, but they are distinct and can be experienced independently of each other (Bradshaw & Finch, 2003). For example, a family may be income poor but neither financially stressed nor materially deprived (Boushey & Gundersen, 2001; Bradshaw & Finch, 2003; Gauthier & Furstenberg, 2010). At the same time, a family could be materially deprived or financially stressed but still have income above the poverty threshold.

Despite evidence that these three dimensions of economic hardship are distinct and independent, the vast majority of studies on the effects of economic hardship on children have focused on income poverty alone. Fewer studies have examined the effects of material deprivation and only a small handful of studies have considered the effects of subjective financial stress. To our knowledge, no studies have yet investigated the different possible combinations of these dimensions of economic hardship and the associations among the distinct manifestations of economic hardship and children's outcomes. This lack of nuance in the conceptualization and measurement of economic

hardship is problematic because income poverty alone does not capture all children who experience economic hardship (Bradshaw & Finch, 2003; Marks, 2007). Thus, research on only income poverty does not comprehensively capture the effects of economic hardship on children. By carefully disentangling the many possible manifestations of economic hardship based on the multiple possible combinations of the three dimensions of economic hardship, we may be able to better measure the association between economic hardship and children's outcomes. This more nuanced approach may also help us to better understand the mechanisms that drive these associations, better explain the differential outcomes for children living with economic hardship, and identify more effective policy approaches.

In this study, we extend the research on economic hardship in childhood by disentangling different manifestations of economic hardship and examining their associations with children's mental health. We ask three research questions: (1) How prevalent is each possible manifestation of economic hardship? (2) Do different families experience different manifestations? (3) To what degree is each manifestation of economic hardship associated with children's mental health? To answer these research questions, we use data from the Millennium Cohort Study (MCS), a nationally representative longitudinal cohort study conducted in the United Kingdom. We distinguish between seven distinct manifestations of economic hardship. We find that approximately half of the families who experienced economic hardship were not income poor. Moreover, all manifestations of economic hardship, including those without

income poverty, were associated with higher levels of mental health problems for children. We interpret these findings as indicating that income poverty, as a measure of economic hardship, is necessary but not sufficient. We argue that, to better understand the significant negative effects of economic hardship on children, we must broaden our theoretical and empirical conceptualization of economic hardship to consider all three dimensions of hardship and their possible combinations.

## ***1.2 Background and Conceptual Motivation***

A growing sociological literature shows that, at least in high-income countries, income poverty, material deprivation, and subjective financial stress are indicators of distinct dimensions of economic hardship (Bradshaw & Finch, 2003; Fusco, Guio, & Marlier, 2011; Gauthier & Furstenberg, 2010; Marks, 2007). Studies from the United Kingdom (UK), Australia, and the United States (US) have all found that families that experience one dimension of economic hardship do not necessarily also experience all or any of the other dimensions (Bradshaw & Finch, 2003; Gauthier & Furstenberg, 2010; Marks, 2007). A nationally representative survey of households in the UK found that, while families who experience one dimension of economic hardship are more likely to also experience a second dimension, most families only experience one dimension of economic hardship at a time (Bradshaw & Finch, 2003). Similarly, a nationally representative survey in Australia found that the three dimensions of economic hardship were only weakly correlated (Marks, 2007). Although no studies in the US have been able to compare all three dimensions of economic hardship at once, several

studies have shown low to moderate correlations between income poverty and material deprivation (Boushey & Gundersen, 2001; Gershoff, Aber, Raver, & Lennon, 2007; Iceland & Bauman, 2007). Similarly, subjective financial stress is also only weakly correlated with income poverty in the US, with many families above the income poverty threshold experiencing subjective financial stress (Gauthier & Furstenberg, 2010; Leininger & Kalil, 2014). These findings suggest that there are multiple manifestations of economic hardship based on the possible combinations of the three dimensions of economic hardship (Bradshaw & Finch, 2003). It remains unclear how these different manifestations of economic hardship differ, especially vis-à-vis their impacts on children.

There are a number of possible reasons for why families might experience only one dimension of economic hardship, but not other dimensions. Families with incomes above the poverty threshold might experience material deprivation or subjective financial stress or both because of regional differences in costs of living, transitions into or out of employment, high levels of debt and assets, perceptions of low job security, the need to support dependent family members, a lack of social support, or unforeseen expenses (Bradshaw & Finch, 2003). For example, though a job loss significantly increases a family's odds of experiencing income poverty and financial stress, several studies have found that a job loss does not necessarily lead to material deprivation (Eamon & Wu, 2011; McKernan, Ratcliffe, & Vinopal, 2009; Sullivan, Turner, & Danziger, 2008). In particular, families with significant assets do not experience material

deprivation despite significant decreases in income (McKernan et al., 2009). An example of unforeseen expenses that differentially affect income poverty, material deprivation, and subjective financial stress are expenses associated with a serious health problem, such as cancer. Several studies have found that, for families of any income level, the need to afford cancer treatment can introduce high levels of subjective financial stress and, in some cases, can lead families to forego paying for basic needs, such as housing or food, in an effort to afford treatment (Bona, London, Guo, Frank, & Wolfe, 2016; Markman & Luce, 2010; Sharp, Carsin, & Timmons, 2013; Yabroff et al., 2016).

### **1.2.1 Theoretical Framework**

Two theoretical frameworks are commonly used to explain how economic hardship affects children. The Family Investment Model (FIM) suggests that economic hardship influences children by causing parents to invest fewer material, social, and time resources in children's development (Conger & Donnellan, 2007). The Family Stress Model (FSM), on the other hand, suggests that economic hardship influences children by undermining parents' capacity to parent in responsive ways (Conger & Donnellan, 2007; Elder, 1998). The FIM is commonly interpreted to define economic hardship by the income poverty dimension alone. The FSM, on the other hand, explicitly accounts for material deprivation and subjective financial stress, but most interpretations of this model treat material deprivation and subjective financial stress as mediators in the relationship between income poverty and children's outcomes. That is, this interpretation of the FSM assumes that material deprivation and subjective financial

stressed are caused by income poverty and this framework does not allow for these dimensions to vary independently of income poverty. Thus, neither of these theoretical models, as commonly interpreted, reflects the evidence that there are three independent dimensions of economic hardship, nor that there may be many possible manifestations of economic hardship based on the combinations of these dimensions.

### **1.2.2 Prior Empirical Research**

As is the case with the theoretical literature, the extant empirical literature on the effects of economic hardship on children has not yet fully incorporated the distinction between the three independent dimensions of economic hardship. Most prior studies on the effects of economic hardship on children have not accounted for material deprivation or subjective financial stress at all (e.g., Akee, Copeland, Keeler, Angold, & Costello, 2010; Brooks-Gunn & Duncan, 1997; Dahl & Lochner, 2012; Dearing et al., 2006; Duncan, Morris, & Rodrigues, 2011; Duncan, Ziol-Guest, & Kalil, 2010; Hackman & Farah, 2009). Studies grounded in the FSM, on the other hand, have included material deprivation and subjective financial stress, but only as mediating variables caused by income poverty (e.g., Conger & Conger, 2002; Conger et al., 1992; McLoyd, 1990; Mistry, Lowe, Benner, & Chien, 2008).

Responding to this gap in the literature, a small but growing number of studies has examined whether material deprivation and subjective financial stress influence children independently of income. Most of these studies have concentrated on material deprivation. The findings show that material deprivation is associated with worse

children's behavior problems, social-emotional competence, and physical health, holding income constant (Gershoff et al., 2007; Lee & Lee, 2016; Zilanawala & Pilkauskas, 2012). Material deprivation is also associated with several risk factors for children's mental health problems, including maternal mental health problems, higher levels of parental stress, and less sensitive parenting behavior, again holding income constant (Gershoff et al., 2007; Heflin & Iceland, 2009; Lee & Lee, 2016; Newland, Crnic, Cox, Mills-Koonce, & Family Life Project Key Investigators, 2013). Moreover, the effects of income poverty and material deprivation may operate through different pathways (Gershoff et al., 2007). Income poverty appeared to impact children through changes in parents' investments of resources in their children's development, as proposed by the FIM. Material deprivation, on the other hand, was associated with changes in parental stress and parenting behaviors, as proposed by the FSM. Moreover, income poverty was primarily associated with children's cognitive development, while material deprivation was primarily associated with children's mental health (Gershoff et al., 2007).

To our knowledge, only two studies have investigated the independent effects of subjective financial stress on children. These studies found that, even in the absence of income poverty, parents' subjective financial stress is significantly associated with higher levels of children's internalizing and externalizing behavior problems (Leininger & Kalil, 2014; Ponnet, 2014). The influence of parents' subjective financial stress on children may be both direct and indirect, depending on families' other economic circumstances. Both studies found that there was a direct influence of parents' subjective

financial stress on children (Leininger & Kalil, 2014; Ponnet, 2014), but, for children in middle- and high-income families, the association appeared to be primarily mediated through parental depression, parents' stress, and parental conflict (Ponnet, 2014).

This growing body of literature underscores the probability that the three dimensions of economic hardship – income poverty, material deprivation, and subjective financial stress – are not only independent of each other but can also influence children in unique ways. In other words, it is possible that children in families who experience income poverty but not material deprivation or subjective financial stress may be affected very differently than children who experience material deprivation and subjective financial stress but not income poverty. These differences may be at least partly because the different dimensions of economic hardship influence children through different pathways and, potentially, also influence different domains of children's well-being. While the extant empirical literature provides some insight into these differential effects, no studies have yet investigated the possible independent and combined effects of all three dimensions of economic hardship on children.

### **1.2.3 Diverse Manifestations of Economic Hardship in Childhood**

In this study, we build on this prior literature by examining the seven possible manifestations of economic hardship in childhood and identifying whether these different manifestations of economic hardship are differentially associated with children's mental health, as measured by children's behavior problems. Our analysis focuses on children in early to middle childhood, when children are most vulnerable to

the effects of economic hardship (Guo, 1998; Wagmiller, 2015). We focus specifically on children's behavior problems, because these are not only predictive of diagnosable mental health disorders in childhood (Goodman, Ford, Simmons, Gatward, & Meltzer, 2000), but are also predictive of poor academic achievement (Sayal, Washbrook, & Propper, 2015), as well as mental health problems and criminal activity in adulthood (Althoff, Verhulst, Rettew, Hudziak, & van der Ende, 2010; Babinski, Hartsough, & Lambert, 1999). Thus, childhood mental health is a meaningful risk factor for short- and long-term disadvantage.

### ***1.3 Data***

#### **1.3.1 Data and Analytic Sample**

This study used data from the Millennium Cohort Study (MCS), a longitudinal, nationally representative cohort study of children living in the UK. Unlike most nationally representative longitudinal studies, the MCS includes measures of all three dimensions of economic hardship, as well as information on children's mental health. The sample was drawn from Child Benefit record and the sampling frame was children who were born between September 1, 2000, and August 31, 2001 in England and Wales, and between November 22, 2000 and January 11, 2002 in Scotland and Northern Ireland (Plewis, Calderwood, Hawkes, Hughes, & Joshi, 2007). Disadvantaged and minority families were oversampled by stratifying by UK country and by the ethnic minority status and Child Poverty Index of the local electoral wards. The initial sample of MCS included 18,818 focal children from 18,552 families. An additional 699 children from 692

families were added at wave 2. The total sample size is 19,517 children from 19,244 families.

This study used data from the second, third, and fourth waves of the MCS when children were 3, 5, and 7 years old respectively. We restricted the analytic sample to only families with singleton focal children, excluding families with twins or triplets. Because several of the measures are subjective, the analysis sample was further restricted to exclude families in which the main respondent was the same throughout the study period in order to ensure that the subjective reporter is the same at all waves. Because of this restriction, all respondents in the analytic sample were mothers. Thus, the final analysis sample includes 17,541 focal children and their mothers.

### **1.3.2 Measures**

**Income poverty.** Families' net household income was measured using 19 income bands at each wave. Bands of different sizes were used for two-parent and single-parent families and the bands were updated over time to reflect changes in the economy and parents' age. Imputation using interval regression was conducted by the MCS to address item non-response (Hansen, 2014). Predictor variables for the imputation included age, ethnicity, education, labor status, public benefit receipt, and household composition. To compare income across families, each families' net income was set relative to that of a couple with no children using the modified OECD equivalence scale (Hansen, 2014). This adjustment addresses the fact that a family of four faces a tighter budget than a family of two with the same income. Adjusted income, therefore, reflects a family's

relative purchasing power. We used the Consumer Price Index (CPI) to adjust for inflation, setting all income equivalent to £2008. We then constructed a dichotomous indicator for relative income poverty by which families with an income below 60% of the median were considered income poor. This is the standard poverty measure in the UK.

**Material deprivation.** Material deprivation was measured using four items available at each wave that capture two types of material deprivation: (1) the inability to afford basic needs and (2) housing deprivation. To measure families' inability to afford basic needs, mothers were asked whether they were *behind on their utility bill payments* (i.e. electricity, gas, other fuel, or water bills). Mothers were also asked whether they were *unable to afford a warm, waterproof coat* for the focal child. To measure housing deprivation, mothers were asked to what degree *damp or condensation* on the walls of their home was a problem in rooms other than the kitchen and bathroom (1 = *no damp*; 2 = *not much of a problem*; 3 = *some problems*; 4 = *great problem*). We dichotomized this question, coding the responses "*some problems*" and "*great problem*" to indicate problems with damp. A second measure of housing deprivation was *crowded housing*, a dichotomous indicator based on the standard threshold of more than 1 person per room (Blake, Kellerson, & Simic, 2007). Using information from these four items, we then constructed a dichotomous indicator that was equal to 1 if a family reported at least one of these four material deprivation experiences.

**Subjective financial stress.** Mothers were asked to rate how well the household was managing financially (1 = *living comfortably*; 2 = *doing alright*; 3 = *just about getting by*; 4 = *finding it quite difficult*; 5 = *finding it very difficult*). This question captures the mothers' subjective perception of her financial circumstances and is comparable to questions used in other studies that have measured financial stress in the UK, the EU, and the US (Gauthier & Furstenberg, 2010; Leininger & Kalil, 2014; Shaw, Benzeval, & Popham, 2014). Using this information, we created a dichotomous indicator, defining subjective financial stress as "*just about getting by*," "*finding it quite difficult*," and "*finding it very difficult*."

**Combinations of economic hardship.** Using information about income poverty, material deprivation, and subjective financial stress, we constructed eight mutually exclusive indicator variables that represent the possible combinations of these three dimensions. Specifically, the eight indicator variables are: (1) income poverty only; (2) material deprivation only; (3) subjective financial stress only; (4) income poverty and material deprivation; (5) income poverty and subjective financial stress; (6) material deprivation and subjective financial stress; (7) all three dimensions of economic hardship; and (8) no economic hardship.

**Child behavior problems.** The 25-item Strengths and Difficulties Questionnaire (SDQ) was used to measure children's behavior problems at each wave (Goodman, 1997). To compute a score for *internalizing behavior problems*, we summed parents' responses to each item in the emotional symptoms subscale (5 items) and in the peer

relationship problems subscale (5 items). We computed scores for *externalizing behavior problems* by summing across parents' responses to each item in the conduct problems subscale (5 items) and in the hyperactivity/inattention subscale (5 items).

**Covariates.** All models include a set of stable and time-varying control variables that capture household, parent, and child characteristics. Household characteristics include the number of children in the household, total household size, and whether a grandparent lives in the household, all of which are time-varying. Stable parent characteristics include mothers' age at birth, mother's ethnicity (white, black/black British, Pakistani/Bangladeshi, Indian, Asian or other, or mixed), and whether any parent or caregiver is an immigrant. Time-varying parent characteristics include marital status (married/cohabiting or single/widowed/divorced), mothers' education (UK National Vocational Qualification levels 0-5), whether at least one parent or caregiver is gainfully employed or self-employed, and mothers' serious psychological distress. Mothers' psychological distress was measured using the Kessler K6 six-item psychological distress scale used to screen for moderate mental health issues (Prochaska, Sung, Max, Shi, & Ong, 2012). We summed across responses to compute a total depression score (scores range from 0 to 24) and used the standard cut-off of 13 or higher to identify serious psychological distress. Finally, child characteristics include the focal child's sex, which is stable, and age in months, which is time-varying.

Table 1.1 shows weighted descriptive characteristics of the sample.

Approximately 91% of the mothers in the sample were white and 9% of children in the

sample had at least one immigrant parent. At any given wave, 65% of mothers were married or cohabiting and approximately 56% of mothers had completed at least two A levels (NVQ Level 3 or higher), the equivalent of a U.S. high school diploma. The vast majority of families had at least one parent who is employed at any given wave. Approximately 26% of mothers at any given wave reported serious psychological distress. On average, children's internalizing and externalizing behavior problems were relatively rare.

### **1.3.3 Attrition, Missing Data, and Multiple Imputation**

The initial sample at the first wave consisted of 18,552 families and 13,857 families remained in the sample at wave 4 (Mostafa, 2015). Mothers that attrited at or before wave 4 were, on average, more disadvantaged, younger, and hold jobs that require longer working hours. To address the potential bias introduced by this systematic attrition, all models use inverse probability weights constructed by the MCS combined with MCS sampling weights.

In addition to systematic sample attrition, item non-response is also a concern. Approximately 37.8% of survey responses were missing data for some items. Of the surveys with any missing data, most (86.4%) surveys were missing responses to only one item used in these analyses. At most, a survey was missing responses to five items used in these analyses. Although which item was missing varied across respondents, the most commonly missing items were whether any parent or caregiver was working (29.7% missing) and mothers' education (22.3% missing). We cannot assume that the

data are missing completely at random. Therefore, and in order to use the complete sample of participating respondents at each wave for analyses, we employed multiple imputation to replace missing data with a probable value based on other available information from the dataset. Specifically, we computed 50 multivariate imputations using Stata version 13.1. To appropriately account for the longitudinal structure of the data and the resulting autocorrelation in mothers' responses over time, the imputation was done with the data structured wide (Young & Johnson, 2015). The imputation model included all available information for the outcome, predictor, and control variables used in the analytical models. Imputed values for the outcome variables were dropped after the imputation and not used in the analyses. All analyses take the multiple imputation into account in the calculation of standard errors.

#### ***1.4 Analytical Approach***

We used linear mixed-effects and fixed-effects modeling approaches to estimate the association between each of the seven possible manifestations of economic hardship and children's behavior problems. We started with a mixed-effects model that combines a family-level random intercept with select fixed-effect indicator variables. We then built on this approach with a model that includes a family fixed-effect in place of the random intercept. Because mixed-effects models are more precise and fixed-effects models better address omitted variable bias, this approach allows us to leverage the complementary strengths of both models (Bell & Jones, 2015; Dieleman & Templin, 2014).

Our mixed-effects model is:

$$Y_{ict} = \beta_{0i} + Pov_{ict} + MD_{ict} + Stress_{ict} + PovMD_{ict} + PovStress_{ict} + MDStress_{ict} \\ + All_{ict} + X_{ict} + \theta_t + \theta_c + \varepsilon_{ict}$$

$$\beta_{0i} = \beta_0 + \varepsilon_{0t} ,$$

where  $Y_{ict}$  is children's internalizing or externalizing behavior problems in family  $i$  in country  $c$  in wave  $t$ ;  $Pov_{ict}$  is a measure of whether family  $i$  in country  $c$  is income poor but not materially deprived or financially stressed in wave  $t$ ;  $MD_{ict}$  measures whether family  $i$  in country  $c$  is materially deprived but not income poor or financially stressed in wave  $t$ ;  $Stress_{ict}$  measures whether family  $i$  in country  $c$  is financially stressed but not income poor or materially deprived in wave  $t$ ;  $PovMD_{ict}$  measures whether family  $i$  in country  $c$  is both income poor and materially deprived but not financially stressed in wave  $t$ ;  $PovStress_{ict}$  measures whether family  $i$  in country  $c$  is both income poor and financially stressed but not materially deprived in wave  $t$ ;  $MDStress_{ict}$  measures whether family  $i$  in country  $c$  is both materially deprived and financially stressed but not income poor in wave  $t$ ;  $All_{ict}$  measures whether family  $i$  in country  $c$  is income poor, materially deprived, and financially stressed in wave  $t$ ; and  $X_{ict}$  reflects all household-, parent-, and child-level covariates. The mixed-effects model also includes indicators for the survey wave ( $\theta_t$ ) to capture any UK-wide changes that may affect economic hardship and children's behavior problems in a given year, as well as indicators for the country ( $\theta_c$ ) to capture any permanent differences between the countries of the UK. Finally, the mixed-

effects model includes a random family intercept ( $\beta_{0i}$ ) to account for the correlation between mothers' responses over time and heteroscedasticity-robust standard errors.

Our fixed-effects model is:

$$Y_{ict} = \beta_0 + Pov_{ict} + MD_{ict} + Stress_{ict} + PovMD_{ict} + PovStress_{ict} + MDStress_{ict} \\ + All_{ict} + X_{ict} + \theta_t + \theta_c + \theta_i + \varepsilon_{ict} ,$$

where  $\theta_i$  is a family indicator variable that captures any stable differences between families that may affect economic hardship and children's behavior problems in a given year. Heteroscedasticity-robust standard errors are clustered at the family-level to adjust for the correlation between mothers' responses over time. All models were weighted using sampling and inverse probability weights constructed by the MCS. Unweighted models provide very similar results.

Both of these the modeling approaches estimate the associations between each of the seven manifestations of economic hardship and children's behavior problems in a given country and year that are not explained by observed demographic characteristics, changes in household composition or parents' marital status, changes in mothers' education of parents' labor status, or changes in mothers' mental health. Additionally, the fixed-effects modeling approach is also able to control for any unobserved stable differences between families. A further difference between the mixed- and fixed-effects models lies in the source of variation each model draws on to estimate the parameters (Dieleman & Templin, 2014). The mixed-effects model uses both between-family and within-family variation in the predictor variables to estimate the association between

economic hardship and children's behavior problems; the fixed-effects model uses only within-family variation in the predictor variables. In the MCS data, most of the variation in the three dimensions of economic hardship and, thus, in their combinations, is between families, rather than within families. The intra-class correlations comparing variation between and within families for income poverty, material deprivation, and subjective financial stress range between 0.37 and 0.59. That is, families do not change very frequently with respect to their experience of economic hardship. Therefore, the estimated coefficients of the mixed-effects models may, in large part, reflect the association between consistently experiencing a specific manifestation of economic hardship and children's behavior problems. To the extent that families do change in their experience of economic hardship, the fixed-effects coefficients reflect the association between each manifestation of economic hardship and children's behavior problems relative to when that family experiences no economic hardship.

To identify whether some manifestations of economic hardship were more strongly associated with children's behavior problems than others, we performed Wald tests to test the equality of the seven coefficients within each model. Specifically, following each model, we conducted 21 tests, comparing each of the seven economic hardship coefficients against each other coefficient. To reduce the possibility of Type 1 error due to multiple tests, we employed a Bonferroni correction.

## ***1.5 Findings***

### **1.5.1 Descriptive Results**

Table 1.1 shows the weighted prevalence of each dimension of economic hardship in the analytic sample. At any given wave, 24.4% of the families are income poor, 14.4% of families are materially deprived (i.e. experience difficulty paying for basic needs or housing deprivation), and 36.1% of mothers report subjective financial stress. In any given wave, approximately half of the families in the sample did not experience any dimension of economic hardship. The weighted correlations of each of the economic hardship dimensions are presented in Table 1.2. The correlations between each of the three dimensions of economic hardship are relatively low, ranging between 0.25 and 0.34, but all are statistically significant.

Figure 1.1 shows the share of families in a given wave who experience each of the seven manifestations of economic hardship. At any given wave, of the families who are experiencing some kind of economic hardship, only approximately half experienced income poverty alone or in combination with another dimension of economic hardship. Specifically, 51.0% of those experiencing some type of economic hardship experienced economic hardship without income poverty and 49.0% of the sample experienced economic hardship with income poverty. Among families that experienced economic hardship without income poverty, subjective financial stress without income poverty or material deprivation was most common. In any given wave, 8.5% of families were materially deprived without being income poor or financially stressed; 34.5% of families

were financially stressed, but neither income poor or materially deprived; and 8.0% of families were materially deprived and financially stressed, but not income poor. Among families that experienced economic hardship with income poverty, income poverty and material deprivation without subjective financial stress was least common. Specifically, in any given wave, 13.0% of families were income poor without being materially deprived or financially stressed; 5.7% of families were income poor and materially deprived, but not financially stressed; 15.8% of families were income poor and financially stressed, but not materially deprived; and 14.5% of families experienced all three dimensions of economic hardship at the same time.

Table 1.3 shows weighted descriptive characteristics of the sample by each of the seven manifestations of economic hardship. Relative to families who experienced no economic hardship, families who experienced any manifestation of economic hardship were more disadvantaged. Families who experienced economic hardship were younger, less likely to be white, less likely to be married or cohabiting, less educated, and had higher levels of psychological distress compared to families with no economic hardship. There were also notable differences between families who experienced economic hardship with and without income poverty. On average, families who experienced economic hardship without income poverty were older, more educated, and more likely to be married or cohabiting relative to families who experienced economic hardship with income poverty. Families who experienced economic hardship without income poverty were also more likely to have at least one parent employed than families who

experienced economic hardship with income poverty. All differences were significant at the  $p < 0.001$  level using a Bonferroni correction for multiple tests.

### **1.5.2 Mixed-Effects Regression Results**

Table 1.4 presents the relationship between the seven manifestations of economic hardship and children's behavior problems as estimated using mixed-effects linear regression. There is a statistically significant association between each manifestation of economic hardship and both types of children's behavior problems. Column 1 shows the results for internalizing behavior problems. Relative to children in families with no economic hardship, children in families that were only income poor, but not materially deprived or financially stressed, had a 0.09 *SD* higher level of internalizing behavior problems ( $p < 0.001$ ). Children in families that were only materially deprived, but neither income poor or financially stressed, had a 0.11 *SD* higher level of internalizing behavior problems ( $p < 0.001$ ). Children in families that were only financially stressed, but neither income poor or materially deprived, had a 0.10 *SD* higher level of internalizing behavior problems ( $p < 0.001$ ). Compared to children in families with no economic hardship, children in families that were both income poor and materially deprived had a 0.12 *SD* higher level of internalizing behavior problems ( $p < 0.001$ ). Children in families that were income poor and financially stressed had a 0.12 *SD* higher level of internalizing behavior problems ( $p < 0.001$ ). Children in families that were materially deprived and financially stressed had a 0.24 *SD* higher level of internalizing behavior problems ( $p < 0.001$ ). Finally, relative to children in families with no economic hardship, children in families

that experienced all three dimensions of economic hardship had a 0.24 *SD* higher level of internalizing behavior problems ( $p < 0.001$ ). Comparing across the coefficients, we find that children in families who were materially deprived and financially stressed but not income poor and children in families who experienced all three dimensions of economic hardship had significantly higher levels of internalizing behavior problems than children in families with any other manifestation of economic hardship ( $p < 0.01$ ).

The results for externalizing behavior problems are very similar (Column 2). Relative to children in families with no economic hardship, children in families that were only income poor had a 0.06 *SD* higher level of externalizing behavior problems ( $p < 0.01$ ). Children in families that were only materially deprived had a 0.12 *SD* higher level of externalizing behavior problems ( $p < 0.001$ ). Children in families that were only financially stressed had a 0.10 *SD* higher level of externalizing behavior problems ( $p < 0.001$ ). Relative to children in families with no economic hardship, children in families that were both income poor and materially deprived had a 0.14 *SD* higher level of externalizing behavior problems ( $p < 0.001$ ). Children in families that were income poor and financially stressed had a 0.09 *SD* higher level of externalizing behavior problems ( $p < 0.001$ ). Children in families that were materially deprived and financially stressed had a 0.22 *SD* higher level of externalizing behavior problems ( $p < 0.001$ ). Finally, children in families that experienced all three dimensions of economic hardship had a 0.17 *SD* higher level of externalizing behavior problems ( $p < 0.001$ ). Again, children in families who were materially deprived and financially stressed but not income poor and children

in families who experienced all three dimensions of economic hardship had significantly higher levels of externalizing behavior problems than children in families with any other manifestation of economic hardship ( $p < 0.05$ ).

### 1.5.3 Fixed-Effects Regression Results

Table 1.5 presents the relationship between the seven manifestations of economic hardship and children's behavior problems as estimated using fixed-effects linear regression. Column 1 shows that, relative to when a family experienced no economic hardship, there was a statistically significant association between only two manifestations of economic hardship and children's internalizing behavior problems. Relative to when their families had no economic hardship, children had a 0.09 *SD* higher level of internalizing behavior problems when their families were materially deprived and financially stressed, but not income poor ( $p < 0.01$ ). Children also had a 0.07 *SD* higher level of internalizing behavior problems when their families experienced all three dimensions of economic hardship at once ( $p < 0.05$ ). Moreover, children's internalizing behavior problems were significantly higher when their families were materially deprived and financially stressed but not income poor and when their families experienced all three dimensions of economic hardship at once than when their families experienced any other manifestation of economic hardship ( $p < 0.01$ ). The other five manifestations of economic hardship were not significantly associated with children's internalizing behavior problems.

Column 2 of Table 1.5 shows that, relative to when a family experienced no economic hardship, children had a 0.06 *SD* higher level of externalizing behavior problems when their families were materially deprived but neither financially stressed or income poor, ( $p < 0.05$ ). Children also had a 0.07 *SD* higher level of internalizing behavior problems when their families were materially deprived and financially stressed but not income poor ( $p < 0.05$ ). However, children's externalizing behavior problems were not significantly different when they experienced these two manifestations of economic hardship than when their families experienced any other manifestation of economic hardship. The other five manifestations of economic hardship were not significantly associated with children's externalizing behavior problems.

#### **1.5.4 Robustness Checks**

We also conduct several robustness checks (all results available from authors upon request). To address potential concerns that the findings represent spurious correlations between the manifestations of economic hardship and children's behavior problems, we estimate both the mixed-and fixed-effects models with the inclusion of children's behavior problems at the prior wave as a predictor. Including a lagged dependent variable as a predictor addresses potential selection bias associated with the possibility that children's behavior problems at an earlier time point systematically predict both children's later outcomes and the family's later economic hardship. Including the lagged dependent variable does not substantially change the results. However, our preferred specifications do not include the lagged dependent variable

because this can lead to bias that suppresses the coefficients of other independent variables in multi-level models (Allison, 2015).

To ensure that our chosen definitions of material deprivation and subjective financial stress do not significantly bias the findings, we also estimate the models using alternative definitions for our predictor variables. Specifically, we construct an alternative specification of material deprivation, using a cut-point of at least two or more deprivations, instead of one or more. We also construct an alternative definition of subjective financial stress, using a cut-point of *“finding it quite difficult”* rather than *“just about getting by.”* Very few families experienced material deprivation or financial stress based on these alternative definitions. We then re-estimate our mixed- and fixed-effects models using new manifestation of economic hardship indicator variables based on these two alternative definitions. We find that, while the explanatory power of the predictor variables is notably reduced, the overall patterns are substantially similar to those using our preferred variable definitions.

Finally, because the fixed-effects regression models exclude families with no variation in the independent variables, it is possible that the sample in the fixed-effects regression models differs in important ways from the full sample. Thus, to check that the fixed-effects regression results do not reflect a selection bias, we repeat all mixed-effects analyses with only parents in the fixed-effects sample. These mixed-effects regression results do not differ substantially from the mixed-effects regression results using the full sample, suggesting that the fixed-effects regression results do not reflect a selection bias.

The findings are also robust to other analytic sample specifications, such as the inclusion of families in which the respondents change and the exclusion of non-white families.

## ***1.6 Discussion***

In this study, we bridge two largely disparate strands of research by bringing what is known about the multiple, independent dimensions of economic hardship to research on the effects of economic hardship on children. To our knowledge, no prior study has yet documented the multiple manifestations of economic hardship, based on the different possible combinations of income poverty, material deprivation, and subjective financial stress, among families with children. In fact, the majority of the theoretical and empirical literature on the effects of economic hardship on children has generally treated material deprivation and subjective financial stress as outcomes of income poverty and has not considered that these could also operate independently of income poverty. We address this gap by taking advantage of the Millennium Cohort Study, one of the only longitudinal datasets to include measures of all three dimensions of economic hardship as well as information on children's outcomes, to identify the multiple manifestations of economic hardship experienced by children in the UK and to assess their differential associations with children's mental health.

We find that approximately half of the families in the sample experienced some kind of economic hardship at any given data collection wave. Consistent with prior literature, the correlations among the three dimensions of economic hardship are statistically significant, but relatively weak, which suggests that these dimensions are

related but can operate independently. That is, families who experience one dimension of economic hardship may not also experience either of the other two dimensions. For example, a family who is income poor may nevertheless be able to meet its material needs and feel financially secure. We construct seven distinct manifestations of economic hardship based on the possible combinations of each dimension. Half of the families who experienced economic hardship were not income poor, but nevertheless experienced material deprivation, subjective financial stress, or both. While these families who experienced economic hardship without being income poor were, on average, more advantaged than families who were income poor, they were, nevertheless, less advantaged than families who experienced no economic hardship.

That such a large share of the families experienced economic hardship even in the absence of income poverty suggests that research focused on income poverty alone does not capture all families who are experiencing economic hardship. Therefore, we argue that it is necessary to consider material deprivation and subjective financial stress as independent dimensions of economic hardship rather than simply the outcomes of income poverty. Several prior studies have found that both material deprivation and subjective financial stress negatively impact children even in the absence of income poverty (Gershoff et al., 2007; Lee & Lee, 2016; Leininger & Kalil, 2014; Ponnet, 2014; Zilanawala & Pilkauskas, 2012). Moreover, prior research suggest that income poverty, material deprivation, and subjective financial stress may each affect children through different pathways and, possibly, affect different domains of children's well-being

(Gershoff et al., 2007; Leininger & Kalil, 2014; Ponnet, 2014). Consistent with this prior literature, we find that the seven manifestations of economic hardship that we construct are associated with children's mental health to different degrees.

Using mixed-effects regression models, we find that children in families with any kind of economic hardship experience have significantly higher levels of internalizing and externalizing behavior problems than children in families with no economic hardship. That children in families who experienced material deprivation or financial stress despite not being income poor had higher levels of behavior problems than children in families with no economic hardship is consistent with prior studies that found effects of material deprivation and subjective financial stress holding income constant. The effect sizes, which ranged from 0.06 *SD* and 0.25 *SD*, depending on the specific manifestation of economic hardship and the type of behavior problems, are relatively consistent with prior research on the effects of income poverty on children's mental health (Costello et al., 2003; Kaiser et al., 2017; McLeod & Shanahan, 1993). While we find that all manifestations of economic hardship were associated with higher levels of children's behavior problems, two manifestations were more strongly associated with behavior problems than others. Specifically, the combination of material deprivation and subjective financial stress and the combination of all three dimensions of economic hardship were associated with the highest levels of behavior problems. That one of the two combinations of economic hardship dimensions most strongly associated with children's behavior problems does not include income poverty provides further

indication that income poverty is a necessary, but not sufficient measure of economic hardship. Moreover, these significant differences between the different manifestations of economic hardship is consistent with our expectation that not all manifestations of economic hardship affect children the same way, underscoring the need to differentiate between these experiences in future research.

The findings from the fixed-effects regression models differ from the mixed-effects regression. Using our fixed-effects specification, we find that only the combination of material deprivation and subjective financial stress and the combination of all three dimension of economic hardship were associated with higher levels of internalizing behavior problems relative to no economic hardship and relative to any other experience of economic hardship. However, only the combination of material deprivation and subjective financial stress was associated with higher levels of externalizing behavior problems.

We offer two possible, complementary interpretations of the differences between findings from the mixed- and fixed-effects regression models. First, while the mixed-effects regression models use both within- and between-family variation in the predictor variables to estimate the association between economic hardship and children's behavior problems, the fixed-effects regression models use only within-family variation. Because between a third and more than half of the variance in economic hardship is between families, our mixed-effects regression models may largely reflect the associations between stable or chronic experiences of specific manifestations of economic hardship

and children's behavior problems. The fixed-effects models, on the other hand, are more likely to reflect the association between each manifestation of economic hardship and children's behavior problems when the family experiences a change in its economic circumstances. By this interpretation, the findings suggest that chronic exposure to any of the manifestations of economic hardship is associated with children's behavior problems, but short-term exposure to only some manifestations of economic hardship is associated with children's behavior problems. In particular, it is those manifestations that are most strongly linked to children's behavior problems in the mixed-effects models (i.e. under chronic exposure) that are also robust to the fixed-effects specification (i.e. shorter-term exposure). We interpret this to suggest that the combination of material deprivation and subjective financial stress without income poverty and the combination of all three dimensions of economic hardship are the two most severe manifestations of economic hardship vis-à-vis their influence on children. Further research is necessary to assess the differential effects between chronic and short-term exposure to all of the manifestations of economic hardship.

Second, the fixed-effects specification controls for potential omitted variable bias due to stable differences between families not addressed by the mixed-effects specification presents. Thus, the mixed-effects results may reflect, to some degree, spurious correlations, that the family fixed effect accounts for in the fixed-effects specification. However, even under the fixed-effects specification, the combination of material deprivation and subjective financial stress without income poverty and, in the

case of internalizing behavior problems, the combination of all three dimensions of economic hardship are associated with children's behavior problems. That only these associations are robust to the inclusion of the family fixed effect could suggest that not all manifestations of economic hardship influence children in the same way. Yet, it is also possible that the fixed-effects specification reduces statistical power enough to make it challenging to detect significant associations. Nevertheless, the fixed-effects results also support our hypothesis that income poverty is not necessary for children to be affected by material deprivation and subjective financial stress.

The primary goal of this article was to provide descriptive evidence of these multiple manifestations of economic hardship and to offer initial insight into whether these different manifestations of economic hardship influence children differently. Although our findings underscore the importance of expanding our theoretical and empirical conceptualization of economic hardship to consider these multiple possible manifestations, our analyses cannot provide causal estimates of the relationships between the various manifestations of economic hardship and children's mental health. We can rule out the possibility that the associations we find are driven by changes in employment, education, the household composition, or mothers' psychological distress, as well as changes at the national level that could affect both economic hardship and children's mental health. Nor are the associations explained by stable observed demographic differences between families or, in the case of the fixed-effects specification, other unobserved stable differences between families. However, none of

our models are able to address unobserved time-varying factors that may confound the relationship between economic hardship and children's mental health. For example, an increase in the severity of parents' substance use problems could lead to both increased economic hardship and increased children's mental health problems. Similarly, a traumatic experience or health diagnosis could lead to some manifestations of economic hardship as well as children's mental health problems. Further research will be necessary to identify whether each of these associations between the multiple manifestations of economic hardship and children's mental health is causal.

Another limitation of this study lies in our measurement of the three dimensions of economic hardship. First, we use a relative measure of income poverty (i.e. 60% below the median income). While this is the standard UK poverty measure, income poverty defined by this relative standard cannot be generalized to other contexts. In fact, because this poverty threshold was constructed using data on incomes from the full MCS sample, it measures poverty only relative to families with children between ages 3 and 7. Second, because of data availability, we were able to measure only two types of material deprivation (i.e. the inability to afford basic needs and housing deprivation) and our measures likely only capture aspects of these deprivations. Unfortunately, the MCS data do not longitudinally capture other types of material deprivation, such as food insecurity or medical hardship. A third measurement-related limitation of this study is our use of dichotomous indicators for income poverty, material deprivation, and subjective financial stress. While the choice to dichotomize these variables allowed us to

construct discreet categories for each of the seven possible manifestations of economic hardship, dichotomizing the variables loses a lot of information and reduces statistical power to detect associations (Altman & Royston, 2006). For these reasons, we cannot conclude that our findings are generalizable. Because it is possible that different measures could lead to different findings, additional research using alternative measurement approaches is necessary.

This study also raises additional questions for future research. It was beyond the scope of this study to identify the mediating mechanisms that explain the associations between each of the manifestations of economic hardship and children's mental health. Findings from prior research suggest that the three dimensions of economic hardship may operate through different mechanisms (Gershoff et al., 2007; Leininger & Kalil, 2014; Ponnet, 2014). Therefore, it is probable that each of the possible manifestations is linked to children through different pathways. Research to identify these different mechanisms may provide insight into why some manifestations of economic hardship are more strongly associated with children's mental health. Lacking adequate data, we were also unable to identify whether the different manifestations of economic hardship were associated with children's cognitive outcomes in addition to mental health outcomes. Prior research suggests that income poverty is more strongly associated with cognitive outcomes, while material deprivation is more strongly associated with mental health outcomes (Gershoff et al., 2007). Given this, we expect that the various manifestations of economic hardship are differentially associated with different domains

of children's well-being. For example, the manifestations of economic hardship that include income poverty may be more strongly associated with cognitive outcomes than what our findings suggest is true for mental health outcomes.

To conclude, this study provides compelling evidence that income poverty is a necessary but insufficient measure of economic hardship. Consistent with prior literature on the distinction between the three independent dimensions of economic hardship, we find that approximately half of the families who experienced economic hardship were not income poor. By focusing only on income poverty, the majority of research on the effects of economic hardship on children has not accounted for the experiences of these families. Based on our finding that all manifestations of economic hardship, including those without income poverty, are associated with higher levels of children's behavior problems, we argue that a broader conceptualization of economic hardship is necessary both in our theoretical and empirical literature. Moreover, it is not sufficient that studies consider each of the three dimensions of economic hardship in isolation. We believe that, in order to develop a comprehensive understanding of the effects of economic hardship on children, it is important to consider the multiple possible combinations of the three dimensions of economic hardship, as each of these may influence children differently. However, for future research to be able to examine these more nuanced manifestations of economic hardship, it is first necessary for more studies to collect information on all three dimensions of economic hardship, particularly longitudinal studies that allow researchers to model dynamic relationships over time.

## 1.7 Tables and Figures

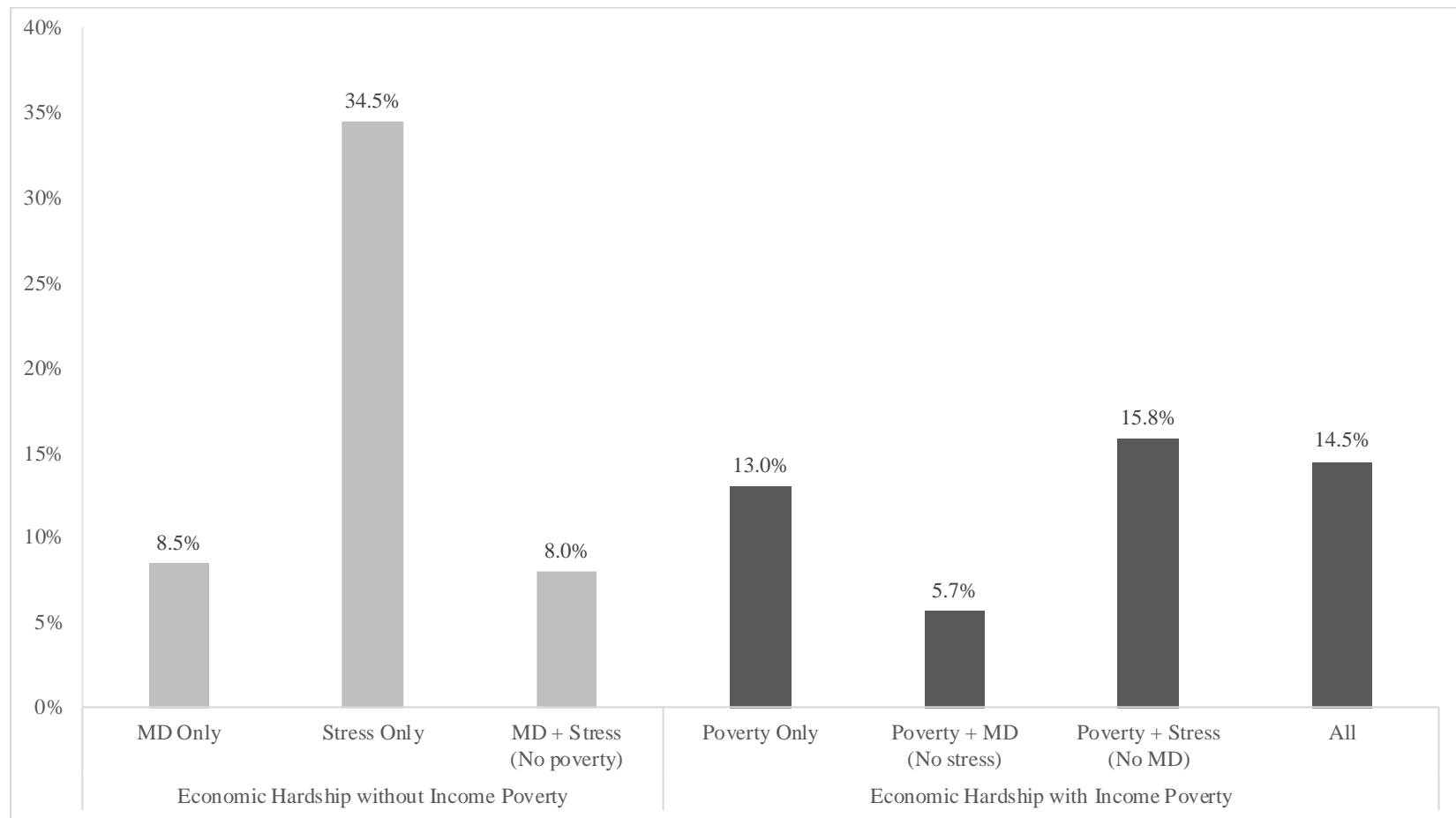
**Table 1.1. Descriptive characteristics (weighted sample)**

	Mean (SD)
Household Characteristics	
# of children	2.3 (1.0)
Live-in grandparent (%)	3.9%
Total HH size	4.2 (1.2)
Parent Characteristics	
Mother age at birth	29.7 (5.8)
Mother ethnicity (%)	86.9%
White	91.1%
Black/Black British	2.2%
Pakistani/Bangladeshi	3.0%
Indian	1.8%
Asian or other	1.1%
Mixed	0.8%
Immigrant parent (%)	9.1%
Married or cohabiting (%)	64.9%
Education (%)	
None	8.8%
NVQ Level 1	7.2%
NVQ Level 2	28.6%
NVQ Level 3	15.4%
NVQ Level 4	34.3%
NVQ Level 5	5.8%
Any parent employed (%)	95.6%
Mother serious psychological distress (%)	26.4%
Focal Child Characteristics	
Male (%)	51.5%
Age	5.1 (1.7)
Internalizing behavior problems (0-20)	2.0 (2.5)
Externalizing behavior problems (0-20)	4.1 (3.9)
Economic Hardship	
No economic hardship	50.3%
Income poverty (%)	24.4%
Material deprivation (%)	14.4%
Subjective financial stress (%)	36.1%
N (Family-Waves)	52,623

**Table 1.2. Correlations of economic hardship dimensions (weighted sample)**

	1. Income poverty	2. Material deprivation	3. Subjective financial stress
1. Income poverty	-		
2. Material deprivation	0.34	-	
3. Subjective financial stress	0.30	0.25	-

*Note:* All correlations are significant at the  $p < 0.001$  level.



*Note:* Poverty = income poverty; MD = material deprivation; Stress = subjective financial stress. ( $N = 52,623$  family-waves).

**Figure 1.1. Prevalence of economic hardship combinations in weighted sample**

**Table 1.3. Descriptive characteristics by combination of economic hardship dimensions (weighted sample)**

	No Economic Hardship	Economic Hardship Without Income Poverty			Economic Hardship With Income Poverty			
		MD Only	Stress only	MD + Stress	Poverty Only	Poverty + MD	Poverty + Stress	All
Household Characteristics								
# of children	2.1 (0.8)	2.7 (1.2)	2.2 (0.8)	2.6 (1.2)	2.3 (1.0)	3.3 (1.6)	2.3 (1.0)	3.0 (1.5)
Live-in grandparent (%)	2.5%	6.9%	2.9%	5.7%	7.7%	9.9%	5.8%	5.1%
Total HH size	4.1 (0.9)	4.9 (1.5)	4.1 (0.9)	4.6 (1.4)	4.1 (1.2)	5.3 (1.9)	3.9 (1.2)	4.7 (1.8)
Parent Characteristics								
Mother age at birth	31.4 (4.9)	29.3 (5.8)	30.9 (5.3)	29.1 (6.1)	27.0	26.5	27.7 (6.3)	26.9 (6.2)
Mother ethnicity (%)								
White	95.0%	86.6%	94.0%	86.7%	85.6%	75.5%	86.2%	80.2%
Black/Black British	0.8%	3.5%	2.4%	6.4%	2.3%	4.4%	3.2%	6.2%
Pakistani/Bangladeshi	0.9%	4.5%	0.8%	2.4%	8.0%	15.0%	5.9%	9.2%
Indian	1.8%	3.0%	1.3%	1.6%	2.4%	1.6%	1.9%	1.0%
Asian or other	0.9%	1.6%	0.8%	2.1%	1.0%	1.8%	1.3%	1.6%
Mixed	50.0%	0.8%	0.7%	0.8%	0.7%	1.6%	1.6%	1.8%
Immigrant parent (%)	7.2%	13.0%	6.7%	10.8%	10.2%	20.1%	9.6%	14.9%
Married or cohabiting (%)	93.9%	89.0%	87.2%	80.2%	58.7%	66.0%	45.4%	51.9%
Education (%)								
None	2.7%	8.8%	4.0%	11.8%	18.0%	36.0%	20.2%	29.5%
NVQ Level 1	4.2%	8.5%	5.6%	9.9%	14.0%	13.6%	13.5%	14.0%
NVQ Level 2	24.7%	30.2%	30.2%	32.8%	34.5%	31.6%	36.3%	35.0%
NVQ Level 3	15.5%	14.3%	17.8%	16.9%	15.8%	9.6%	14.2%	11.6%
NVQ Level 4	44.8%	31.4%	36.8%	24.6%	15.9%	8.7%	14.4%	9.1%
NVQ Level 5	8.1%	6.8%	5.6%	4.1%	1.8%	0.5%	1.6%	0.8%
Any parent employed (%)	99.7%	97.8%	99.1%	97.0%	88.4%	72.1%	82.6%	64.7%
Mother serious psychological distress (%)	2.8%	7.2%	5.3%	10.8%	8.4%	17.0%	13.8%	20.7%
Focal Child Characteristics								
Male (%)	51.2%	52.0%	50.3%	55.1%	51.6%	52.6%	49.4%	49.1%
Age	5.1 (1.7)	5.3 (1.7)	5.2 (1.7)	5.4 (1.7)	4.9 (1.6)	5.0 (1.7)	5.1 (1.6)	5.2 (1.7)
Internalizing behavior problems (0-20)	2.1 (2.2)	2.7 (2.6)	2.6 (2.5)	3.3 (3.1)	2.9 (2.7)	3.2 (2.8)	3.2 (2.9)	3.7 (3.1)
Externalizing behavior problems (0-20)	4.5 (3.3)	5.5 (3.8)	5.3 (3.6)	6.3 (3.9)	6.0 (3.9)	6.2 (4.3)	6.1 (4.1)	6.7 (4.3)

Note: Poverty = income poverty; MD = material deprivation; Stress = subjective financial stress. (N = 52,623 family-waves).

**Table 1.4. Weighted mixed-effects regression results: Economic hardship combinations and children's behavior problems**

	(1) Internalizing behavior	(2) Externalizing behavior
Poverty Only	0.087*** (0.023)	0.060** (0.022)
MD Only	0.107*** (0.027)	0.123*** (0.024)
Stress Only	0.103*** (0.015)	0.097*** (0.014)
Poverty + MD	0.117*** (0.034)	0.140*** (0.033)
Poverty + Stress	0.118*** (0.023)	0.089*** (0.022)
Stress + MD	0.235*** <sup>a</sup> (0.031)	0.215*** <sup>b</sup> (0.027)
All	0.239*** <sup>a</sup> (0.028)	0.174*** <sup>b</sup> (0.026)

*Note:* All models include full set of covariates, as well as country and wave fixed effects. Coefficients presented in SD units. Clustered robust standard errors in parentheses. Poverty = income poverty; MD = material deprivation; Stress = subjective financial stress.  $N = 52,623$  family-waves.

<sup>a</sup>Coefficients are significantly different from all other coefficients in the model ( $p < 0.01$ ); not significantly different from each other.

<sup>b</sup>Coefficients are significantly different from all other coefficients in the model ( $p < 0.05$ ); not significantly different from each other.

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

**Table 1.5. Weighted fixed-effects regression results: Economic hardship combinations and children's behavior problems**

	(1) Internalizing behavior	(2) Externalizing behavior
Poverty Only	0.011 (0.026)	0.004 (0.024)
MD Only	0.032 (0.031)	0.055* (0.026)
Stress Only	0.035 (0.018)	0.025 (0.016)
Poverty + MD	-0.033 (0.042)	0.069 (0.039)
Poverty + Stress	-0.015 (0.028)	-0.005 (0.025)
Stress + MD	0.091*** <sup>a</sup> (0.035)	0.070* (0.031)
All	0.072*** <sup>a</sup> (0.035)	0.038 (0.031)

*Note:* All models include full set of covariates, as well as family, country, and wave fixed effects. Coefficients presented in SD units. Clustered robust standard errors in parentheses. Poverty = income poverty; MD = material deprivation; Stress = subjective financial stress.  $N = 40,317$  family-waves.

<sup>a</sup>Coefficients are significantly different from all other coefficients in the model ( $p < 0.05$ ); not significantly different from each other.

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

## **Chapter 2. Associations Between Perceived Material Deprivation, Parents' Disciplinary Practices, and Children's Behavior Problems: An International Perspective**

### ***2.1 Introduction***

Family economic hardship has detrimental effects on children's development. Compared to their peers who do not experience economic hardship, children in families that live in economic hardship tend to have lower levels of math and reading skills at school entry, are more likely to exhibit emotional and behavior problems, and are more likely to engage in risky behaviors in adolescence (Bradley & Corwyn, 2002; Brooks-Gunn & Duncan, 1997; Conger & Donnellan, 2007). Economic hardship can contain multiple dimensions, including income poverty and material deprivation. The focus of prior research on economic hardship has traditionally been on income poverty, considering material deprivation only as a mediating factor. There is, however, evidence that families can experience material deprivation at any level of income (Bradshaw & Finch, 2003; Gershoff et al., 2007). Consequently, attention has recently turned to better understanding the effects of material deprivation on children and family functioning even in the absence of income poverty (Gershoff et al., 2007; Heflin & Iceland, 2009; Lee & Lee, 2016; Newland et al., 2013; Paat, 2011; Zilanawala & Pilkauskas, 2012).

Children's development and the prevention of child abuse and violence against children are among the 2030 Sustainable Development Goals (UN General Assembly,

2015). One-third of children in low- and middle-income countries (LMICs) are at risk of poor developmental outcomes and economic hardship appears to be an important contributing factor (McCoy et al., 2016). Yet, research on material deprivation, children's development, and parenting has only examined these links in high-income countries (HICs). Additional research focused on the processes that explain poor developmental outcomes in LMICs is necessary to be able to achieve the 2030 Sustainable Development Goals in LMICs (Wuermli, Tubbs, Petersen, & Aber, 2015). Moreover, most studies have only considered the link between material deprivation and parenting behavior for mothers, though there is reason to believe that the associations might be stronger for fathers (Paat, 2011). The purpose of this study is to examine associations among material deprivation, parents' disciplinary practices, and children's behavioral outcomes independent of income from an international perspective and to offer insight into how these associations may differ for mothers and fathers.

### **2.1.2. Economic Hardship and Parent Disciplinary Practices**

Developed on the basis of families' experiences in the Great Depression and the 1980s Farm Crisis, the Family Stress Model (FSM) posits that economic hardship affects children's development through increases in parents' stress and mental health problems, which lead to changes in parenting practices (Conger & Donnellan, 2007; Elder, 1998). Specifically, the FSM suggests that the stress of economic hardship leads parents to use harsh disciplinary practices. This association between economic hardship and parents' disciplinary practices, including corporal punishment, verbal attacks, and coercion, is

well-supported empirically (Conger & Conger, 2002; Conger et al., 1992; Conger, Ge, Elder, Lorenz, & Simons, 1994; Conrad-Hiebner, 2015; McLoyd, Mistry, & Hardaway, 2013). These increases in harsh disciplinary practices have been found to lead to increased externalizing and internalizing behavior problems in children in early and middle childhood and in adolescence (Conger et al., 1992; Gershoff, 2002; Puff & Renk, 2014).

Much of the research on the effects of economic hardship on parents' disciplinary practices thus far has focused on physical aggression, the physical dimension of harsh disciplinary practices. It is important not to overlook psychological aggression, such as shaming or yelling, as a harsh disciplinary practice. Psychological aggression is used more frequently than physical aggression and, like physical aggression, it is also associated with aggression and anxiety problems in children (Conger et al., 1992; Gershoff et al., 2010). Moreover, its influence on children's development is nearly as strong as the influence of physical aggression on children's development (Gershoff et al., 2010). Despite the relation between psychological aggression as a disciplinary practice and children's development, few studies have examined the differential associations between economic hardship and physical and psychological aggression.

### **2.1.3. A Focus on Material Deprivation**

Economic hardship refers to any financial difficulties that families may experience and has two dimensions: income poverty and material deprivation. Income poverty captures only the inadequate input of resources that a family has (Fusco et al.,

2011). Material deprivation, on the other hand, refers to a family's inability to access or own goods and services that are considered necessary in a given society, capturing the lived conditions of economic hardship (Fusco et al., 2011). This definition is relative to a society's living standards and expectations, but, at its most extreme, material deprivation can be defined as the inability to afford basic living needs, such as food and housing.

This differentiation between income poverty and material deprivation is reflected in the FSM. The FSM posits that material deprivation, in addition to subjective financial stress, are the mechanisms that mediate the association between income poverty and outcomes for parents and children (Conger & Donnellan, 2007). The mediating role of material deprivation is supported by a large body of evidence (for a review, see Conger & Donnellan, 2007). However, although income poor families are more likely to experience material deprivation (Bradshaw & Finch, 2003), evidence from the United States, the United Kingdom, Australia, and Canada shows that families with incomes well above the poverty threshold can also experience material deprivation (Bradshaw & Finch, 2003; Iceland & Bauman, 2007; Lee & Lee, 2016; Notten & Mendelson, 2016). In fact, more families are affected by material deprivation than by income poverty (Boushey & Gundersen, 2001). This means that some income poor families are able to meet their material needs, while other families with higher income may struggle to do so.

Consistent with the fact that families can experience material deprivation at any

income level, several studies have found that material deprivation is associated with worse children's behavior problems and social-emotional competence regardless of the family's income level (Gershoff et al., 2007; Lee & Lee, 2016; Paat, 2011; Zilanawala & Pilkauskas, 2012). That is, material deprivation may have independent effects on parents and children in addition to its role as a mediator. Material deprivation is also independently associated with worse maternal mental health (Heflin & Iceland, 2009; Lee & Lee, 2016; Newland et al., 2013), higher levels of parental stress (Gershoff et al., 2007), and lower levels of positive or sensitive parenting behavior among mothers (Gershoff et al., 2007; Newland et al., 2013), all of which are mediators between economic hardship and children's outcomes in the FSM. The FSM literature suggests that parents' disciplinary practices are also an important mediating mechanism of the effects of economic hardship, but no studies have yet examined whether there is an independent association between material deprivation and parents' disciplinary practices.

#### **2.1.4 The Importance of Studying Fathers**

Fathers appear to be more vulnerable to the adverse effects of material deprivation than mothers (Chen & Dagher, 2016; Paat, 2011; Williams, Cheadle, & Goosby, 2015). Material deprivation has a larger effect on relationship stress and conflict for fathers than for mothers (Paat, 2011; Williams et al., 2015). During times of economic recession, when levels of material deprivation are generally high (Pilkauskas, Currie, & Garfinkel, 2012), men are also more likely than women to suffer depression (Chen &

Dagher, 2016). Both relationship stress and depression are risk factors for harsh disciplinary practices (Conger & Donnellan, 2007). Therefore, it is possible that the effects of material deprivation on parenting practices may also be larger for fathers than mothers. Unfortunately, because of a lack of available data on fathers, few studies have considered the effects of economic hardship on fathers' parenting behaviors. Analyses using aggregate data found that only job losses that affect predominantly men are associated with child maltreatment, a particularly severe form of harsh parenting, but not job losses that affect primarily women (Lindo, Schaller, & Hansen, 2013; Schenck-Fontaine, Gassman-Pines, Gibson-Davis, & Ananat, 2017). Several individual-level studies have investigated whether income poverty differentially influences mothers' and fathers' parenting practices, but the results are inconclusive: Two studies found similar effects on fathers and mothers (Conger et al., 1992, 1994), while one study found stronger effects for fathers (Ponnet, 2014). No studies to our knowledge have yet examined whether material deprivation is differentially related to mothers' and fathers' parenting practices.

### **2.1.5 An International Perspective**

One-third of children in low- and middle-income countries (LMICs) do not reach social-emotional and cognitive development milestones and these developmental disadvantages are strongly associated with poverty (McCoy et al., 2016). Yet, the majority of research on the effects of poverty and material deprivation on children's cognitive or social-emotional outcomes still focuses predominantly on children in high-

income countries (HICs), such as the United States, Australia, and Finland (Conger et al., 1994; Gershoff et al., 2007; Lee & Lee, 2016; Solantaus, Leinonen, & Punamäki, 2004). To be able to achieve these goals in LMICs, understanding the processes and factors that contribute to the worse developmental outcomes in these countries is critical, and we cannot assume that these processes and factors are the same as in HICs (Wuermli et al., 2015).

The use of harsher disciplinary practices is more common in many LMICs relative to HICs (Ember & Ember, 2005; Huang et al., 2011). Harsh disciplinary practices, such as yelling or using corporal punishment, are associated with children's behavior problems in all countries, but the strength of this association varies across country according to children's perception of parenting norms (Deater-Deckard et al., 2011; Gershoff et al., 2010; Lansford et al., 2005). Yet, there are also notable similarities in the association between parenting and children's outcomes across countries. A meta-analysis of research in Africa, Asia, Europe, and North and South America, found that parental rejection is consistently linked to children's psychological maladjustment (Khaleque & Rohner, 2002).

Little evidence exists of the associations among economic hardship, children's outcomes, and parenting behavior in LMICs. One study found that income poverty is strongly correlated with worse cognitive and social-emotional development outcomes for children in LMICs (McCoy et al., 2016). Also, as in HICs, income poverty is correlated with parents' disciplinary behaviors and child maltreatment in LMICs

(Butchart, World Health Organization, & International Society for the Prevention of Child Abuse and Neglect, 2006). To our knowledge, no studies have yet examined the associations among material deprivation, children's outcomes, and parenting behavior in LMICs. There is evidence that the distinction between income poverty and material deprivation is relevant in LMICs; material deprivation and not income poverty is linked to parents' mental health in LMICs (Lund et al., 2010). However, because of differences in values, norms, and expectations, it is possible that the effects of poverty and material deprivation on children's development and parenting practices may differ between HICs and LMICs.

#### **2.1.6. The Present Study**

The research reviewed here has established that material deprivation influences children and parents independently of income, but several gaps in the literature remain. Responding to these gaps, we use data from the Parenting Across Cultures Project (PAC), an innovative longitudinal study that follows families in nine diverse countries over time to examine the associations among perceived material deprivation, children's behavior problems, and parents' disciplinary practices. Specifically, we ask four research questions: (1) What is the association between perceived material deprivation and children's internalizing and externalizing behavior problems in an international sample of families? (2) What is the association between perceived material deprivation and parents' disciplinary practices and does this association mediate the link between perceived material deprivation and children's outcomes? (3) Are the associations among

perceived material deprivation, children's behavior problems, and parents' disciplinary practices different for fathers and mothers? (4) Are the associations among perceived material deprivation, children's behavior problems, and parents' disciplinary practices different in HICs and LMICs? We focus specifically on children's behavior problems, which have received little attention in research on LMICs, even though these are predictive of later mental health, substance use, and educational outcomes (Hack et al., 2004; King, Iacono, & McGue, 2004; Sayal et al., 2015), and are, therefore, highly relevant to broader development goals.

Given evidence that material deprivation is distinct from income poverty in both HICs and LMICs (Bradshaw & Finch, 2003; Lund et al., 2010), we expect to find a significant association between material deprivation and children's behavior problems net of income consistent with prior literature focused only on families in HICs. We also expect to find that parents' disciplinary practices mediate this association in our international sample of families. Based on evidence that men are more vulnerable to material deprivation (Chen & Dagher, 2016; Paat, 2011; Williams et al., 2015), we expect that the association between material deprivation and parents' disciplinary practices will be stronger for fathers than mothers. Finally, given norm-related differences in the effects of parenting behavior on children's outcomes (Gershoff et al., 2010), we expect that the associations among perceived material deprivation, children's behavior problems, and parents' disciplinary strategies will be stronger in HICs than in LMICs.

The use of longitudinal data allows us to address multiple threats to internal validity that have not been addressed in several of the prior studies. Specifically, we use information from both parent and child reports and combined stable and time-varying covariates with country, wave, and country-wave fixed effects to minimize the extent to which other factors, such as changes in the economy or parenting norms, might bias the associations among perceived material deprivation, children's outcomes, and parents' disciplinary practices. We also present results from more conservative models that additionally include parent and family fixed effects, which further reduce the risk of bias and lend increased confidence in the robustness of the study's findings.

## ***2.2. Method***

### **2.2.1 The Parenting Across Cultures Project**

This study used data from the Parenting Across Cultures Project (PAC), a study that followed children and their families living in nine different countries between 2008 and 2013. The PAC sample includes 1,418 focal children, their mothers ( $n = 1,398$ ), and their fathers ( $n = 1,146$ ). Families were drawn from eleven data collection sites in nine countries: Jinan, China ( $n = 120$ ), Shanghai, China ( $n = 121$ ), Medellin, Colombia ( $n = 108$ ), Naples, Italy ( $n = 100$ ), Rome, Italy ( $n = 103$ ), Zarqa, Jordan ( $n = 114$ ), Kisumu, Kenya ( $n = 100$ ), Manila, Philippines ( $n = 120$ ), Trollhättan/Vänersborg, Sweden ( $n = 101$ ), Chiang Mai, Thailand ( $n = 120$ ), and Durham, North Carolina, United States ( $n = 111$  European Americans,  $n = 103$  African Americans,  $n = 97$  Latin Americans). With the goal of recruiting a sample reflective of the diversity in each city's population, families

were recruited from area schools in low-, middle-, and high-income neighborhoods, including both public and private schools, in the approximate proportion in which these groups reflect each city's overall population. The Durham, NC, sample includes African-American and Latin-American families, and the Kenya sample includes the Luo ethnic group (13% of the population). The samples in other sites do not include any ethnic minorities or immigrant families. Further details on the sample and study design have been provided in previously published articles using PAC data (e.g., Deater-Deckard et al., 2011; Lansford et al., 2015). Table 2.1 provides additional information on each country included in the sample.

Participants were recruited through letters sent home with children from schools. The interviews, which lasted approximately one hour each, were conducted at home, at schools, or at an alternate location chosen by the participants. Interviews of all family members, including children, were conducted separately so that all responses would be private. Mothers, fathers, and children responded either orally or in writing. All survey instruments were translated and back-translated to ensure measurement validity.

This study used data from waves 1, 2, 3, and 5 of PAC when, on average, children were aged 8, 9, 10, and 13 years respectively. (Because data relevant to the study questions were not collected in all countries in wave 4, wave 4 data were excluded from these analyses.) Demographic characteristics of the sample are presented in Table 2. Mothers were 38 years old and fathers were 42 years on average during the study period. Approximately 79.5% of parents were married and an additional 7.2% of parents

were unmarried but living together. Only 13.3% of families were headed by a single parent. On average, families in the sample consisted of 2.5 adults and 2.3 children. The highest level of education achieved by either parent was 13.7 years.

### 2.2.2. Measures

**Child behavioral outcomes.** The 118-item Child Behavior Checklist (CBCL) was used to measure parents' reports of children's behavior problems and the Youth Self Report version was used to measure self-reported behavior problems (Achenbach, 1991). This measure has been tested for measurement invariance and was validated for use in international research (Crijnen, Achenbach, & Verhulst, 1997). The CBCL includes two composite subscales. The *internalizing behavior* subscale consists of 34 items from the withdrawn, somatic complaints and anxious/depressed subscales. The *externalizing behavior* subscale consists of 33 items from the delinquent behavior and the aggressive behavior subscales. To compute a total score for each composite subscale, parents' and children's responses to each item (0 = *not true*; 1 = *somewhat or sometimes true*; 2 = *very true or often true*) were summed (father-report internalizing: cross-country range  $\alpha = .77 - .88$ , mean  $\alpha = .85$ ; father-report externalizing: cross-country range  $\alpha = .77 - .86$ , mean  $\alpha = .83$ ; mother-report internalizing: cross-country range  $\alpha = .77 - .88$ , mean  $\alpha = .85$ ; mother-report externalizing: cross-country range  $\alpha = .78 - .89$ , mean  $\alpha = .84$ ; child-report internalizing: cross-country range  $\alpha = .81 - .88$ , mean  $\alpha = .86$ ; child-report externalizing: cross-country range  $\alpha = .78 - .86$ , mean  $\alpha = .85$ ). The intra-class correlations comparing variation between and within countries for child-report and parent-report internalizing

and externalizing behavior problems range between 0.08 and 0.12, suggesting only a small share of the variation in behavior problems is explained by country-level differences.

**Parents' disciplinary practices.** Parents' disciplinary practices were measured using both parents' and children's responses to the Discipline Interview (DI), a measure developed for the PAC study based on items from the Parent-Child Conflict Tactics Scale and which has been tested for measurement invariance across these nine countries (Huang et al., 2011; Straus, Hamby, Finkelhor, Moore, & Runyan, 1997). Parents were asked how often they used a number of disciplinary practices when their child misbehaved in the year prior to the interview. To measure *physical aggression*, respondents were asked how often each parent (1) "spanks, slaps, or hits," (2) "grabs or shakes," or (3) "throws things at" the child. The mean score for the physical aggression subscale was calculated by averaging responses to each item (1 = *never*; 2 = *less than once a month*; 3 = *about once a month*; 4 = *about once a week*; 5 = *almost every day*) (father-report: cross-country range  $\alpha = .48 - .72$ , mean  $\alpha = .62$ ; mother-report: cross-country range  $\alpha = .49 - .70$ , mean  $\alpha = .67$ ; child-report: cross-country range  $\alpha = .48 - .73$ , mean  $\alpha = .65$ ).

Seven items were used to measure *psychological aggression*. Respondents were asked how often each parent (1) "tells [the] child to be ashamed," (2) "tells [the] child [they] won't love him/her anymore," (3) "threatens [the child] with punishment," (4) "threatens to leave," (5) "scares [the] child into behaving," (6) "ignores," (7) or "yells or scolds." The mean score for the psychological aggression subscale was calculated by

averaging responses to each item (father-report: cross-country range  $\alpha = .60 - .81$ , mean  $\alpha = .75$ ; mother-report: cross-country range  $\alpha = .61 - .81$ , mean  $\alpha = .75$ , mean; child-report: cross-country range  $\alpha = .60 - .81$ , mean  $\alpha = .76$ ). The intra-class correlations comparing variation between and within countries for child-report and parent-report disciplinary practices range between 0.15 and 0.17, suggesting only a small share of the variation in disciplinary practices is explained by country-level differences.

**Perceived material deprivation.** The key independent variable of interest was parents' perceived material deprivation, which was measured in all waves by asking both parents whether they had experienced money problems that made it hard to pay for basic living expenses in the past year (0 = *no*, 1 = *yes*). This is a common material deprivation measure in surveys across countries and captures the inability to pay for any items that are essential for physical survival (e.g. food, clothes, housing, etc.) (Boarini & d'Ercole, 2006). What is considered essential varies across countries, and other, more objective measures of material deprivation often fail to account for these differences across countries. Thus, because of its focus on subjective perception, this measure is well-suited to capture relative material deprivation corresponding to a specific time and place and is, therefore, more appropriate for international research.

**Household income.** To measure household income at each wave, the main respondent (typically the mother) was asked to identify which one of ten gross income bands the household fell into based on income from all sources. Different income bands were used in each country. A quasi-continuous measure was created by taking the mid-

point of each income band. This quasi-continuous measure was then adjusted for household size so that income was relative to the reference income of a couple with two children. Purchase Power Parity (PPP) and the Consumer Price Index (CPI) were then used to equate all amounts to 2010 US Dollars to allow for cross-country comparison.

**Covariates.** To adjust for parent's psychosocial characteristics that could affect parents' reports of both their level of perceived material deprivation and their disciplinary practices, we included three measures of parents' psychosocial characteristics. Parents' *emotional regulation and parental efficacy* were measured at each wave using a 15-item family efficacy scale (Caprara, Regalia, Scabini, Barbaranelli, & Bandura, 2004) adapted for cross-country comparison for the PAC Study. The scale asked respondents to rate their agreement with fifteen statements, nine statements related to their emotional regulation skills (e.g. "avoid flying off the handle when you're angry") and five statements related to parental efficacy skills (e.g. "get your children to do things you want at home") (1 = *not well at all/nothing*; 2 = *not too well/very little*; 3 = *somewhat well/some influence*; 4 = *pretty well/quite a bit*; 5 = *very well/a great deal*). To compute a total self-efficacy mean score, parents' responses to each item were averaged (father-report: cross-country range  $\alpha = .78 - .98$ , mean  $\alpha = .92$ ; mother-report: cross-country range  $\alpha = .77 - .88$ , mean  $\alpha = .85$ ). Because this variable was highly skewed (skewness = 2.21), a log-transformed variable was included in the analyses.

Parents' endorsement of *collectivist values* was measured at wave 3 using a 16-item scale (Singelis, Triandis, Bhawuk, & Gelfand, 1995) adapted for the PAC Study to

measure their acceptance of inequality within their community. Because collectivist values are considered a stable trait (Triandis, 1995), this measure was treated as time-invariant. All questions asked parents to state their level of agreement or disagreement with a statement related to collectivist attitudes (1 = *strongly disagree*; 2 = *disagree*; 3 = *agree*; 4 = *strongly agree*; items were reverse coded as needed). To compute a mean score of collectivist identity, parents' responses to each item were averaged (father-report: cross-country range  $\alpha = .66 - .81$ , mean  $\alpha = .73$ ; mother-report: cross-country range  $\alpha = .57 - .79$ , mean  $\alpha = .73$ ), with a higher score reflecting a higher level of collectivist identity.

Parents' *social desirability bias* was measured at baseline using the 13-item Social Desirability Scale-Short Form, which has been tested for measurement invariance across countries (Bornstein, 2002; Reynolds, 1982). This measure was also treated as time-invariant. A social desirability mean was computed by averaging parents' responses to each item (1 = *yes*; 2 = *no*) (father-report: cross-country range  $\alpha = .46-.72$ , mean  $\alpha = .60$ ; mother-report: cross-country range  $\alpha = .47 - .63$ , mean  $\alpha = .54$ ), with a higher score reflecting a higher level of social desirability.

Finally, we also included a set of controls in all models. Parent demographic controls included parents' age, and relationship status. Child characteristic controls included the focal child's age and sex, as well as prior behavior problems. Household structure controls included the number of children in the household and the number of adults in the household. The number of adults in the household was highly skewed (skewness = 2.40), so a log-transformed variable was included in the analyses instead.

Finally, socioeconomic controls included the highest level of education held by either parent in the household and whether at least one parent was employed at the time of the survey.

### **2.2.3. Attrition, Missing Data, and Multiple Imputation**

The initial sample at the first wave consisted of 1,418 families and 1,082 families provided data at wave 5, resulting in a 23.7% attrition rate. Parents who attrited at or before wave 5 were younger, more likely to be married, less likely to report perceived material deprivation, and had lower income than families who provided data at wave 5. Moreover, slightly more families from China, Sweden, and the Philippines attrited at or before wave 5 compared to families in the other countries. To address any potential bias due to selective sample attrition, we used an inverse probability weighting approach. Using auxiliary variables that could be associated with both attrition and the outcomes, we constructed inverse probability weights by first modeling the probability of continuing in the study and then calculating predicted probabilities of continuation for each observation. We then weighted observations by the inverse of the probability of continuation in all analyses.

In addition to systematic sample attrition, item non-response was a concern with approximately 56.2% of survey responses missing data for at least one item. Of the surveys with missing data, 19.1% of surveys were missing responses to only two items, though these questions varied across participants. At most, a survey was missing responses to 16 items used in these analyses. Because we could not assume the data

were missing completely at random and in order to use the complete sample of participating respondents at each wave for analyses, we employed multiple imputation to address the missing data. Multiple imputation replaces missing data with a probable value based on other available information from the dataset. Analyses then produce estimates and confidence intervals that take into account missing-data uncertainty.

For these analyses, 50 multivariate imputations were computed using Stata version 13.1. The imputation model included all available information for outcome, predictor, and control variables and was chosen to be compatible with the analytical models to be estimated, such that all variables in the analytical models were present in the imputation model. Imputed values for outcome variables were dropped after the imputation and not used in the analyses. To appropriately account for the hierarchical structure of the data and the resulting autocorrelations, the imputation was done with the data structured wide (Young & Johnson, 2015). All analyses take the multiple imputation into account in the calculation of standard errors. Though this method cannot completely account for bias due to missing data, it improves consistency and efficiency compared to other methods, such as listwise deletion (Johnson & Young, 2011).

#### **2.2.4 Analytical Strategy**

The PAC data allowed us to examine the associations among parents' perceived material deprivation, parents' disciplinary practices, and children's internalizing and externalizing behavior problems in a multilevel framework. Time points ( $n = 4$ , Level 1)

are nested within parents ( $n = 2$ , Level 2), nested within families ( $n = 1,418$ , Level 3), which are nested in countries ( $n = 9$ , Level 4). Multilevel fixed-effects and mixed-effects linear regression models were used to account for the hierarchical nature of the data. Because mixed-effects and fixed-effects regression models have complementary advantages and disadvantages, results from both analytical approaches are presented here.

The mixed-effects regression models use variation between and within families to estimate the associations between perceived material deprivation, income, children's behavior problems, and parents' disciplinary practices. These models include a random intercept to account for the correlation between a parent's responses over time, as well as country, wave, and country-wave fixed effects. The country fixed effect accounts for any stable observed and unobserved differences between countries that may affect the association between parents' perceived material deprivation, disciplinary practices, and children's behavioral outcomes, such as differences in parenting norms or living conditions. The wave fixed effect accounts for any changes that impacted all countries at a given time that could affect the associations among parents' material deprivation, disciplinary practices, and children's behavioral outcomes, such as the global recession. The country-wave fixed effect accounts for linearly evolving differences between countries, as well as any localized events that occurred in a given year in a given country, such as the violence that followed the 2007 election in Kenya (Skinner, Oburu, Lansford, & Bacchini, 2014). However, these models assume that the individual error

terms are uncorrelated with the regressors. If this assumption is violated, the model estimates may be biased. Because it is possible that the differences between parents are correlated with their levels of perceived material deprivation, we also estimated fixed-effects regression models.

The fixed-effects models additionally include parent and family fixed effects to account for any stable observed and unobserved differences between parents and families that may be associated with both perceived material deprivation, disciplinary practices, and children's behavioral outcomes. The fixed-effects models use only within-family variation to estimate the associations among perceived material deprivation, income, children's behavior problems, and parents' disciplinary practices. As such, the fixed-effects models can account for possible parent- and family-level omitted variables that bias the associations among perceived material deprivation, children's outcomes, and parent's disciplinary practices that the mixed-effects models do not address. Like the mixed-effects regression models, all fixed-effects regression models also include country, wave, and country-wave fixed effects. However, because fixed-effects models hold constant the average effect of each indicator included (Wooldridge, 2008), parents with no variation in parenting practices, material deprivation, or children's behavioral outcomes are excluded from analyses, thereby reducing the analytic sample, and power, significantly.

For each child-reported and parent-reported outcome of interest, we present stepwise models that show the effect of adding each additional set of time-varying and

constant covariates. Using mixed-effects models, we first we regressed both children's behavior problems and parents' disciplinary practices on material deprivation and household income (Specification 1). The additional specifications each add a vector of control variables, first adding all sociodemographic characteristics (Specification 2), then adding parents' self-efficacy, collectivism, and social desirability (Specification 3), and finally adding child age, sex, and children's prior internalizing and externalizing behavior (Specification 4). Specification 5 is the fixed effects model and adds parent and family fixed effects to Specification 4. Specifications 4 and 5 are our preferred specifications because these control for the broadest set of factors that can potentially confound the associations among material deprivation, disciplinary practices, and children's behavioral outcomes. All coefficients are standardized to SD units.

Next, we estimated how much of the association between parents' perceived material deprivation, income, and children's behavior problems is mediated by parents' disciplinary practices based on Specification 4 (i.e. mixed-effects). To accommodate the hierarchical structure of the data we followed the procedure for multi-level mediation modeling outlined by Krull and MacKinnon (2001), which adjusts for any bias in standard errors due to correlation in children's and parents' responses over time. We used bootstrapping to calculate the standard errors and confidence intervals for the estimated direct, indirect, and total effects based on 1,000 replications. This procedure is not available for fixed-effects models.

Finally, we also used Specifications 4 and 5 to estimate sub-group differences comparing (1) mothers and fathers and (2) parents in high-income countries and parents in low- and middle-income countries. As Table 1 shows, high-income countries (i.e. Italy, Sweden, and the US) each have GDP per capita that is an order of magnitude higher than the GDP per capita of the low- and middle-income countries in this sample (i.e. China, Colombia, Jordan, Kenya, Philippines, and Thailand) (World Bank, 2017). To identify whether the differences between the groups are statistically significant, fully-interacted models were estimated, which are empirically identical to a sub-group model (Wooldridge, 2008).

## **2.3. Results**

### **2.3.1. Descriptive Statistics**

Descriptive statistics on disciplinary practices, children's behavioral outcomes, perceived material deprivation, and household income, as well as all covariates for the full sample are presented in Column 1 of Table 2.2. On average, 28.3% of parents reported perceived material deprivation (i.e. problems paying for basic living expenses) at any given time across countries and the average household income was \$34,013. There was a statistically significant correlation between income and material deprivation, but this correlation was relatively small ( $r = -0.29$ ,  $p < 0.001$ ). Children and parents reported that parents use both types of disciplinary practices relatively infrequently. For psychological aggression, the parent-reported mean score across the study period was 2.0 on a scale of 1 to 5, while the child-reported mean score was 1.7. Both the parent-

reported and child-reported physical aggression mean score was 1.5. On average, parents and children reported low levels of child behavior problems. The average level of child-reported internalizing behavior problems was slightly higher than the parent-reported level (12.8 compared to 8.7, respectively;  $p < 0.01$ ), while parents reported slightly higher levels of externalizing behavior problems than children (10.0 compared to 9.2, respectively;  $p < 0.01$ ).

Columns 2 and 3 present the descriptive statistics by parent gender. Fewer fathers reported perceived material deprivation than mothers (25.6% compared with 30.5% respectively;  $p < 0.01$ ). Fathers and mothers did not differ with respect to their self-reported or child-reported disciplinary practices. However, compared to fathers, mothers were slightly more likely to report that their children exhibited internalizing behavior problems (mean score of 9.1 compared to 8.2;  $p < 0.01$ ) and externalizing behavior problems (mean score of 10.3 compared to 9.7,  $p < 0.05$ ).

Descriptive statistics for HICs and LMICs are presented in Columns 4 and 5 of Table 2.2. Families in HICs reported higher household income than families in LMICs (\$43,986 compared with \$24,397 respectively;  $p < 0.01$ ). Compared to 29.4% of parents in LMICs, fewer parents in HICs reported material deprivation (25.6%) ( $p < 0.10$ ). Parents in HICs also reported less frequent psychological aggression (mean score of 1.9 compared to 2.0 in LMICs;  $p < 0.05$ ) and less frequent physical aggression (mean score of 1.4 compared to 1.6 in LMICs;  $p < 0.05$ ) in parenting. The same pattern was found using children's reports of parents' physical and psychological aggression. Compared to

parents in LMICs, parents in high-income countries also reported slightly lower levels of children's internalizing behavior problems (9.1 compared to 10.7;  $p < 0.01$ ) and externalizing behavior problems (8.0 compared to 9.2;  $p < 0.01$ ). Children's self-report of internalizing behavior problems did not differ between countries, but children in LMICs reported slightly higher levels of externalizing behavior problems than children in HICs (9.4 compared to 9.0;  $p < 0.01$ ).

### **2.3.2. Associations with Children's Behavior Problems**

Columns 1 and 2 of Table 2.3 present the results from the regression models predicting children's self-reported internalizing and externalizing behavior problems. There were significant, positive associations between perceived material deprivation and children's reports of both internalizing behavior problems and externalizing behavior problems. Both associations were robust to the inclusion of sociodemographic characteristics and parents' psychosocial characteristics. The association between perceived material deprivation and child-reported behavior problems was not robust to the inclusion of lagged child behavior problems or the parent and family fixed effects (Specifications 4 and 5). However, the results of Specification 4 show that a \$10,000 increase in household income was associated with a 0.01 *SD* decrease in externalizing behavior problems ( $p < 0.05$ ). Similarly, the results of the mixed-effects specification (Specification 5) show that a \$10,000 increase in household income was associated with a 0.03 *SD* decrease in externalizing behavior problems ( $p < 0.01$ ).

Columns 3 and 4 present the results from the regression models predicting

parent-reported internalizing and externalizing behavior problems. As with the results for child-reported behavior problems, there are significant associations between perceived material deprivation and parent-reported behavior problems. These associations are larger than for child-reported behavior problems and are robust to the inclusion of lagged child behavior (Specification 4). Specifically, the results of our preferred mixed-effects specification (Specification 4) show that perceived material deprivation was associated with a 0.22 *SD* increase in parent-reported internalizing behavior problems ( $p < 0.01$ ). At the same time, perceived material deprivation was associated with a 0.17 *SD* increase in the parent-reported externalizing behavior problems ( $p < 0.01$ ). The results of the fixed-effects specification (Specification 5) show that the association between perceived material deprivation and parent-reported internalizing behavior problems was not robust to the inclusion of parent and family fixed effects. However, even under this more conservative modeling approach, perceived material deprivation was associated with a 0.14 *SD* increase in parent-reported externalizing behavior problems ( $p < 0.01$ ). The results of Specification 4 show no significant association between household income and parent-reported behavior problems, but the results of the fixed-effects specification show a significant, negative association between household income and parent-reported externalizing behavior problems. Specifically, a \$10,000 increase in household income was associated with a 0.02 *SD* decrease in parent-reported externalizing behavior problems ( $p < 0.01$ ).

### 2.3.3. Associations with Parent's Disciplinary Practices

Columns 1 and 2 of Table 2.4 present the results from the regression models predicting child-reported psychological and physical aggression. There were significant, positive associations between perceived material deprivation and both physical aggression and psychological aggression. Both associations were robust to all four mixed-effects specifications. Specifically, the results of our preferred mixed-effects specification (Specification 4) show that perceived material deprivation was associated with a 0.07 *SD* increase in child-reported physical aggression ( $p < 0.05$ ) and a 0.06 *SD* increase in child-reported psychological aggression ( $p < 0.10$ ). However, the associations between perceived material deprivation and child-reported parents' disciplinary practices were not robust to the inclusion of the family and parent fixed effects. There was no significant association between household income and child-reported parents' disciplinary practices.

Columns 3 and 4 of Table 2.4 present the results from the regression models predicting parent-reported psychological and physical aggression. As for child-reported parents' disciplinary strategies, there were significant, positive associations between perceived material deprivation and both parent-reported physical and psychological aggression, which were robust to all four mixed-effects specifications. The results of our preferred mixed-effects specification (Specification 4) show that perceived material deprivation was associated with a 0.10 *SD* increase in parent-reported physical aggression ( $p < 0.01$ ) and a 0.15 *SD* increase in parent-reported psychological aggression

( $p < 0.01$ ). The association between perceived material deprivation and parent-reported physical aggression was not robust to the inclusion of the family and parent fixed effect. However, even under this more conservative modeling approach, perceived material deprivation was associated with a 0.23 *SD* increase in parent-reported psychological aggression ( $p < 0.01$ ).

There were also significant, negative associations between household income and parent-reported physical and psychological aggression, but neither association was robust to the addition of the full set of covariates. The association between income and parent-reported physical aggression was nullified by the addition of child characteristics and past behavior as covariates and the association between income and parent-reported psychological aggression was nullified by the addition of sociodemographic characteristics.

#### **2.3.4. Mediation Through Parent's Disciplinary Practices**

Table 2.5 shows the results of the mediation analysis using both child-reported and parent-reported measures. Columns 1 and 2 of Panel A show that there was no significant indirect association between perceived material deprivation and children's self-reported behavior problems that was explained by either child-reported physical or psychological aggression. Column 3 of Panel A shows that parent-reported psychological aggression explained 6.7% of the association between perceived material deprivation and parent-reported internalizing behavior problems. Specifically, while the direct effect was 0.16 *SD* ( $p < 0.01$ ), the indirect effect explained by parent-reported

psychological aggression was 0.01 *SD* ( $p < 0.05$ ). However, there was no significant indirect association between perceived material deprivation and parent-reported internalizing behavior problems explained by parent-reported physical aggression. Similarly, Column 4 of Panel A showed no significant indirect association between perceived material deprivation and parent-reported externalizing behavior problems explained by parent-reported physical aggression, but parent-reported psychological aggression explained 12.8% of the association between parent-reported externalizing behavior problems. Specifically, while the direct effect was 0.11 *SD* ( $p < 0.01$ ), the indirect effect explained by parent-reported psychological aggression was 0.02 *SD* ( $p < 0.05$ ).

Panel B of Table 2.5 shows that there were no significant direct or indirect associations between income and parent- or child-reported children's behavior problems when accounting for the mediating role of parent's disciplinary practices.

### **2.3.5. Differential Associations by Parent Gender**

We tested whether associations between household income, perceived material deprivation, children's behavior problems, and parents' disciplinary strategies differed by parent gender (Appendix Table A.1). All sub-group models used our preferred mixed-effects specification (Specification 4) and fixed-effects specification (Specification 5). Differences between mothers and fathers in the associations among income, perceived material deprivation, children's behavior problems, and parenting practices were not statistically significant.

### **2.3.6. Differential Associations by Country GDP**

We also tested whether the associations among household income, material deprivation, parents' disciplinary practices, and children's behavior problems differed in HICs compared to LMICs (Appendix Table A.2). There were no significant differences in coefficients between LMICs and HICs.

### **2.3.7. Robustness Checks**

To check that the fixed-effects regression results were robust to our sample and specifications, we conducted several additional analyses (results available from authors). First, because the fixed-effects regression models excluded families with no variation in material deprivation, household income, physical and psychological aggression, and children's behavioral outcomes, it is possible that the sample in the fixed-effects regression models differs in important ways from the full sample. Thus, to check that the fixed-effects regression results do not reflect a selection bias, we repeated all mixed-effects analyses with only families in the fixed-effect sample. These mixed-effects regression results did not differ substantially from the mixed-effects regression results using the full sample, suggesting that the fixed-effects regression results do not reflect a selection bias.

Second, we repeated all analyses excluding families in Sweden and Kenya from the sample. It is possible that the inclusion of Swedish and Kenyan families in the sample may bias the results, because corporal punishment is illegal in both Sweden and Kenya, but not in the other countries. Both psychological aggression and physical

aggression rates are significantly lower in Sweden than in the other countries in the sample and Sweden also has the lowest rates of material deprivation and income poverty of all of the countries in the sample. However, excluding Swedish and Kenyan families from the analyses did not substantially change the results. Third, because single parents likely experience very different economic circumstances, we also repeated all analysis excluding single parent families, which did not substantially change the results. Finally, we also checked that the results were not biased by multiple imputation by repeating all analyses using the non-imputed data and using a fully-imputed dataset that included imputed outcomes. The results using the non-imputed data and the fully-imputed data were substantially similar to the results of analyses using the imputed data without imputed outcomes.

## ***2.4 Discussion***

This study investigates associations among household income, material deprivation, children's behavior problems, and parents' disciplinary practices using information about mothers and fathers in high- and low- and middle-income countries. Even in our most conservative specification, we found that when income remained stable, becoming materially deprived was associated with an increase in parent-reported children's externalizing behavior problems, but not internalizing behavior problems. Consistent with earlier research (Gershoff et al., 2007), this association between perceived material deprivation and children's externalizing behavior problems was

much larger than the significant association between income and parent-reported externalizing behavior problems.

Perceived material deprivation was also associated with an increase in parents' self-reported use of psychological aggression when disciplining their children, even when income remained stable. Since psychological aggression is associated with significant increases in children's behavior problems (Conger et al., 1992; Gershoff et al., 2010), these results highlight the need to pay attention to the effects of material deprivation on parents' disciplinary practices even in contexts where physical aggression is relatively rare. There was also a significant association between perceived material deprivation and parent-reported physical aggression, but this was not robust to the inclusion of the family and parent fixed effects. The fixed-effects specification measures the association with a change in material deprivation, rather than the level of material deprivation. Since, physical aggression as a disciplinary practice is uncommon (Gershoff et al., 2010), it is possible that only a more extreme change in material deprivation than what our measure captures would lead to an increase physical aggression.

The FSM posits that harsh parenting practices mediate the association between income poverty, material deprivation, and children's outcomes. We tested whether harsh parenting practices also mediate the association between material deprivation and children's outcomes when income remains stable. We found that, holding income constant, the increase in parent-reported psychological aggression explains a small but

significant share of the association between perceived material deprivation and parent-reported externalizing behavior problems. That parents' disciplinary practices partly mediate the relation between material deprivation and child behavioral outcomes is consistent with the Family Stress Model and prior research on the effects of material deprivation. However, the proportion of the total mediated effect is smaller than expected based on prior research. Because the associations between parents' disciplinary practices and children's outcomes are weaker in countries where these behaviors are more normative (Gershoff et al., 2010), it is possible that the average mediating effect is weaker across countries than research focused on HIC samples alone suggests. Thus, this finding underscores the need for cross-country research and, specifically, the need to examine between-country differences in mediating pathways. Unfortunately, we were unable to investigate such differences due to relatively small within-country sample sizes. We found no indirect effects of perceived material deprivation on child-reported behavior problems and no indirect effects of income on child- or parent-reported behavior problems.

A limitation of some prior studies on the associations among material deprivation, parenting, and children's outcomes is the reliance on parent-reported data (Gershoff et al., 2007; Paat, 2011). Though two studies used child- or teacher-reported data (Lee & Lee, 2016; Zilanawala & Pilkauskas, 2012), ours is the first study to our knowledge to combine and compare three unique perspectives using mother-, father-, and child-reported data. The associations between material deprivation and child-

reported outcomes are smaller and are not all robust to the inclusion of lagged child behavior and the family and parent fixed effects. Yet, as with parent-reported data, the association between income and child-reported externalizing behavior problems is robust to even our most conservative specification. The within-child variation in reported behavior problems and parents' disciplinary practices is smaller than the within-parent variation in reported outcomes. It may be that this smaller variation, possibly reflecting a bias in children's reports, is influencing the difference between parent- and child-report results. It is also possible that the difference between the parent- and child-report results is due to time-varying parent characteristics that are biasing the association between parents' perception of material deprivation and parents' reports of child behavior and disciplinary practices.

Contrary to our hypothesis, we found no significant differences in the association between perceived material deprivation, children's behavior problems, and parents' disciplinary practices between mothers and fathers. Research that found notable differences between men's and women's vulnerability to economic hardship vis-à-vis relationship stress, conflict, and depression focused only on samples in HICs (Chen & Dagher, 2016; Paat, 2011; Williams et al., 2015). Thus, it's possible that these differences between men and women are culturally specific and not detectable in analyses across countries. Unfortunately, our sample is too small to support splitting the sample further to identify differences in gender interactions across countries. On the other hand, the lack of significant differences between mothers and fathers is consistent with some FSM

research, which also found no differences between mothers and fathers in the effects of income poverty on parenting behavior (Conger et al., 1992, 1994). Therefore, it may be that, though men are in some respects more vulnerable to economic hardship than women, this greater vulnerability does not extend to parents' disciplinary practices.

We also found no significant differences between HICs and LMICs in the associations among income, perceived material deprivation, children's behavior problems, and parents' disciplinary practices. The lack of differences is especially notable because the nine countries in the PAC sample represent very different economic, political, and cultural contexts. These results indicate that the independent effect of perceived material deprivation on children's outcomes found in previous studies in HICs may be a universal phenomenon that is also relevant to children's development in LMICs. Therefore, targeting disparities related to material deprivation as well as income would likely be a promising strategy to achieve the 2030 Sustainable Development Goals related to children's development in LMICs. However, additional research using a larger sample size is warranted in case the differences between the countries are too small to identify with the relatively small country-level sample sizes of the PAC Project.

In addition to extending the research to consider a different parenting outcome, differences between mothers and fathers, and an international sample, this study contributes to research on the effects of material deprivation by addressing threats to internal validity that prior research has not yet addressed. Most prior studies used cross-sectional data (Gershoff et al., 2007; Lee & Lee, 2016; Paat, 2011), while one study used a

lagged dependent variable design (Zilanawala & Pilkauskas, 2012). Thus, these studies were unable to address many potential sources of omitted variable bias. By combining lagged child behavior, stable and time-varying covariates, and parent, family, country, wave, and country-wave fixed effects, our analyses are able minimize the influence of omitted variables, such as country-wide and global economic events, country-wide differences in parenting norms, and parents' and children's stable characteristics. For example, the parent fixed effect accounts for parents' unobserved mental health problems that are stable over time and could explain the associations among material deprivation, disciplinary practices, and children's behavioral outcomes. Similarly, the inclusion of a country-wave fixed effect, as well as the country and wave fixed effects, minimize the possibility that unobserved global economic events, such as the global recession that occurred during the study period, or localized political events, such as the post-election violence in Kenya, lead to biased results. This lends increased confidence that these results reflect the true associations among perceived material deprivation, children's outcomes, and disciplinary practices.

Our study is not without its limitations. First, though the mixed- and fixed-effects specifications can address multiple sources of omitted variable bias, these are not causal analyses and additional research is needed to assess whether the associations found here are causal. It is also important to consider the generalizability of this study's findings, as the sample of families in each country was not selected randomly and may not be representative of all families in these countries. However, because the samples

were recruited in such a way that captured families from all socioeconomic groups in each city's population in the approximate proportion in which these groups reflect each city's overall population, the samples are diverse and likely do not significantly overrepresent a single socioeconomic group. Nevertheless, the samples include only families living in urban areas and only two samples include ethnic minorities. Therefore, additional research should give particular attention to populations that may have very different parenting norms and different access to social and community resources that could affect material deprivation, such as families living in rural areas and immigrant and minority families.

Establishing measurement invariance is a common challenge in international research (Lansford et al., 2016). Though our measures of child behavior problems, parents' disciplinary practices, and social desirability bias have been tested for measurement invariance, other measures in this study have not. Specifically, our measure of income may not have the same meaning across countries, because it does not include remittances or informal income sources that are more common and more important in LMICs (Howe et al., 2012). Similarly, because living standards and, thus, what is considered a basic living expense differs across countries, our measure of perceived material deprivation may also vary in meaning across countries. These cross-country differences make the interpretations of these results challenging and future research should use more internationally comparable measures of economic hardship.

Another limitation of the material deprivation measure is that it is a subjective evaluation, rather than an objective measure of actual lived conditions. Therefore, this measure may confound economic stress with material deprivation and future research should disentangle the associations of each of these dimensions of economic hardship with children's outcomes and parents' disciplinary practices. It is also important to note that our measures of parents' disciplinary practices reflect only one relatively harsh aspect of parenting behavior. The associations with material deprivation and income may be even stronger if considering less rare forms of parenting behavior, such as parent involvement or cognitive stimulation. For example, Gershoff et al. (2007) found relatively large associations with parent stress and positive parenting behavior that mediated the association between material deprivation and children's social-emotional outcomes.

This study also raises additional questions. The relatively small country-level sample sizes of this study limit our ability to examine more fine-grained differences between countries. Although grouping together LMICs is a common practice, there are significant differences between the LMICs in this study that could influence the associations considered. Nevertheless, this broad grouping of LMICs is relevant to the study of economic hardship, because a large share of the population in middle-income countries, as in low-income countries, lives in poverty (Sumner, 2010). The small within-country sample sizes also limit our ability to examine differences in mediating mechanisms between countries. Additional research is also necessary to identify other

mediating mechanisms that explain the association between perceived material deprivation and children's behavior problems, because parents' psychological aggression explain only a relatively small share of the association.

Despite these limitations, this study makes several important contributions to the study of material deprivation. Building on prior literature that found associations among material deprivation, children's outcomes, and positive or sensitive parenting behavior, these results show that, independent of income, material deprivation is also associated with an increase in parents' disciplinary practices and children's externalizing behavior problems. Though we focus on the independent effect of perceived material deprivation holding income constant, our results do not contradict the substantial FSM literature that shows that material deprivation mediates the association between income and children's behavior problems. Instead, our results suggest that it is likely that material deprivation directly affects children's outcomes at any income level and also mediates the association between income poverty and children's outcomes.

Moreover, this is the first study to our knowledge that examines the association between material deprivation, children's outcomes, and parenting behavior in LMICs. Prior research has found these associations for children in HICs; we find that, even when income remains stable, a change in material deprivation is also associated with more behavior problems for children and psychological aggression in parenting in LMICs. These associations do not differ between HICs and LMICs. Thus, our results suggest that material deprivation should be a target for interventions supportive of meeting the 2030

Sustainable Development Goals related to child development. In fact, since a larger share of families experiences perceived material deprivation than income poverty (Boushey & Gundersen, 2001), interventions that directly target material deprivation (e.g., food or housing subsidies) and are broadly available across income levels have the potential of supporting the development of more children than interventions that focus solely on increasing family income. This study is also the first to investigate differential associations between material deprivation, children's outcomes, and parenting behaviors for mothers and fathers. That we found no difference indicates that fathers should also be targeted by parenting interventions for low-income families, which often target only mothers (Panter-Brick et al., 2014). Together, these findings add a more nuanced and global perspective to a growing body of literature on the independent effects of material deprivation on children.

## 2.5 Tables

**Table 2.1. Country descriptions**

	Human Development Index Rank <sup>a</sup>	% of pop < US\$1.25 per day 2002–2012 <sup>a</sup>	Is religion important in your daily life? <sup>b</sup>	Hofstede individualism score	Age at first marriage (women) <sup>c</sup>	% enrollment in tertiary education <sup>c</sup>
China	90	6.3	-	20	24.7	27
Colombia	97	5.6	0.83	13	22.2	45
Italy	27	-	0.72	76	30.6	62
Jordan	80	0.1	-	30	24.7	47
Kenya	145	43.4	-	25	22	4
Philippines	115	19	0.96	32	24.4	28
Sweden	14	-	0.17	71	31.4	70
Thailand	93	0.3	0.97	20	24.1	51
U.S.A.	8	-	0.65	91	26.9	94
Range	8-145	0-43	17-97%	13-91	22-31	4-94

- = No data available

<sup>a</sup>Human Development Report (2015). <sup>b</sup>Crabtree (2010). <sup>c</sup>World Bank (2015). Tertiary education includes colleges, universities, and technical training programs.

Table 2.2. Descriptive statistics

	Mean (SD)				
	(1) Full Sample	(2) Mothers	(3) Fathers	(4) High-income Countries	(5) Low- and middle- income
<i>Demographics</i>					
Parent age	40.2 (6.6)	38.8 (6.3)	41.8 (6.6)	41.1 (6.9)	39.5 (6.2)
Married (%)	80.5 (37.8)			68.2 (44.4)	90.4 (27.9)
Education (years)	12.8 (4.1)	12.7 (4.1)	12.9 (4.1)	13.2 (4.4)	12.5 (3.7)
Employed (%)	78.6 (26.0)			79.3 (26.7)	78.1 (25.6)
# of adults	2.6 (1.1)			2.1 (0.6)	2.9 (1.2)
# of children	2.3 (1.2)			2.2 (0.9)	2.3 (1.3)
<i>Economic hardship</i>					
Perceived money problems (%)	28.3 (38.1)	30.5 (38.9)	25.6 (37.1)	26.9 (38.4)	29.4 (37.9)
Income (2010 US \$)	34,013.01 (30,493.00)			43,985.83 (27,107.71)	24,397.22 (30,059.84)
<i>Parenting behavior</i>					
Child-report physical aggression (1-5)	1.5 (0.7)	1.5 (0.7)	1.4 (0.7)	1.3 (0.6)	1.6 (0.8)
Child-report psychological aggression (1-5)	1.7 (0.7)	1.7 (0.7)	1.6 (0.6)	1.6 (0.6)	1.7 (0.7)
Parent-report physical aggression (1-5)	1.5 (0.5)	1.5 (0.6)	1.5 (0.5)	1.4 (0.4)	1.6 (0.6)
Parent-report psychological aggression (1-5)	2.0 (0.6)	2.0 (0.6)	1.9 (0.5)	1.9 (0.5)	2.0 (0.6)
<i>Parent psychosocial characteristics</i>					
Parental self-efficacy score (1-5)	3.8 (0.7)	3.8 (0.5)	3.7 (0.8)	3.9 (0.8)	3.6 (0.5)
Social desirability score (1-13)	8.7 (2.4)	8.7 (2.3)	8.6 (2.5)	8.5 (2.5)	8.8 (2.3)
Collectivism score (1-4)	2.8 (0.3)	2.8 (0.3)	2.7 (0.3)	2.8 (0.2)	2.7 (0.2)
<i>Child characteristics</i>					
Child age	10.1 (0.9)			10.3 (0.9)	9.9 (0.8)
Child-report internalizing behavior (0-58)	12.8 (8.4)			12.9 (8.2)	12.8 (8.5)
Child-report externalizing behavior (0-58)	9.2 (6.8)			9.0 (6.4)	9.4 (7.1)
Parent-report internalizing behavior (0-58)	8.7 (6.2)	9.1 (6.4)	8.2 (6.0)	8.0 (6.4)	9.2 (6.1)
Parent-report externalizing behavior (0-58)	10.0 (6.5)	10.3 (6.8)	9.7 (6.2)	9.1 (6.5)	10.7 (6.5)
<i>N (Families)</i>	2,870	2,870	2,870	1,260	1,610

Table 2.3. Stepwise regression results – child behavior problems

Specification	Child-Report		Parent-Report	
	Internalizing behavior	Externalizing behavior	Internalizing behavior	Externalizing behavior
<i>1. Mixed effects: No covariates</i>				
Perceived material deprivation	0.053** (0.025)	0.045* (0.025)	0.329*** (0.030)	0.221*** (0.027)
Income (\$10,000)	0.000 (0.005)	0.004 (0.005)	-0.005 (0.006)	-0.010* (0.006)
<i>2. Mixed effects: Controlling for sociodemographics</i>				
Perceived material deprivation	0.051** (0.025)	0.048* (0.025)	0.325*** (0.031)	0.216*** (0.027)
Income (\$10,000)	0.000 (0.006)	0.003 (0.006)	-0.000 (0.006)	-0.006 (0.006)
<i>3. Mixed effects: Controlling for sociodemographics and parent psychosocial characteristics</i>				
Perceived material deprivation	0.048* (0.025)	0.045* (0.025)	0.301*** (0.030)	0.202*** (0.027)
Income (\$10,000)	0.000 (0.006)	0.003 (0.006)	-0.000 (0.006)	-0.005 (0.006)
<i>4. Mixed effects: Controlling for sociodemographics, parent psychosocial characteristics, and lagged child behavior</i>				
Perceived material deprivation	0.022 (0.027)	0.022 (0.028)	0.215*** (0.032)	0.169*** (0.031)
Income (\$10,000)	0.011 (0.007)	-0.014** (0.007)	0.009 (0.006)	0.005 (0.006)
<i>5. Fixed effects: Controlling for sociodemographics, parent psychosocial characteristics, and lagged child behavior</i>				
Perceived material deprivation	-0.037 (0.044)	-0.035 (0.047)	0.056 (0.039)	0.138*** (0.037)
Income (\$10,000)	0.011 (0.010)	-0.028*** (0.010)	0.011 (0.009)	-0.022*** (0.008)

Note: All models control for country, wave, and country-wave fixed effects. Fixed effects specification also includes parent and family fixed effects. Coefficients presented in SD units. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

**Table 2.4. Stepwise regression results – parenting behavior**

Specification	Child-Report		Parent-Report	
	Physical aggression	Psychological aggression	Physical aggression	Psychological aggression
<i>1. Mixed effects: No covariates</i>				
Perceived material deprivation	0.092*** (0.028)	0.075*** (0.028)	0.168*** (0.030)	0.237*** (0.031)
Income (\$10,000)	-0.007 (0.006)	0.003 (0.006)	-0.024*** (0.006)	-0.011* (0.006)
<i>2. Mixed effects: Controlling for sociodemographics</i>				
Perceived material deprivation	0.086*** (0.028)	0.077*** (0.028)	0.159*** (0.030)	0.233*** (0.031)
Income (\$10,000)	-0.003 (0.006)	-0.001 (0.006)	-0.014** (0.007)	-0.005 (0.006)
<i>3. Mixed effects: Controlling for sociodemographics and parent psychosocial characteristics</i>				
Perceived material deprivation	0.080*** (0.028)	0.071** (0.028)	0.143*** (0.030)	0.207*** (0.030)
Income (\$10,000)	-0.003 (0.006)	-0.002 (0.006)	-0.013** (0.006)	-0.005 (0.006)
<i>4. Mixed effects: Controlling for sociodemographics, parent psychosocial characteristics, and lagged child behavior</i>				
Perceived material deprivation	0.071** (0.036)	0.060* (0.034)	0.100*** (0.037)	0.154*** (0.036)
Income (\$10,000)	-0.001 (0.008)	0.006 (0.007)	-0.008 (0.008)	-0.000 (0.008)
<i>5. Fixed effects: Controlling for sociodemographics, parent psychosocial characteristics, and lagged child behavior</i>				
Perceived material deprivation	0.051 (0.052)	0.002 (0.050)	0.028 (0.048)	0.094** (0.045)
Income (\$10,000)	0.004 (0.011)	-0.003 (0.011)	-0.011 (0.011)	-0.006 (0.011)

Note: All models control for country, wave, and country-wave fixed effects. Fixed effects specification also includes parent and family fixed effects. Coefficients presented in SD units. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

**Table 2.5. Mediation results**

	Child-Report		Parent-Report	
	Internalizing behavior	Externalizing behavior	Internalizing behavior	Externalizing behavior
<b>A. Perceived money problems</b>				
<i>Mediator: Physical aggression</i>				
Indirect effect	0.000 (0.002)	0.004 (0.005)	0.002 (0.004)	0.004 (0.006)
Direct effect	0.096** (0.040)	0.079* (0.042)	0.160*** (0.035)	0.112*** (0.034)
Total effect	0.096** (0.041)	0.083** (0.042)	0.162*** (0.035)	0.116*** (0.034)
Proportion of total effect mediated	0.002	0.045	0.013	0.030
Ratio of indirect to direct effect	0.002	0.047	0.014	0.031
Ratio of total to direct effect	1.002	1.047	1.014	1.031
<i>Mediator: Psychological aggression</i>				
Indirect effect	0.004 (0.009)	0.004 (0.008)	0.012** (0.005)	0.017** (0.008)
Direct effect	0.096** (0.040)	0.079* (0.042)	0.160*** (0.035)	0.112*** (0.034)
Total effect	0.100** (0.041)	0.082* (0.043)	0.172*** (0.035)	0.129*** (0.034)
Proportion of total effect mediated	0.042	0.046	0.067	0.128
Ratio of indirect to direct effect	0.044	0.048	0.072	0.147
Ratio of total to direct effect	1.044	1.048	1.072	1.147
<b>B. Income (\$10,000)</b>				
<i>Mediator: Physical aggression</i>				
Indirect effect	-0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)
Direct effect	0.006 (0.008)	0.006 (0.009)	0.010 (0.007)	0.008 (0.006)
Total effect	0.006 (0.008)	0.005 (0.009)	0.009 (0.007)	0.007 (0.006)
Proportion of total effect mediated	-0.009	-0.205	-0.105	-0.220
Ratio of indirect to direct effect	-0.009	-0.170	-0.095	-0.180
Ratio of total to direct effect	0.991	0.830	0.905	0.820
<i>Mediator: Psychological aggression</i>				
Indirect effect	0.002 (0.002)	0.002 (0.002)	0.000 (0.001)	0.000 (0.002)
Direct effect	0.006 (0.008)	0.006 (0.009)	0.010 (0.007)	0.008 (0.006)
Total effect	0.008 (0.008)	0.007 (0.009)	0.010 (0.007)	0.008 (0.006)
Proportion of total effect mediated	.228	0.230	0.005	0.009
Ratio of indirect to direct effect	.295	0.299	0.005	0.009
Ratio of total to direct effect	1.295	1.299	1.005	1.009

Note: All models include random intercept and control for country, wave, and country-wave fixed effects, as well as the full set of covariates. Coefficients presented in SD units. Bootstrapped standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

## **Chapter 3. Local Job Losses and Child Maltreatment: A National Replication**

### ***3.1 Introduction***

Child maltreatment has serious short- and long-term health consequences, including illness, disability, psychopathology, and early mortality (Cicchetti and Toth 2005; Felitti et al. 1998). A growing body of evidence suggests that community-level economic downturns are an important risk factor for child maltreatment (Berger et al., 2015; Frioux et al., 2014; Lindo et al., 2013; Schenck-Fontaine et al., 2017; Seiglie, 2004; Wood et al., 2015). This association is concerning, because economic downturns are an inevitable part of the business cycle in capitalist economies (Hénin, 2013).

However, most of the prior studies have examined this association only in select U.S. counties or states (Berger et al., 2015; Frioux et al., 2014; Lindo et al., 2013; Schenck-Fontaine et al., 2017; Seiglie, 2004; Wood et al., 2015). It is possible that the county and state populations included in the prior literature differ from the U.S. population as a whole in ways that could bias the association between economic downturns and child maltreatment. The same may be true for the economic and Child Protective Services (CPS) contexts on which prior research has focused. Only two studies have investigated the effect of economic downturns on child maltreatment at the national level, but both studies used data from prior to 2000, which do not reflect the recent changes in the economic climate and labor market conditions (Bitler & Zavodny, 2004; Seiglie, 2004). Therefore, the findings of these studies may not be generalizable to the effects of

economic downturns today. It is critical to assess the generalizability of these findings and the breadth of their applicability, so that policy makers may determine how these findings should influence the design and implementation of policy interventions. The aim of this study is to replicate prior research investigating the effect of community-wide job losses, our preferred operationalization of an economic downturn, on screened-in reports of child maltreatment using national data.

### ***3.2 Background***

The studies that have most rigorously assessed the association between community-wide economic downturns and child maltreatment indicate that economic downturns predict an increase in child maltreatment risk (Frioux et al., 2014; Lindo et al., 2013; Schenck-Fontaine et al., 2017; Seiglie, 2004). While most of these studies found that an economic downturn predicts an increase in the rate of child maltreatment investigations, the effect of economic downturns on child maltreatment may also be one of severity. One study that was able to disentangle effects on frequency from effects on severity found that, although the rate of investigated reports of child maltreatment remained stable after an economic downturn, an increased share of the reports reflected relatively severe maltreatment (Schenck-Fontaine et al., 2017). Additionally, there is evidence that economic downturns are associated with an increase in unsubstantiated reports, which suggests that downturns may also impact community reporting or CPS screening behaviors (Schenck-Fontaine et al., 2017; Seiglie, 2004). These effects of economic downturns on child maltreatment investigations and substantiations appear to

be delayed, peaking in the second quarter after the downturn (Schenck-Fontaine et al., 2017).

Research on whether economic downturns differentially influence different types of maltreatment is less clear. Of the studies that have examined the differential effects of economic downturns on child maltreatment, two studies found an association between economic downturns and an increase in the rates of investigations for both physical abuse and neglect (Lindo et al., 2013; Steinberg, Catalano, & Dooley, 1981). Another study found that economic downturns only predict an increase in the rate of neglect investigations, but not abuse (Seiglie, 2004). Finally, the study that was able to disentangle severity from frequency found that economic downturns only predict an increase in the rate of severe neglect with a high risk of harm to the child (Schenck-Fontaine et al., 2017).

An important limitation of the extant literature is the concern about population and ecological validity. Most prior studies have investigated the association between economic downturns and child maltreatment in select, regional samples, including California, North Carolina, and Pennsylvania (Berger et al., 2015; Frioux et al., 2014; Lindo et al., 2013; Schenck-Fontaine et al., 2017; Seiglie, 2004; Wood et al., 2015). Though these studies used population-level data, the studied states and counties may differ from the U.S. as a whole with respect to their population characteristics, economies, and CPS systems in ways that could influence the association between economic downturns and child maltreatment investigations. Two studies have used data from all U.S. states, but

both of these studies focused on time periods prior to 2000 (Bitler & Zavodny, 2004; Seigle, 2004). Labor market participation rates have steadily declined since their peak in 2000, particularly for workers with less than a college education (Hipple, 2016), a trend that may be largely due to technological changes that result in fewer manufacturing jobs (Hicks & Devaraj, 2015). Moreover, two of the most severe recessions since the Great Depression have occurred since 2000 (Jacobsen & Mather, 2010), with significant lingering effects on unemployment rates even after the 2007-2009 recession (CBPP, 2017). Thus, families face a more tenuous labor market and economic climate in the new millennium than prior to 2000. Therefore, the findings of these two national studies may not be generalizable to the current economic climate and labor market.

The lack of recent U.S.-wide research is particularly important to note, since the effects of economic downturns on child maltreatment have not been found in all communities and, therefore, it is possible that the effects do not generalize to the nation as a whole. In fact, several studies have found that the relation between child maltreatment rates and economic downturns varied across states or counties within a state (Millett, Lanier, & Drake, 2011; Nguyen, 2013; Schenck-Fontaine et al., 2017; Steinberg et al., 1981). While most of these studies did not examine possible reasons for these regional differences, initial evidence suggests that pre-existing economic conditions within a community are one possible reason for such regional differences (Schenck-Fontaine et al., 2017).

The current study aims to address the question of external validity by assessing the impact of sudden and unanticipated community-wide job losses, our preferred operationalization of a local economic downturn, on screened-in reports of child maltreatment (i.e., allegations of abuse or neglect accepted by CPS for further attention) in all U.S. states between 2004 and 2013. Specifically, this study first investigates whether job losses are associated with an increase in the rate of screened-in reports of child maltreatment and the substantiation rate of reports. Then, this study examines whether these effects are immediate or delayed. Finally, this study investigates the association between job losses and screened-in reports by type of abuse or neglect.

### ***3.3. Methods***

#### **3.3.1 Data and Measures**

Child maltreatment reports data came from the National Child Abuse and Neglect Data System (NCANDS): Child File. States voluntarily submit data to a federal repository, from which NCANDS data are culled. The data included in the following analyses are from the years 2004 to 2013, the most recent year for which job loss data is available. While the majority of states have consistently submitted their data since 2004, Oregon and North Dakota did not begin submitting data until 2012 and are, therefore, excluded from these analyses. Moreover, fourteen states did not submit data in some years, but submitted data for at least 7 of the 10 years and were, therefore, included in the analyses.

Data for each screened-in report includes basic demographic information for the

child, the type of maltreatment reported (i.e., neglect, physical abuse, sexual abuse, other abuse, and no abuse), and the disposition of the report (i.e., substantiated or unsubstantiated). Each report may include up to four different types of maltreatment. Reports with a maltreatment type of “other abuse” include cases of abandonment and risk of harm to the child and, in many cases, indicates that the report was handled through an alternative response (Shusterman, Hollinshead, Fluke, Yuan, & McDonald, 2005). Reports with a maltreatment type of “no abuse” include reports handled through an alternative response or reports for children living in the same home as the focal child of a given maltreatment report (Raissian & Bullinger, 2017; Shusterman et al., 2005). Because of the state variation in the definition of these two maltreatment types, reports of “other abuse” or “no abuse” were excluded from these analyses. To calculate our outcomes of interest, we aggregated the data to construct a state-month panel dataset and calculated rates per 1,000 children using population data from the U.S. Census.

To test the effects of economic downturns on child maltreatment reports by type and disposition, this study used community-wide job losses as a proxy for economic downturns. Data on community-level job losses came from the Bureau of Labor Statistics’ (BLS) Mass Layoff Statistics. The job loss data contain monthly information about job losses due to mass business closings and layoffs and exclude employment separations initiated by the workers for each state. Mass closings and mass layoffs are defined as those closings or layoffs that affect 50 or more workers and last longer than thirty days. Because forced job losses are likely not anticipated by workers and

communities, they are more likely to reflect exclusively exogenous changes in the economy than the more commonly used unemployment rate, which reflects changes both in the economy and in other phenomena that could independently affect child maltreatment (Ananat, Gassman-Pines, & Gibson-Davis, 2011, 2013). Economic change in a community is measured by scaling the total number of workers affected by job losses in the state by the number of working-age adults (age 25 to 64) in the state.

Quarterly lagged predictor variables were included in all analyses, to assess whether the effect of the economic downturn on screened-in reports in month  $j$  are delayed and whether they persist over time. For the monthly job loss data, the quarterly lagged predictors were constructed by first creating monthly variables for  $j=t-1$  through  $t-12$  equal to the lagged value of the percent of the working-age population affected by job losses at month  $j$ . Then, the values of the lagged variables were averaged in three month groupings.

### **3.3.2. Analytical Strategy**

We conducted analyses of the effects of job losses on three types of outcomes: the rate of screened-in reports per 1,000 children, the rate of reports per 1,000 children for each type of maltreatment (i.e., physical abuse, neglect, and sexual abuse), and the share of reports that was substantiated. Ordinary least squares regression models were used to model the effect of job losses on the share of reports that was substantiated. Heteroskedastic-robust standard errors were clustered at the state level. Fixed-effects generalized linear models were used for all analyses. Poisson regression models

appropriate for modeling non-normally distributed counts and rates were used to examine the effect of community-wide job losses on the rate of maltreatment reports per 1,000 children. All regression models included sets of dichotomous indicators for the following: state, to capture persistent differences between states; year of CPS report, to capture statewide changes that may affect job losses and CPS reports; and month of CPS report, to address seasonality. They also included linear state-specific over-time trends to capture linearly evolving differences in job losses and CPS reports by state. In other words, the inclusion of year, month, and linear time trend indicators isolates the effect of job losses that were aberrations relative to the overall economy in the state in a given month and year, and relative to any linearly evolving trends within states. The inclusion of state fixed effects controls for all stable differences between states.

### ***3.4. Results***

#### **3.4.1. Descriptive Statistics**

Table 3.1 presents summary statistics for the key variables for the 4,839 state-months included in the analyses. During the study period, an average of 3.73 reports per 1,000 children were investigated in a given month. Of these screened-in reports, 22.8 percent of reports (0.85 reports per 1,000 children) were reports of physical abuse, 69.2% (2.58 reports per 1,000 children) were reports of neglect, and another 8.0% (0.30 reports per 1,000 children) were reports of sexual abuse. With regards to community job loss, on average, 0.08 of the working-age population was affected by job losses in a given

district-month. Of all screened-in reports, 25.7 percent (0.96 reports per 1,000 children) were substantiated.

### **3.4.2. Effects of Community-Wide Job Losses on Child Maltreatment Reports**

An increase in community-wide job losses was not significantly related to the overall rate of reports screened in for investigation, suggesting that the overall rate of screened-in reports remained stable in response to job losses (Table 3.2, Column 1). However, an increase in community-wide job losses was significantly associated with an increase in the rate of physical abuse (Table 3.2, Column 2). Specifically, though community-wide job losses did not have an immediate effect on the rate of physical abuse, in the three months following a 1% increase in the percent of the affected by job losses, there was a 283.8% increase ( $IRR = 3.838, p < 0.05$ ) in the rate of screened-in reports for physical abuse. This effect is equivalent to approximately 2.4 additional screened-in reports per 1,000 children. Four to six months after job losses, there was a 433.0% increase ( $IRR = 5.330, p < 0.05$ ) in the rate of screened-in reports for physical abuse. This effect is equivalent to approximately 3.7 additional screened-in reports per 1,000 children. Job losses did not significantly impact the rate of physical abuse reports more than six months after job losses occurred. Job losses were also not associated with a change in the rate of screened-in reports for neglect or sexual abuse (Table 3.2, Columns 3 and 4).

### **3.4.3. Effects of Community-Wide Job Losses on Child Maltreatment Report Substantiation**

An increase in community-wide job losses was also associated with an immediate and lingering significant decrease in the share of screened-in reports of maltreatment that were substantiated (Table 3.3). Specifically, a 1% increase in the percent of the working-age population affected by job losses was associated with 0.83 percentage-point decrease in the share of total screened-in reports that was substantiated during the month in which the job losses occurred. This is equivalent to a 3.23% decrease in the share of reports that was substantiated. Additionally, in the three months following job losses there was a 1.23 percentage-point decrease in the share of reports that was substantiated ( $p < 0.01$ ), which is equivalent to a 5.06% decrease in the share of reports that was substantiated.

### ***3.5 Discussion and Next Steps***

Using data on screened-in reports of child maltreatment from 48 of the 50 U.S. states, we find that community-level job losses had no effect on the overall rate of screened-in reports of child maltreatment. The finding that job losses were not associated with the overall rate of screened-in reports is consistent with one prior study that found that the effects of economic downturns operate on the severity of maltreatment and not the frequency (Schenck-Fontaine et al., 2017). When examining the effects of job losses by type of maltreatment, we find that job losses predicted a significant increase in the rate of screened-in reports of physical abuse, but not neglect or

sexual abuse. Even though neglect is associated with significant harm for children, physical abuse and sexual abuse have traditionally been considered more severe forms of maltreatment than neglect. Thus, while the present study was not able to disentangle effects on severity and frequency, the differential effects by sub-type of finding do appear to suggest that the effects of job losses are solely on a more severe type of child maltreatment. That job losses do not predict an increase in the rate of neglect reports contradicts findings from previous studies (Lindo et al., 2013; Seiglie, 2004; Steinberg et al., 1981). This difference may be due to characteristics of the CPS system or economy in the states on which those analyses focused, but it may also be explained by the less rigorous analytical approaches used by these studies.

The increase in physical abuse reports began in the three months following job losses and peaked in the four to six months following job losses, after which the effect dissipated entirely. This lagged but enduring effect is consistent with prior research on the timing of the effects of economic downturns on child maltreatment (Schenck-Fontaine et al., 2017), as well as with prior research on the effects of involuntary job losses on other outcomes (Arulampalam, 2001; Kinicki, Prussia, & McKee-Ryan, 2000). The delay in the effects of job losses may be because families have had some amount of financial buffer that allowed them to absorb the consequences of a job loss for a short period of time.

Finally, consistent with prior research, job losses predicted a decrease in the share of all screened-in reports that was substantiated (Schenck-Fontaine et al., 2017;

Seigle, 2004). Also consistent with prior research (Schenck-Fontaine et al., 2017), this effect on the substantiation lingered for several months after the job losses occurred. This decrease in the share of reports that was substantiated suggests that at least some reports being screened into CPS for investigation in the month during which job losses occurred and shortly thereafter should have been screened out instead. This may be due to a change in community reporting or CPS screening behaviors.

In sum, the results suggest that, although job losses do not impact the overall rate of screened-in reports of child maltreatment, they do predict a slightly delayed and lingering increase in the rate of a more severe type of maltreatment, physical abuse. Moreover, job losses also predict a decrease in the share of reports that was unsubstantiated. Together, these results provide further evidence of the effects of economic downturns on child maltreatment and indicate that these effects generalize to the U.S. as a whole. That the results of prior research generalize to the nation as a whole suggest that the association between economic downturns and child maltreatment is unlikely to be an artifact of specific characteristics of the populations, economies, and CPS systems that have been studied in prior research.

However, while these results suggest that job loss has an association with reports of physical abuse, but not the overall rate of child maltreatment reports, it is important to note that, because of the reliance on CPS data on screened-in reports, these changes can reflect both a change in actual child maltreatment behavior in the community and a change in CPS screening decisions. Thus, interpretations other than an increase in actual

child maltreatment are possible. For example, the increase in the rate of physical abuse reports may reflect a change in the prioritization by CPS caseworkers who choose to focus limited agency resources on physical abuse cases during times of widespread economic strain. Other limitations to this study should also be noted. The findings likely reflect a lower bound of child maltreatment incidents because of the reliance on CPS data (Sedlak et al., 2010). However, child maltreatment data from all sources suffers from underreporting, and CPS administrative data are preferable to emergency department data for the estimation of population-level trends (Petersen, Joseph, & Feit, 2014; Widom, 1988).

Despite these limitations, the results of this study confirm that policymakers and practitioners need to pay extra attention to child maltreatment risk during and after local economic downturns, and that this effect is relevant for communities across the U.S. Several additional analyses are planned to expand this research. First, I will assess whether the job losses impact screened-in reports of child maltreatment differentially for different groups of children. Specifically, I will test differences by age, race, and gender of children. Second, I will test whether two of the primary policy responses to protect workers from the effects of economic downturns, Trade Adjustment Assistance and Unemployment Insurance, moderate these effects. Finally, I will conduct specification checks to ensure that the results are robust to my choice of job losses as the predictor variable and robust to the exclusion of states with missing data.

### 3.6 Tables

**Table 3.1. Descriptive statistics**

	Mean	SD
% Affected by job losses	0.08%	0.11%
Screened-in Reports	3.92	1.79
Substantiations	0.96	0.58
Physical Abuse	0.85	0.49
Neglect	2.58	1.52
Sexual Abuse	0.30	0.20
Other Abuse	0.33	0.83
Observations	4,839	4,839

Notes: All rates per 1,000 children

**Table 3.2. Effect of local job losses on child maltreatment reports and substantiations**

	(1) All Reports	(2) Physical Abuse	(3) Neglect	(4) Sexual Abuse
Month of job loss	0.019	0.018	0.028	0.248
	-0.046	(0.058)	(0.086)	(0.834)
1-3 months after job loss	2.560	3.838*	1.776	0.206
	(2.372)	(1.662)	(1.325)	(0.415)
4-6 months after job loss	5.433	5.330**	2.072	1.778
	(6.063)	(1.334)	(3.281)	(2.905)
7-9 months after job loss	4.444	0.164	1.791	2.151
	(5.561)	(1.785)	(1.520)	(1.684)
10-12 months after job loss	0.334	2.642	0.718	2.285
	(0.563)	(1.842)	(1.385)	(1.914)
Observations	4,839	4,839	4,839	4,839

Notes: Coefficients reported as IRR. All models control for state, year, and month fixed effects and state-time trends. Robust standard errors in parentheses

\*\* p<0.01, \* p<0.05

**Table 3.3. Effect of local job losses on share of reports substantiated**

	% of Reports Substantiated
Month of job loss	-0.831* (0.405)
1-3 months after job loss	-1.230** (0.288)
4-6 months after job loss	-0.025 (0.256)
7-9 months after job loss	-0.188 (0.274)
10-12 months after job loss	0.202 (0.295)
Observations	4,839

Notes: All models control for state, year, and month fixed effects and state-time trends.

Robust standard errors in parentheses

\*\* p<0.01, \* p<0.05

## Conclusion

The purpose of this dissertation is to provide a more nuanced and global perspective to a growing body of literature on the multiple dimensions of economic hardship at the family and community level and their impacts on children and parents. The first chapter provides compelling evidence that income poverty is a necessary but insufficient measure of economic hardship. Consistent with prior literature on the distinction between the three independent dimensions of economic hardship, I find that approximately half of the families who experienced economic hardship were not income poor. By focusing only on income poverty, the majority of research on the effects of economic hardship on children has not accounted for the experiences of these families. Based on my finding that all manifestations of economic hardship, including those without income poverty, are associated with higher levels of children's behavior problems, I argue that a broader conceptualization of economic hardship is necessary both in our theoretical and empirical literature. Moreover, it is not sufficient that studies consider each of the three dimensions of economic hardship in isolation. I believe that, in order to develop a comprehensive understanding of the effects of economic hardship on children, it is important to consider the multiple possible combinations of the three dimensions of economic hardship, as each of these may influence children differently. However, for future research to be able to examine these more nuanced manifestations of economic hardship, it is first necessary for more studies to collect information on all

three dimensions of economic hardship, particularly longitudinal studies that allow researchers to model dynamic relationships over time.

The second chapter more deeply investigates the association between material deprivation and children's social-emotional outcomes from an international perspective, holding income constant. This study makes several important contributions to the study of material deprivation. Building on prior literature that found associations among material deprivation, children's outcomes, and positive or sensitive parenting behavior, I find that, independent of income, material deprivation is also associated with an increase in parents' disciplinary practices and children's externalizing behavior problems in this international sample. This finding underscores the finding of the first chapter, that material deprivation can affect children's outcomes at any income level. Moreover, this is the first study to our knowledge that examines the association between material deprivation, children's outcomes, and parenting behavior in low- and middle-income countries. That these associations do not differ between high-income countries and low- and middle-income countries suggests that interventions that directly target material deprivation (e.g., food or housing subsidies) and are broadly available across income levels have the potential of supporting the development of more children than interventions that focus solely on increasing family income in all countries. Together, these findings add a more nuanced and global perspective to a growing body of literature on the independent effects of material deprivation on children. The third chapter provides evidence that community-level economic hardship is

associated with children's experience of child maltreatment. Specifically, I find that job losses are associated with a significant increase in investigations for physical abuse, but not in the overall rate of investigations. Moreover, I also find that job losses predict an increase in the share of reports that was substantiated. The results of this study confirm that policymakers and practitioners need to pay extra attention to child maltreatment risk during and after local economic downturns, and that this effect is relevant for communities across the U.S. Together, the findings of these three chapters indicate that income poverty at the family-level is a necessary but insufficient measure of economic hardship and that future research on the effects of economic hardship should consider all of the possible manifestations of economic hardship at both the family and community level.

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## Biography

Anika Maria Schenck-Fontaine was born on May 26, 1985, in Ulm, Germany. In 2006, she graduated from University of Maryland, receiving a B.S. in Business Administration with a minor in Rhetoric. In 2009, Anika received a Master's degree in Public Policy from Johns Hopkins University. At Johns Hopkins University, she was awarded the institute for Policy Studies Scholarship (2007 – 2009). While at Duke, she was awarded the James B. Duke Fellowship (2013 – 2017), the Education and Human Development Scholars Award (2015 – 2016), and the Doris Duke Fellowship for the Promotion of Child Well-Being (2016 - 2018).

Anika has two articles published in *Social Service Review* titled “Use of informal safety nets during the SNAP benefit cycle: How poor families cope with within-month economic instability” (with Anna Gassman-Pines and Zoelene Hill) and “Local Job Losses and Child Maltreatment: The importance of community context” (with Anna Gassman-Pines, Christina Gibson-Davis, and Elizabeth Ananat). She also has a report published for the Administration for Children and Families titled “Self- regulation and toxic stress: A systematic review of ecological, biological, and developmental studies” (with Amar Hamoudi, Desiree Murray, and Lucy Sorensen). She has a book chapter forthcoming in the *APA Handbook of Contemporary Family Psychology* titled “Economic Strain and Job Loss.”