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A Cross-National Analysis of Childhood Predictors of Physical Pain

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Abstract

Background: The socioeconomic, psychosocial, and behavioural factors that influence physical pain have been largely explored. However, evidence on the childhood circumstances that shape physical pain in adulthood is scarce.

Methods: Using a nationally representative dataset of 202,898 individuals from 22 countries and a random effects meta-analysis, we examine 13 potential childhood predictors of physical pain in adulthood.

Results: We find that childhood experiences, personal attributes, and familial and social circumstances have meaningful and varied associations with adulthood levels of physical pain. Specifically, we find that people whose parents were divorced, single, or died (vs married) when they were children, those who reported that their family found it very difficult to live with their family's household income when they were growing up (vs got by), those who experienced abuse (vs not), felt like an outsider (vs not), reported poor physical health while growing up (vs good) and reported more frequent religious attendance at age 12 (vs never) have a greater risk of experiencing pain later in life. The strength of these associations differs by country reflecting diverse societal influences.

Conclusions: Our study provides valuable insights on the early-life experiences that shape physical pain in adulthood. These findings enhance our understanding of early-life predictors of adult wellbeing and offer comprehensive evidence for designing interventions to reduce physical pain levels.

Keywords: Physical pain, childhood, country differences, worldwide data, cultural variation.

Plain Language Summary

Knowing the childhood predictors of physical pain is crucial for the development of approaches to reducing pain later in life. In this study, we used rigorous statistical techniques to examine the relationship between 13 childhood circumstances and physical pain in adulthood across 22 countries from all over the world. We found that people who had disadvantageous situations during childhood, like difficulties with family income, abuse, or poor physical health, had a higher risk of experiencing physical pain later in life. Other circumstances, like frequent religious attendance at age 12, were also linked to greater physical pain in adulthood. We also found that the link between childhood circumstances and pain in adulthood varied by country.

Introduction

A large body of work suggests that many diseases and conditions that occur in adulthood may have their origins in childhood [1–3]. For instance, Slopen et al. [4] have shown that childhood experiences like parental love, two-parent family structure, and high socioeconomic status were linked to good cardiovascular health in middle adulthood. Previous work also found that parental warmth during childhood was negatively associated with harmful health behaviours like drug use and smoking in mid-life [5], and that social and emotional support during childhood can be protective against later depression [6]. Related work has shown that frequent early-life religious attendance was linked to better physical health in later life [7]. While the association between childhood circumstances and health in adulthood has been studied in detail, less is known about the childhood experiences that shape physical pain in adulthood.

Prior work has attempted to address this empirical question. For instance, using data from the 1958 British Cohort Study, Jones et al. [8] found that childhood adversity, represented by familial financial hardship, living in institutional care, and maternal death, was linked to greater chronic pain in adulthood. Other related studies also used cohort data from the United Kingdom and found that low socio-economic status in childhood was linked to greater pain in adulthood [9–11]. Mustard et al. [12] have shown the same association using Canadian data. Focusing on other childhood predictors and using data from the United States, prior work has found that maternal depression [13], physical abuse [14], and an accumulation of different adverse events [15] were associated with greater physical pain in adulthood. A strong link between physical abuse during childhood and pain later in life was also found in Japan [16]. The stress that results from the exposure to negative events seems to have lifelong consequences for physical pain [17].

Although this body of work sheds light on a very important question, most of the conclusions were drawn based on samples from specific countries and only a limited number

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of childhood circumstances were explored. This scenario might have its roots in the challenge of collecting relevant data in different regions at the same time. Here, we use data from a diverse and international sample of 202,898 individuals across 22 countries to explore 13 potential childhood predictors, assessed retrospectively, of physical pain in adulthood. These predictors include age, gender, immigration status, marital status or family structure, religious service attendance and religious affiliation at age 12, relationship with mother and father, feeling like an outsider, abuse, self-rated health, immigration status, and subjective financial status of family while growing up. The selection of these childhood circumstances is based on the previously described body of work that documented strong relationships between these factors and mental and physical health in adulthood.

Examining childhood experiences is crucial because they have been associated with important behavioural outcomes in adulthood. For instance, childhood adversity has been found to be linked to harmful health behaviours like smoking and heavy drinking [18] and weaker interpersonal relationships [19]. Prior work has also shown that people who experienced adversity while growing up died 20 years earlier than those who did not experience adversity while growing up [20].

The present research is motivated by the Ecological Systems Theory (EST) [21] which suggests that one key predictor of people's circumstances in adulthood including physical and mental health is the set of immediate environmental systems during childhood (e.g., family structure and relationships, socioeconomic status). Building on this theory that highlights the importance of individual's environment while growing up, we examine the following hypotheses:

Hypothesis 1: Childhood experiences, personal attributes, and familial or social circumstances will have varied associations with adulthood levels of physical pain.

Hypothesis 2: The strength of these associations will differ by country, reflecting diverse societal influences that are specific to each country.

Hypothesis 3: Some of the observed associations between the 13 childhood predictors and an individual's physical pain in adulthood will be robust against potential unmeasured confounding assessed through E-values.

To explore these hypotheses we 1) calculated descriptive statistics for the various childhood predictors across the 22 countries (Table 1), 2) conducted the meta-analysis of regression estimates for each of the childhood predictors using a random effects meta-analysis (Table 2), 3) estimated E-values to assess the robustness of the meta-analytic effect estimates in Table 2 to potential unmeasured confounding (Table 3), and 4) present analyses by country and graphs that visually display the childhood predictor effect estimates in each of the 22 countries in the Supplementary Information.

Our study aims to provide comprehensive insights into early-life experiences that contribute to the levels of physical pain in adulthood. The findings will enhance our understanding of early-life predictors of adult outcomes and provide valuable evidence for developing approaches to reducing physical pain levels.

Methods

The description of the methods below has been adapted from VanderWeele et al.[22]. Further methodological detail is available elsewhere [23–29].

Data

The Global Flourishing Study (GFS) is a study of 202,898 participants from 22 geographically and culturally diverse countries, with nationally representative sampling within each country, concerning the distribution of determinants of wellbeing. Wave 1 of the data included the following countries and territories: Argentina, Australia, Brazil, Egypt, Germany, Hong Kong, India, Indonesia, Israel, Japan, Kenya, Mexico, Nigeria, the Philippines, Poland, South Africa, Spain, Sweden, Tanzania, Turkey, the United Kingdom, and the United States. The countries were selected to (a) maximize coverage of the world's population, (b) ensure geographic, cultural, and religious diversity, and (c) prioritize

feasibility and existing data collection infrastructure. Data collection was carried out by Gallup Inc. Data for Wave 1 were collected principally during 2023, with some countries beginning data collection in 2022 and exact dates varying by country [27]. Four additional waves of panel data on the participants will be collected annually from 2024-2027. The precise sampling design to ensure nationally representative samples varied by country and further details are available in Ritter et al. [27]. Survey items included aspects of well-being such as happiness, health, meaning, character, relationships, and financial stability [30], along with other demographic, social, economic, political, religious, personality, childhood, community, health, and wellbeing variables. The data are publicly available through the Center for Open Science (https://www.cos.io/gfs). During the translation process, Gallup adhered to the TRAPD model (translation, review, adjudication, pretesting, and documentation) for cross-cultural survey research (ccsg.isr.umich.edu/chapters/translation/overview). Additional details about methodology and survey development can be found in the GFS Questionnaire Development Report [23], and the GFS Methodology [27], GFS Codebook, and GFS Translations documents [24].

This project was ruled EXEMPT for Institutional Review Board (IRB) review by the Baylor University IRB (#1841317-2). Gallup Inc. IRB approved the study on November 16, 2021 (#2021-11-02). All data collection was performed in accordance with the ethical standards of Gallup and with the 1964 Helsinki Declaration and its later amendments. Informed consent was obtained during the respondent recruitment stage of fieldwork. Consent was also obtained at the start of the survey. The exact wording varies across countries depending on the local laws and regulations governing data protection. All personally identifiable information (PII) was removed from the data used in this study by Gallup Inc.

Measures

Childhood Demographic Variables: Relationship with mother during childhood was assessed with the question: "Please think about your relationship with your mother when you were growing up. In general, would you say that relationship was very good, somewhat good, somewhat bad, or very bad?" Responses were dichotomized to very/somewhat good versus very/somewhat bad. An analogous variable was used for relationship with father. We dichotomized these two variables to avoid a multi-collinearity issue because these two variables were highly correlated. "Does not apply" was treated as a dichotomous control variable for respondents who did not have a mother or father due to death or absence. Parental marital status during childhood was assessed with responses of married, divorced, never married, and one or both had died. Financial status was measured with: "Which one of these phrases comes closest to your own feelings about your family's household income when you were growing up, such as when YOU were around 12 years old?" Responses were lived comfortably, got by, found it difficult, and found it very difficult. Abuse was assessed with yes/no responses to "Were you ever physically or sexually abused when you were growing up?" Participants were also asked: "When you were growing up, did you feel like an outsider in your family?" Childhood health was assessed by: "In general, how was your health when you were growing up? Was it excellent, very good, good, fair, or poor?" Immigration status was assessed with: "Were you born in this country, or not?" Religious attendance during childhood was assessed with: "How often did YOU attend religious services or worship at a temple, mosque, shrine, church, or other religious building when YOU were around 12 years old?" with responses of at least once/week, one-to-three times/month, less than once/month, or never. Gender was assessed as male, female, or other. The choice of age 12 reflects a balance between ensuring adequate recall ability and capturing a key stage in developmental transitions. Continuous age (year of birth) was classified as 18-24, 25-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80 or older. Childhood religious tradition/affiliation had response

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categories of Christianity, Islam, Hinduism, Buddhism, Judaism, Sikhism, Baha'i, Jainism, Shinto, Taoism, Confucianism, Primal/Animist/Folk religion, Spiritism, African-Derived, some other religion, or no religion/atheist/agnostic; precise response categories varied by country [31]. Racial/ethnic identity was assessed in some, but not all, countries, with response categories varying by country. In some cases, the reference category was chosen based on the category with the largest number of respondents (e.g., subjective financial status of family growing up – got by) or the mid-category (e.g., health when you were growing up – good). For additional details on the assessments see the COS GFS codebook or Crabtree et al. [23].

Outcome Variable: Our pain measure comes from the following question: "How much bodily pain have you had during the past 4 weeks?" Respondents could answer a lot, some, not very much, or none at all. In the main analyses, this variable was dichotomized as a lot/some (1) vs. not very much/none at all (0). As a post-hoc sensitivity analysis we provide the equivalent results of Table 2 with a different dichotomization point where the outcome is treated as lot/some/not very much (1) vs. none at all (0).

Statistics and reproducibility

Descriptive statistics for the observed sample, weighted to be nationally representative within country, were estimated for each childhood demographic category. A weighted modified Poisson regression model with complex survey adjusted standard errors was fit within each country for physical pain on all of the aforementioned childhood predictor variables simultaneously. In the primary analyses, random effects meta-analyses of the regression coefficients [32,33] along with confidence intervals, lower and upper limits with 95% prediction intervals, and I2 for evidence concerning variation within a given demographic category across countries [34]. Plots of estimates are available in the online supplement. Religious affiliation/tradition and race/ethnicity were used within country as control variables, when available, but these coefficients themselves were not included in the meta-analyses since

categories/responses varied by country. All meta-analyses were conducted in R [35] using the metafor package [36]. Within each country, a global test of association of each childhood predictor variable group with physical pain was conducted, and a pooled p-value [37] across countries reported concerning evidence for association within any country. Bonferroni corrected p-value thresholds are provided based on the number of childhood demographic variables [38,39]. For each childhood predictor, we calculated E-values to evaluate the sensitivity of results to unmeasured confounding. The E-value informs whether the results can be influenced by factors not included in the analyses. For instance, large E-values suggest that the unmeasured confounding can be strongly associated with both the exposure and outcome whereas small E-values suggest weak unmeasured confounding. An E-value is the minimum strength of the association an unmeasured confounder must have with both the outcome and the predictor, above and beyond all measured covariates, for an unmeasured confounder to explain away an association [40]. As a supplementary analysis, population weighted meta-analyses of the regression coefficients were estimated. All analyses were pre-registered with COS prior to data access, with only slight subsequent modification in the regression analyses due to multicollinearity

(https://osf.io/zshpy/?view_only=34700935c63449968221300d51b91350, see also Text S.1 in the Supplementary Information); all code to reproduce analyses are openly available in an online repository [26].

Missing Data

Missing data on all variables was imputed using multivariate imputation by chained equations, and five imputed datasets were used [41–44]. To account for variation in the assessment of certain variables across countries (e.g., religious affiliation/tradition and race/ethnicity), the imputation process was conducted separately in each country. This within-country imputation approach ensured that the imputation models accurately reflected country-

specific contexts and assessment methods. Sampling weights were included in the imputation model to account for missingness to be related to probability of inclusion.

Accounting for Complex Sampling Design

The GFS used different sampling schemes across countries based on availability of existing panels and recruitment needs [27]. All analyses accounted for the complex survey design components by including weights, primary sampling units, and strata. Additional methodological detail, including accounting for the complex sampling design, is provided elsewhere [25].

Results

Table 1 shows the number and percentage of people across each childhood predictor in the observed sample: 63% had a very good relationship with their mother, 53% had a very good relationship with their father, 75% had parents who were married, 41% reported that they could get by with their family income while they were growing up, 82% had not suffered from abuse, 84% had not felt like an outsider while growing up, 33% reported to have had excellent health while growing up, 94% were born in the country in which the survey was conducted, and 41% attended religious services at least once a week when they were 12 years of age. Most individuals were middle aged (30-39 years old (20%), 40-49 years old (17%), 50-59 (16%)), 51% of respondents were women, and 49% were men. These descriptive statistics for each country separately can be found in Tables S1-S22 in the Supplementary Information (SI).

Table 2 provides a summary estimate from a random effects meta-analysis of the multivariate logistic regression estimates across countries for each of the childhood predictors. The table shows that the risk ratios for having had a good or somewhat good relationship with mother and with father were 1.02 and 1.00, respectively. This suggests that there is virtually no difference in the risk of feeling pain between people who had a good or somewhat good relationship and those who had a bad or somewhat bad relationship with both

mother and father. The table also shows that people whose parents were divorced (RR = 1.06, $p < .001$, 95%CI [1.02,1.10]), single (RR = 1.11, $p < .001$, 95%CI [1.01,1.21]), or died (RR = 1.07, $p < .001$, 95%CI [1.02,1.13]) had a greater risk of experiencing physical pain in comparison to those whose parents were married. Participants who reported that their family found it very difficult to live with their household income when they were growing up (vs got by, RR=1.07, $p < .001$, 95%CI [1.03,1.11]), those who experienced abuse (vs no, RR=1.25, p $< .001$, 95%CI [1.22,1.29]), those who felt like an outsider (vs no, RR=1.16, $p < .001$, 95%CI [1.11,1.20]), and those who reported poor physical health while growing up (vs good, RR= 1.20, $p < .001$, 95%CI [1.07,1.35]) had a greater risk of experiencing pain. People who were born in a different country to the one in which the survey was conducted (RR= 0.94, $p < .001$, 95%CI [0.89,1.00]) had lower risk of experiencing physical pain in comparison to those who were born in the country in which the survey was conducted. Religious attendance at age 12 was positively linked to physical pain: People who attended religious services at least once a week (RR= 1.04, $p < .001$, 95%CI [1.00,1.08]), 1-3 times a month (RR=1.07, $p < .001$, 95%CI [1.03,1.13]) or less than once a month (RR=1.02, $p < .001$, 95%CI [0.98,1.07]) had a greater risk of experiencing pain than those who never attended a religious service at age 12. Regarding key demographic factors, the analysis shows that older people (vs younger) and women (vs men) had a greater risk of experiencing physical pain. The findings shown in Table 2 confirm *Hypothesis 1* of this study: Childhood experiences, personal attributes, and familial or social circumstances have varied associations with adulthood levels of physical pain.

Country-specific estimates of these regression models can be found in Tables S23-S244 in the Supplementary Information. Figures S1-S27 show graphs for each of the childhood predictor estimates in each of the 22 countries. These figures show the information presented in Tables S23-S44 but organized by childhood predictor, rather than by country. These country-specific findings show that some aspects like having experienced abused were

significantly positively associated with adult pain in all the countries of our sample (Figure S9). However, the link between adult pain and other aspects like the subjective financial status of family growing up varied by country. For instance, finding it very difficult to live with the family's household income while growing up was significantly positively associated with adult pain in Poland, Turkey, Egypt, and Brazil whereas that link was insignificant in the other countries (Figure S8). The results shown in Tables S23-S44, and Figures S1-S27 confirm *Hypothesis 2:* The strength of these associations differ by country, reflecting diverse societal influences that are specific to each country.

The E-values shown in Table 3 suggest that some of the observed associations were moderately robust to unmeasured confounding. For example, for having experienced abuse, an unmeasured confounder that was associated with both having experienced abuse and physical pain by risk ratios of 1.82 each (above and beyond the covariates already adjusted for) could explain away the association but weaker joint confounder associations could not. To shift the confidence interval to include the null, an unmeasured confounder associated with both having experienced abuse and physical pain by risk ratios of 1.73 each could suffice but weaker joint confounder associations could not.

Country-specific E-values can be found in Tables S45-S66 in the Supplementary Information. Overall, the analyses presented in Table 3, and Tables S45-S66 confirm *hypothesis 3* of this study: The observed associations between the 13 childhood predictors and an individual's physical pain in adulthood are robust against potential unmeasured confounding assessed through E-values.

Alternative meta-analyses in which each country's results were weighted by the *actual* 2023 population size are presented in Table S67. These results are consistent with those presented in Tables 2 and 3.

Discussion

In this study, we used a dataset of 202,898 individuals from 22 countries and a random effects meta-analysis to examine 13 childhood predictors of physical pain in adulthood. Overall, we found that people whose parents were divorced, single, or died (vs married) when they were children, those who reported that their family found it very difficult to live with their household income when they were growing up (vs got by), those who experienced abuse (vs not), felt like an outsider (vs not), reported poor physical health while growing up (vs good) and reported more frequent religious attendance at age 12 (vs never) had a greater risk of experiencing pain later in life. These findings are in line with the Ecological Systems Theory (EST) [21] which supports the idea that environmental factors, including childhood circumstances, can influence people's development, experiences, and wellbeing.

Our analyses show that the strength of these associations differs by country. For instance, while abuse was significantly positively linked with adult pain in all countries, finding it very difficult to live with family's household income while growing up was significantly negatively associated with pain in specific countries like Poland, Turkey, Egypt, and Brazil. Historical, macroeconomic, and cultural factors might help to explain these differences. For instance, stronger social safety nets and the development of resilience that help people to cope with financial difficulties can explain why finding it very difficult to live with family's household income can have different links with adult pain across countries. More research is needed to understand the specific historical, macroeconomic, and cultural aspects that might influence cross-country findings.

The general findings are in line with prior work that showed that children who grew up with married parents had better physical health and psychological wellbeing than those who grew up with single or separated parents [45]. Socioeconomic status [9–12] and abuse [14,16] during childhood have been found to be associated with greater physical pain in adulthood in the United States, Canada, and Japan. Discrimination has also been found to be a strong predictor of physical pain over time in Australia [46]. Poor physical health in childhood tends to

be strongly correlated with poor physical health in adulthood [47]. The psychological distress that results from childhood disadvantages might explain the findings of this study [17,48] as prior work has shown that negative emotions like distress and anxiety can create new pain and exacerbate existing pain [49].

It is possible that other childhood circumstances not explored here play a role in adult pain. For instance, Sheffler et al. [50] found that coping strategies mediated the link between adverse childhood experiences and mental and physical health outcomes later in life. Moreover, prior work has suggested that positive childhood experiences like engaging in prosocial behaviour, or having a large number of friends at school, can mitigate the effect of childhood negative experiences in adult health, pain, and wellbeing [51]. Future research should explore these possibilities.

Although recent work has shown that frequent early-life religious service attendance was linked to better physical health in later life [7], in this study, we found that more frequent religious service attendance during childhood was linked to greater pain in adulthood which is consistent with some other studies [52]. Although religious participation is often associated with better health, pain may be an exception [52]. It might be the case that children with poorer physical health sought religious attendance for relief and that their poor health during childhood predicted their greater pain in adulthood, however, we attempted to control for this possibility by adjusting for self-rated health in childhood. More research is needed to fully understand the dynamics between religious service attendance in childhood and physical pain later in life.

The potential multicollinearity among childhood predictors also deserves special attention. For instance, our results show that the risk of experiencing pain for people who had a good relationship with their mother or father does not differ from the risk of those who had a bad relationship with their mother or father. However, these results should be interpreted with caution due to the potential correlation among these two variables and marital status. It

might be the case that people's relationship with their parents during childhood is captured by marital status which, out of these three variables, is the one that yielded the most reliable estimate of heterogeneity (see the note of Table 2). It is also possible that prior studies relating pain to relationship with mother and father may have been confounded by marital status.

Our study has some limitations. First, our pain measure does not allow us to explore the intensity or the type of pain (e.g., back pain, neck pain), or whether pain interferes with daily activities. Second, because the childhood predictors were reported retrospectively, they may be subject to recall bias. However, for recall bias to completely explain the observed associations of the childhood predictors with adult physical pain, the effect of adult physical pain on the retrospective assessments of the childhood predictors would have to be at least as strong as the observed associations themselves [53]. Many of these observed associations were quite substantial. Third, our analyses might be subject to remaining unmeasured confounding, which we tried to address with the E-value sensitivity analysis reported in Table 3.

In the last decades, physical pain has become one of the most important public health challenges [54]. The health and economic benefits of childhood policy have, moreover, received extensive recent attention [55]. The findings of this study link these two important domains of inquiry and might inform the design of early life interventions that would contribute to reducing physical pain in adulthood.

Data availability: All the data that support the findings of this article are openly available on the Open Science Framework. The specific dataset used was Wave 1 non-sensitive Global data https://osf.io/sm4cd/ available February 2024 - March 2026 via preregistration and publicly from then onwards. All analyses were pre-registered with COS prior to data access (https://osf.io/zshpy/?view_only=34700935c63449968221300d51b91350, see also Text S.1 in the Supplementary Information);

Code availability: All code to reproduce analyses are openly available in an online

repository [26].

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Author contributions

L.M. Conducted the data analysis, wrote the paper.

C.N.O. Provided helpful comments to the written drafts.

T.B. Provided helpful comments to the written drafts.

K.S. Provided code for data analysis.

A.P. Provided helpful comments to the written drafts.

B.R.J. Coordinated data collection, participated in survey design, coordinated creation of code for analysis, provided helpful comments to the written drafts.

T.J.V. Coordinated data collection, participated in survey design, coordinated creation of code for analysis, provided helpful comments to the written drafts.

Competing interests

Funding

Tables of results

Table 1. Nationally representative childhood descriptive statistics of the observed sample

Characteristic	N = 202,898[1]	Characteristic	N = 202,898[1]
Relationship with mother		Age group	
Very good	127,836 (63%)	1998-2005; age: 18-24	27,007 (13%)
Somewhat good	52,439 (26%)	1993-1998; age: 25-29	20,700 (10%)
Somewhat bad	11,060 (5.5%)	1983-1993; age: 30-39	40,256 (20%)
Very bad	4,642 (2.3%)	1973-1983; age 40-49	34,464 (17%)
Does not apply	5,965 (2.9%)	1963-1973; age 50-59	31,793 (16%)
Missing	956 (0.5%)	1953-1963; age 60-69	27,763 (14%)
Relationship with father		1943-1953; age 70-79	16,776 (8.3%)
Very good	107,742 (53%)	1943 or earlier; age 80+	4,119 (2.0%)
Somewhat good	55,714 (27%)	Missing	20 (<0.1%)
Somewhat bad	15,807 (7.8%)	Gender	
Very bad	8,278 (4.1%)	Male	98,411 (49%)
Does not apply	13,985 (6.9%)	Female	103,488 (51%)
Missing	1,372 (0.7%)	Other	602 (0.3%)
Parent marital status		Missing	397 (0.2%)
Yes, married	152,001 (75%)	Country	
No, divorced	17,726 (8.7%)	Argentina	6,724 (3.3%)
Never married	15,534 (7.7%)	Australia	3,844 (1.9%)
No, one or both of them had died	7,794 (3.8%)	Brazil	13,204 (6.5%)
Missing	9,843 (4.9%)	Egypt	4,729 (2.3%)
Subjective financial status of family growing up		Germany	9,506 (4.7%)
Lived comfortably	70,861 (35%)	India	12,765 (6.3%)
Got by	82,905 (41%)	Indonesia	6,992 (3.4%)
Found it difficult	35,852 (18%)	Israel	3,669 (1.8%)
Found it very difficult	12,606 (6.2%)	Japan	20,543 (10%)
Missing	674 (0.3%)	Kenya	11,389 (5.6%)
Abuse		Mexico	5,776 (2.8%)
Yes	29,139 (14%)	Nigeria	6,827 (3.4%)
No	167,279 (82%)	Philippines	5,292 (2.6%)
Missing	6,479 (3.2%)	Poland	10,389 (5.1%)
Outsider growing up		South Africa	2,651 (1.3%)
Yes	28,732 (14%)	Spain	6,290 (3.1%)
No	170,577 (84%)	Tanzania	9,075 (4.5%)
Missing	3,589 (1.8%)	Turkey	1,473 (0.7%)
Self-rated health growing up		United Kingdom	5,368 (2.6%)
Excellent	67,121 (33%)	United States	38,312 (19%)
Very good	63,086 (31%)	Sweden	15,068 (7.4%)
Good	47,378 (23%)	Hong Kong	3,012 (1.5%)
Fair	19,877 (9.8%)		
Poor	4,906 (2.4%)		
Missing	530 (0.3%)		
Immigration status			
Born in this country	190,998 (94%)		
Born in another country	9,791 (4.8%)		
Missing	2,110 (1.0%)		
Age 12 rel. service attendance			
At least 1/week	83,237 (41%)		
1-3/month	33,308 (16%)		
<1/month	36,928 (18%)		
Never	47,445 (23%)		
Missing	1,980 (1.0%)		

[1]n (%)

Table 2. Random effects meta-analysis of regression of physical pain on childhood predictors

| Variable | Category | RR | 95% CI | Estimated Proportion of Effects by Threshold | | I^2 | Global p-value |
				< 0.90	> 1.10		
Relationship with mother	(Ref: Very bad/somewhat bad)						6.52e-06
	Very good/somewhat good	1.02	(0.98,1.05)	0.00	0.00	21.9	
Relationship with father	(Ref: Very bad/somewhat bad)						1.89e-05
	Very good/somewhat good	1.00	(0.98,1.02)	0.00	0.00	<0.1‡	
Parent marital status	(Ref: Parents married)						3.96e-06
	No, divorced	1.06	(1.02,1.10)	0.00	0.27	46.2	
	Single, never married	1.11	(1.01,1.21)	0.00	0.32	89.7	
	No, one or both of them had died	1.07	(1.02,1.13)	0.00	0.36	57.0	
Subjective financial status of family growing up	(Ref: Got by)						2.19e-06
	Lived comfortably	0.97	(0.93,1.00)	0.18	0.09	74.4	
	Found it difficult	1.08	(1.05,1.10)	0.00	0.23	38.1	
	Found it very difficult	1.07	(1.03,1.11)	0.00	0.18	34.8	
Abuse	(Ref: No)						1.05e-06
	Yes	1.25	(1.22,1.29)	0.00	1.00	58.8	
Outsider growing up	(Ref: No)						1.98e-06
	Yes	1.16	(1.11,1.20)	0.00	0.77	71.8	
Self-rated health growing up	(Ref: Good)						1.55e-06
	Excellent	0.85	(0.81,0.90)	0.64	0.00	86.5	
	Very good	0.91	(0.89,0.93)	0.36	0.00	22.7	
	Fair	1.08	(1.04,1.12)	0.00	0.23	56.7	
	Poor	1.20	(1.07,1.35)	0.00	0.59	91.2	
Immigration status	(Ref: Born in this country)						6.40e-06
	Born in another country	0.94	(0.89,1.00)	0.36	0.00	44.2	
Age 12 religious service attendance	(Ref: Never)						3.46e-06
	At least 1/week	1.04	(1.00,1.08)	0.05	0.14	52.0	
	1-3/month	1.07	(1.03,1.13)	0.00	0.32	62.2	
	<1/month	1.02	(0.98,1.07)	0.00	0.18	60.8	
Year of birth	(Ref: 1998-2005; age 18-24)						1.37e-06
	1993-1998; age 25-29	1.03	(1.00,1.06)	0.00	0.00	<0.1‡	
	1983-1993; age 30-39	1.06	(1.00,1.11)	0.09	0.36	75.9	
	1973-1983; age 40-49	1.12	(1.06,1.18)	0.05	0.73	76.1	
	1963-1973; age 50-59	1.25	(1.14,1.36)	0.05	0.77	89.8	
	1953-1963; age 60-69	1.28	(1.14,1.43)	0.05	0.77	91.9	
	1943-1953; age 70-79	1.41	(1.22,1.63)	0.00	0.77	92.7	
	1943 or earlier; age 80+	1.56	(1.32,1.83)	0.05	0.95	84.9	
Gender	(Ref: Male)						1.18e-06
	Female	1.14	(1.10,1.19)	0.00	0.73	84.8	
	Other	0.25	(0.04,1.52)	0.22	0.56	99.6	

Note. ‡estimate of heterogeneity is likely unstable, please see figures S1 to S27 for more detail on heterogeneity of effects. *RR:* Risk ratio. *95% CI:* The 95% confidence interval for that estimate.
Estimated proportion of effects by threshold: The estimated proportion of effects across the implied distribution of effects sizes within the 22 countries that are either less than a RR of 0.9 or above a RR of 1.1. *I^2:* An estimate of how much of the variability in effect sizes is due to heterogeneity across countries vs. sampling variability. *Global p-value:* Test of the null hypothesis that the RR is 1 in all of the 22 countries.

Table 3. Sensitivity of meta-analyzed childhood predictors to unmeasured confounding

Variable	Predictor (level)	E-value for Estimate	E-value for 95% CI
Relationship with mother	(Ref: Very bad/somewhat bad)		
	Very good/somewhat good	1.14	1.00
Relationship with father	(Ref: Very bad/somewhat bad)		
	Very good/somewhat good	1.05	1.00
Parent marital status	(Ref: Parents married)		
	No, divorced	1.31	1.18
	Single, never married	1.45	1.13
	No, one or both of them had died	1.35	1.15
Subjective financial status of family growing up	(Ref: Got by)		
	Lived comfortably	1.22	1.00
	Found it difficult	1.36	1.28
	Found it very difficult	1.35	1.22
Abuse	(Ref: No)		
	Yes	1.82	1.73
Outsider growing up	(Ref: No)		
	Yes	1.59	1.47
Self-rated health growing up	(Ref: Good)		
	Excellent	1.63	1.47
	Very good	1.43	1.36
	Fair	1.38	1.26
	Poor	1.69	1.34
Immigration status	(Ref: Born in this country)		
	Born in another country	1.31	1.03
Age 12 religious service attendance	(Ref: Never)		
	At least 1/week	1.24	1.03
	1-3/month	1.36	1.19
	<1/month	1.17	1.00
Year of birth	(Ref: 1998-2005; age 18-24)		
	1993-1998; age 25-29	1.20	1.00
	1983-1993; age 30-39	1.30	1.05
	1973-1983; age 40-49	1.49	1.32
	1963-1973; age 50-59	1.80	1.55
	1953-1963; age 60-69	1.87	1.54
	1943-1953; age 70-79	2.17	1.74
	1943 or earlier; age 80+	2.49	1.98
Gender	(Ref: Male)		
	Female	1.55	1.44
	Other	7.46	1.00