

## Associations Between Perceived Material Deprivation, Parents' Discipline Practices, and Children's Behavior Problems: An International Perspective

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This study investigated the association between perceived material deprivation, children's behavior problems, and parents' disciplinary practices. The sample included 1,418 8- to 12-year-old children and their parents in China, Colombia, Italy, Jordan, Kenya, the Philippines, Sweden, Thailand, and the United States. Multilevel mixed- and fixed-effects regression models found that, even when income remained stable, perceived material deprivation was

This article has benefitted from very helpful advice and comments from the Anna Gassman-Pines. This research has been funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development grant RO1-HD054805, Fogarty International Center grant co, the Jacobs Foundation, and an International Research Fellowship in collaboration with the Centre for the Evaluation of Development Policies (EDePO) at the Institute for Fiscal Studies (IFS), London, UK, funded by the European Research Council (ERC) under the Horizon 2020 research and innovation program (grant agreement No 695300-HKADeC-ERC-2015-AdG). This research also was supported by the Intramural Research Program of the NIH/NICHHD. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or NICHHD. Finally, we are also grateful to the Doris Duke Foundation Fellowship for the Promotion of Child Wellbeing for generous support.

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associated with children's externalizing behavior problems and parents' psychological aggression. Parents' disciplinary practices mediated a small share of the association between 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 suggest that material deprivation likely influences children's outcomes at any income level.

Family economic hardship has detrimental effects on children's development. Compared to their peers who do not experience economic hardship, children in families who 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, Aber, Raver, & Lennon, 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, Crnic, Cox, Mills-Koonce, & Family Life Project Key Investigators, 2013; Paat, 2011; Zilana-wala & 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). Therefore, 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 (Wuermler, 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.

#### *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, Ge, Elder, Lorenz, & Simons, 1994; Conger et al., 1992, 2002; 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.

### *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, Guio, & Marlier, 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, whereas 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.

### *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), whereas one study found stronger effects for fathers (Ponnet, Wouters, Goedemé, & Mortelmans, 2013). No studies to our knowledge have yet examined whether material deprivation is differentially related to mothers' and fathers' parenting practices.

### *An International Perspective*

One third of children in 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 developmental outcomes focuses predominantly on children in 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 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 by country according to children's perception of parenting norms (Deater-Deckard et al., 2011; Gershoff et al., 2010; Lansford et al., 2005). 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 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.

#### *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 (PAC) project, 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: (a) What is the association between perceived material deprivation and children's internalizing and externalizing behavior problems in an international sample of families? (b) 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? (c) Are the associations among perceived material deprivation, children's behavior problems, and parents' disciplinary practices different for fathers and mothers? (d) 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, Washbrook, & Propper, 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.

Longitudinal data allow 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.

## Method

### *The PAC Project*

This study used data from the PAC Project, 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 11 data collection sites in nine countries: Jinan, China ( $n = 120$ ), Shanghai, China ( $n = 121$ ), Medellín, Colombia ( $n = 108$ ), Naples, Italy ( $n = 100$ ), Rome, Italy ( $n = 103$ ), Zarqa, Jordan ( $n = 114$ ), Kisumu, Kenya ( $n = 100$ ), Manila, Philippines ( $n = 120$ ), Trollhättan and 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 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 1 hr 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

Table 1  
*Country Descriptions*

	GDP per capita (US\$) 2016 <sup>a</sup>	Human Development Index rank 2015 <sup>b</sup>	% of pop < US\$1.25 per day 2002–2012 <sup>b,c</sup>	Age at first marriage (women) 2015 <sup>d</sup>	No. of children per household 2008–2012 <sup>e</sup>	Child Development Index rank 2005–2010 <sup>f</sup>
China	6,807	90	6.3	24.7	1.2	29
Colombia	7,831	97	5.6	22.2	2.0	52
Italy	35,925	27	—	30.6	2.0	—
Jordan	5,214	80	0.1	24.7	3.3	45
Kenya	1,245	145	43.4	22.0	3.6	102
Philippines	2,765	115	19.0	24.4	2.8	80
Sweden	60,430	14	—	31.4	2.2	19
Thailand	5,778	93	0.3	24.1	1.7	49
USA	53,042	8	4.3 <sup>g</sup>	26.9	2.4	23
Range	—	8–145	0–43	22–31	1–13	—

Note. —, No data available.

<sup>a</sup>World Bank (2017). <sup>b</sup>Jahan (2015). <sup>c</sup>Shaefer and Edin (2013). <sup>d</sup>World Bank (2015). <sup>e</sup>Parenting across cultures data. <sup>f</sup>Cobham, Molina, and Guarde (2012). <sup>g</sup>% of households < US\$2.00 per day.

Table 2  
Descriptive Statistics

	M (SD)				
	(1) Full Sample	(2) Mothers	(3) Fathers	(4) High-income countries	(5) Low- and middle-income countries
Demographics					
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)
No. of adults	2.6 (1.1)			2.1 (0.6)	2.9 (1.2)
No. of children	2.3 (1.2)			2.2 (0.9)	2.3 (1.3)
Economic hardship					
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)
Parenting behavior					
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)
Parent psychosocial characteristics					
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)
Child characteristics					
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)
N (families)	2,870	2,870	2,870	1,260	1,610

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.

### 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 the results suggest that the construct has the same meaning across countries (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 or 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 .08 and .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, 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 and found to be invariant across countries (Huang et al., 2011; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). 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 (a) "spansks, slaps, or hits," (b) "grabs or shakes," or (c) "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 (a) "tells [the] child to be ashamed," (b) "tells [the] child [they] won't love him or her anymore," (c) "threatens [the child] with punishment," (d) "threatens to leave," (e) "scares [the] child into behaving," (f) "ignores," (g) 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 .15 and .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 1 of 10 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 and the Consumer Price Index were then used to equate all amounts to 2010 U.S. 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 and the results suggest that this scale has the same meaning across countries (Bornstein, 2019; 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.

#### *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 nonresponse 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 data set. 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 (StataCorp, College Station, TX, USA). 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 list-wise deletion (Young & Johnson, 2015).

### *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 who 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 using Specification 4 (i.e., mixed-effects). Models using child-reported data used child reports of both children's behavior and parent's disciplinary practices, whereas models using parent-reported data used parent-reports of both children's behavior and of parent's disciplinary practices. To accommodate the hierarchical structure of the data, we followed the procedure for multilevel mediation modeling outlined by Krull and MacKinnon (2001), which adjusts for any bias in standard errors due to correlation in 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 (a) mothers and fathers and (b) parents in HICs and parents in LMICs. As Table 1 shows, HICs (i.e., Italy, Sweden, and the United States) each have Gross Domestic Product (GDP) per capita that is an order of magnitude higher than the GDP per capita of the LMICs 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).

## Results

### *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. 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 ( $r = -.29$ ,  $p < .001$ ). 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 1–5, whereas 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 8.6, respectively;  $t(8,984) = -41.52$ ,  $p < .01$ , whereas parents reported slightly higher levels of externalizing behavior problems than children, 9.4 compared to 9.2, respectively;  $t(8,984) = -2.38$ ,  $p < .05$ .

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;  $t(6,454) = -4.32$ ,  $p < .01$ . 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;  $t(9,012) = -6.82$ ,  $p < .01$ , and externalizing behavior problems, mean score of 10.3 compared to 9.7,  $t(9,012) = -4.25$ ,  $p < .01$ .

Descriptive statistics for HICs and LMICs are presented in Columns 4 and 5 of Table 2. Families in HICs had higher household income than families in LMICs, \$43,986 compared with \$24,397, respectively;  $t(6,470) = -25.34$ ,  $p < .01$ . Compared to 29.4% of parents in LMICs, fewer parents in HICs reported material deprivation, 25.6%;  $t(6,454) = 2.13$ ,  $p < .05$ . Parents in HICs also reported less frequent psychological aggression, mean score of 1.9 compared to 2.0 in LMICs;  $t(8,795) = 10.99$ ,  $p < .01$ , and less frequent physical aggression, mean score of 1.4 compared to 1.6 in LMICs;  $t(8,795) = 19.97$ ,  $p < .01$ . The same pattern was found using children's reports of parents' physical and psychological aggression. Compared to parents in LMICs, parents in HICs also reported lower levels of children's internalizing behavior problems, 9.1 compared to 10.7;  $t(9,012) = 7.45$ ,  $p < .01$ , and externalizing behavior problems, 8.0 compared to 9.2;  $t(9,012) = -4.25$ ,  $p < .01$ . Children's self-report of internalizing and externalizing behavior problems did not differ significantly between countries.

### *Associations With Children's Behavior Problems*

Columns 1 and 2 of Table 3 present the results from the regression models predicting children's self-reported internalizing and externalizing

Table 3  
Stepwise Regression Results—Child Behavior Problems

Specification	Child-report		Parent-report	
	Internalizing behavior	Externalizing behavior	Internalizing behavior	Externalizing behavior
1. Mixed effects: No covariates				
Perceived material deprivation	.053 (.025)*	.045 (.025)	.329 (.030)**	.221 (.027)**
Income (\$10,000)	.000 (.005)	.004 (.005)	-.005 (.006)	-.010* (.006)
2. Mixed effects: Controlling for sociodemographics				
Perceived material deprivation	.051 (.025)*	.048 (.025)	.325 (.031)**	.216 (.027)**
Income (\$10,000)	.000 (.006)	.003 (.006)	-.000 (.006)	-.006 (.006)
3. Mixed effects: Controlling for sociodemographics and parent psychosocial characteristics				
Perceived material deprivation	.048 (.025)	.045 (.025)	.301 (.030)**	.202 (.027)**
Income (\$10,000)	.000 (.006)	.003 (.006)	-.000 (.006)	-.005 (.006)
4. Mixed effects: Controlling for sociodemographics, parent psychosocial characteristics, and lagged child behavior				
Perceived material deprivation	.022 (.027)	.022 (.028)	.215 (.032)**	.169 (.031)**
Income (\$10,000)	.011 (.007)	-.014 (.007)*	.009 (.006)	.005 (.006)
5. Fixed effects: Controlling for sociodemographics, parent psychosocial characteristics, and lagged child behavior				
Perceived material deprivation	-.037 (.044)	-.035 (.047)	.056 (.039)	.138 (.037)**
Income (\$10,000)	.011 (.010)	-.028 (.010)**	.011 (.009)	-.022 (.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.

\* $p < .05$ . \*\* $p < .01$ .

behavior problems. There was a significant, positive associations between perceived material deprivation and children's reports of internalizing behavior problems. This association was robust to the inclusion of sociodemographic characteristics, but was not robust to the inclusion of parents' psychosocial characteristics. There was no association between perceived material deprivation and child-reported externalizing behavior problems. 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 ( $p < .05$ ). Similarly, the results of the fixed-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 ( $p < .01$ ).

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 ( $p < .01$ ). At the same time, perceived material deprivation was associated with a 0.17 *SD* increase in the parent-reported externalizing behavior problems ( $p < .01$ ). 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 ( $p < .01$ ). 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 ( $p < .01$ ).

#### Associations With Parent's Disciplinary Practices

Columns 1 and 2 of Table 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

Table 4  
 Stepwise Regression Results—Parenting Behavior

Specification	Child-report		Parent-report	
	Physical aggression	Psychological aggression	Physical aggression	Psychological aggression
1. Mixed effects: No covariates				
Perceived material deprivation	.092 (.028)**	.075 (.028)**	.168 (.030)**	.237 (.031)**
Income (\$10,000)	-.007 (.006)	.003 (.006)	-.024 (.006)**	-.011 (.006)
2. Mixed effects: Controlling for sociodemographics				
Perceived material deprivation	.086 (.028)**	.077 (.028)**	.159 (.030)**	.233 (.031)**
Income (\$10,000)	-.003 (.006)	-.001 (.006)	-.014 (.007)*	-.005 (.006)
3. Mixed effects: Controlling for sociodemographics and parent psychosocial characteristics				
Perceived material deprivation	.080 (.028)**	.071 (.028)*	.143 (.030)**	.207 (.030)**
Income (\$10,000)	-.003 (.006)	-.002 (.006)	-.013 (.006)*	-.005 (.006)
4. Mixed effects: Controlling for sociodemographics, parent psychosocial characteristics, and lagged child behavior				
Perceived material deprivation	.071 (.036)*	.060 (.034)	.100 (.037)**	.154 (.036)**
Income (\$10,000)	-.001 (.008)	.006 (.007)	-.008 (.008)	-.000 (.008)
5. Fixed effects: Controlling for sociodemographics, parent psychosocial characteristics, and lagged child behavior				
Perceived material deprivation	.051 (.052)	.002 (.050)	.028 (.048)	.094 (.045)*
Income (\$10,000)	.004 (.011)	-.003 (.011)	-.011 (.011)	-.006 (.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.

\* $p < .05$ . \*\* $p < .01$ .

physical and psychological aggression. The association between perceived material deprivation and child-reported physical aggression was robust to all four mixed-effects specifications. Specifically, the results of our preferred mixed-effects specification (Specification 4) shows that perceived material deprivation was associated with a 0.07 *SD* increase in child-reported physical aggression ( $p < .05$ ). The association between perceived material deprivation and child-reported psychological aggression was not robust to the inclusion of lagged child behavior. 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 4 present the results from the regression models predicting parent-reported psychological and physical aggression. 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 ( $p < .01$ ) and a 0.15 *SD* increase in parent-reported psychological aggression ( $p < .01$ ). 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 0.09 *SD* increase in parent-reported psychological aggression ( $p < .01$ ).

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.

#### Mediation Through Parent's Disciplinary Practices

Table 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

Table 5  
Mediation Results

	Child-report		Parent-report	
	Internalizing behavior	Externalizing behavior	Internalizing behavior	Externalizing behavior
A. Perceived money problems				
Mediator: Physical aggression				
Indirect effect	.000 (.002)	.004 (.005)	.002 (.004)	.004 (.006)
Direct effect	.096 (.040)*	.079 (.042)	.160 (.035)**	.112 (.034)**
Total effect	.096 (.041)*	.083 (.042)*	.162 (.035)**	.116 (.034)**
Proportion of total effect mediated	.002	.045	.013	.030
Ratio of indirect to direct effect	.002	.047	.014	.031
Ratio of total to direct effect	1.002	1.047	1.014	1.031
Mediator: Psychological aggression				
Indirect effect	.004 (.009)	.004 (.008)	.012 (.005)*	.017 (.008)*
Direct effect	.096 (.040)*	.079 (.042)	.160 (.035)**	.112 (.034)**
Total effect	.100 (.041)*	.082 (.043)	.172 (.035)**	.129 (.034)**
Proportion of total effect mediated	.042	.046	.067	.128
Ratio of indirect to direct effect	.044	.048	.072	.147
Ratio of total to direct effect	1.044	1.048	1.072	1.147
B. Income (\$10,000)				
Mediator: Physical aggression				
Indirect effect	-.000 (.000)	-.001 (.001)	-.001 (.001)	-.002 (.001)
Direct effect	.006 (.008)	.006 (.009)	.010 (.007)	.008 (.006)
Total effect	.006 (.008)	.005 (.009)	.009 (.007)	.007 (.006)
Proportion of total effect mediated	-.009	-.205	-.105	-.220
Ratio of indirect to direct effect	-.009	-.170	-.095	-.180
Ratio of total to direct effect	.991	.830	.905	.820
Mediator: Psychological aggression				
Indirect effect	.002 (.002)	.002 (.002)	.000 (.001)	.000 (.002)
Direct effect	.006 (.008)	.006 (.009)	.010 (.007)	.008 (.006)
Total effect	.008 (.008)	.007 (.009)	.010 (.007)	.008 (.006)
Proportion of total effect mediated	.228	.230	.005	.009
Ratio of indirect to direct effect	.295	.299	.005	.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.

\* $p < .05$ . \*\* $p < .01$ .

the association between perceived material deprivation and parent-reported internalizing behavior problems. Specifically, while the direct effect was 0.16  $SD$  ( $p < .01$ ), the indirect effect explained by parent-reported psychological aggression was 0.01  $SD$  ( $p < .05$ ). 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  $SD$  ( $p < .01$ ), the indirect effect explained by parent-reported psychological aggression was 0.02  $SD$  ( $p < .05$ ).

Panel B of Table 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.

#### 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 (Table S1). 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.

#### *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 (Table S2). There were no significant differences in coefficients between LMICs and HICs.

#### *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, income, disciplinary practices, and children's outcomes, it is possible that the sample in the fixed-effects regression models differs in important ways from the full sample. 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-effects 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 nonimputed data and using a fully imputed data set that included imputed outcomes. The results using the nonimputed data and the fully imputed data were substantially similar to the results of analyses using the imputed data without imputed outcomes.

## **Discussion**

This study investigates associations among household income, material deprivation, children's behavior problems, and parents' disciplinary practices using information about families in high- and LMICs. Even in our most conservative specification, we found that, net of income, being 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, net of income, was also associated with an increase in parents' self-reported use of psychological aggression when disciplining their children according to our most conservative specification. Because 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. Physical aggression as a disciplinary practice is not an uncommon practice, but rarely used by parents (Gershoff et al., 2010; UNICEF, 2014). Therefore, 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 FSM 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. Though we found no indirect effects of income, it is possible that income indirectly affects children's behavior problems through both material deprivation and parents' disciplinary practices. Such a double mediation process would be consistent with earlier findings (Gershoff et al., 2007).

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 our preferred specifications that include 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. There is also

no significant indirect effect on internalizing or externalizing behavior problems when the child-reported data are used. 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 of the main and mediation analyses. 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 is 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 aspects 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 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), whereas 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 to 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 measurement invariance has been established for our measures of child behavior problems, parents' disciplinary practices, and social desirability bias have, 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. Furthermore, 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. Although 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, because 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.

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### Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's website:

**Table S1.** Differences in Associations by Parent Gender

**Table S2.** Differences in Associations by Country GDP