

Achieving the Sustainable Development Goals: Evidence from the Longitudinal Parenting Across Cultures Project

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Introduction

This chapter uses evidence from the Parenting across Cultures (PAC) project to illustrate ways in which longitudinal data can help achieve the Sustainable Development Goals (SDGs; <https://sustainabledevelopment.un.org/>). The chapter begins by providing an overview of the research questions that have guided PAC as well as a description of the participants, procedures and measures. Next, empirical findings from PAC are summarized to illustrate implications for six specific SDGs. Then the chapter describes how longitudinal data offer advantages over cross-sectional data in operationalizing SDG targets and implementing the SDGs. Finally, limitations, future research directions and conclusions are provided.

PAC was developed in response to concerns that understanding of parenting and child development was biased by the predominant

focus in the literature on studying families in Western, educated, industrialized, rich and democratic (WEIRD) societies and that findings in such countries may not generalize well to more diverse populations around the world (Henrich et al, 2010). In an analysis of the sample characteristics in the most influential journals in six subdisciplines of psychology from 2003 to 2007, 96% of research participants were from Western industrialized countries, and 68% were from the United States alone (Arnett, 2008), which means that 96% of research participants in these psychological studies were from countries with only 12% of the world's population (Henrich et al, 2010). When basic science research is limited to WEIRD countries, knowledge of human development becomes defined by a set of experiences that may not be widely shared in different cultural contexts, so studying parenting and child development in a wide range of diverse cultural contexts is important to understand development more fully.

PAC has been conceptualized and funded as a consecutive series of three five-year grants, each covering a different developmental period and guided by different research questions. In the first project period, participants were aged 8 to 12. The main research questions focused on cultural differences in links between discipline and child adjustment, warmth as a moderator of links between harsh discipline and child outcomes, and cognitive and emotional mediators of effects of harsh discipline on children's aggression and anxiety. In the second period, target participants were 13 to 17 years old. The main research questions focused on how biological maturation and socialization interact in the development of risk-taking behaviour; psychological mechanisms through which biological maturation, parenting and culture alter the development of adolescent risk-taking behaviour; and how cultural normativeness of parenting behaviours and culturally shaped opportunity for risk-taking behaviours moderate the relation between parenting and adolescents' risk-taking. In the third and current period, target participants are aged 18 to 22. The main research questions focus on parenting influences on risky behaviours, cultural context moderators of associations between early parenting factors and the development of both competence and maladaptation during the transition to adulthood, and child-level and family-level mediators of links between childhood risk factors and young-adult competence and maladaptation.

Participants

Participants included 1,432 families with a child ranging in age from 7 to 10 years ($M = 8.28$, $SD = 0.65$; 51% girls) at the time of recruitment.

Families were drawn from Jinan, China ($n = 120$), Shanghai, China ($n = 122$), Medellín, Colombia ($n = 108$), Naples, Italy ($n = 100$), Rome, Italy ($n = 109$), Zarqa, Jordan ($n = 114$), Kisumu, Kenya ($n = 100$), Manila, Philippines ($n = 120$), Trollhättan/Vänern, Sweden ($n = 103$), Chiang Mai, Thailand ($n = 120$) and Durham, North Carolina, United States ($n = 112$ European Americans, $n = 104$ African Americans, $n = 100$ Hispanic Americans). Participants were recruited through public and private schools to increase socioeconomic diversity and representativeness of the sample. Response rates varied from 24% to nearly 100%, primarily because of differences in the schools' roles in recruiting. For example, in China, once schools agreed to participate, the parents agreed to participate as well, and interviews were conducted at the schools, leading to participation rates of nearly 100%. In the United States, after schools agreed to help with recruitment, our interview team was allowed to leave letters explaining the study at the school to send home with students. Parents then returned a letter to the school indicating their willingness to participate. Our team then contacted them directly to arrange an interview at a convenient time and place.

Most parents lived together (82%) and were biological parents (97%); non-residential and non-biological parents also provided data. Sampling included families from each country's majority ethnic group, except in Kenya where we sampled Luo (third largest ethnic group, 13% of population), and in the United States, where we sampled equal proportions of White, Black and Latino families. Socioeconomic status was sampled in proportions representative of each recruitment area. For example, six well-defined socioeconomic strata in Colombia were used as a basis for recruiting families to our sample in proportion to their representation in the socioeconomic strata in Medellín, our recruitment city. The samples are not nationally representative, but our goal was to sample families in each recruitment city such that residents would deem the sample locally representative. Child age and gender did not vary across cultural groups.

With one exception, retention of the original sample exceeded 75% and approached 100% in some sites through the most current wave of data collection, ten years after initial recruitment. We retained the sample and minimized attrition over time by maintaining detailed contact information (including email addresses, mobile phone numbers, street addresses and social media contacts) for mothers, fathers and adolescents. We also obtained contact information for family members or friends who do not live with the participants who would know how to find them. Periodic newsletters are sent to families with

information about the project as well as birthday and holiday cards to keep families engaged. Participants are given incentives specific to individual sites, either payments in cash or gift cards that are deemed locally motivating but not coercive or gifts to children's schools. On occasion, our project has been an important resource for the participating families. For example, when a flood in the Philippines destroyed a participating family's home, our project records of their address served as the documentation they provided to local authorities to prove where they had once lived.

Procedure and measures

Annual interviews are conducted with target participants, their mothers and their fathers. Until age 10, children completed in-person oral interviews in which interviewers would ask children questions and record their responses, showing children visual representations of response scales to aid in their responding. After age 10, children were given the choice of continuing with oral interviews or completing interviews in writing. Parents completed oral interviews in the first project year and were given the choice of completing oral or written interviews in subsequent years. Completing online interviews was added as an option when advances in technology and internet access made this option feasible. To maximize retention, we have been flexible about offering several ways for participants to complete the interviews, including over the telephone or in writing to be mailed back to our project in-country offices, especially if families have moved too far to make an in-person interview in their home or the university possible. Interviews generally last one to two hours.

Measures have assessed a wide range of parenting variables (for example, discipline, monitoring, warmth, control) and a wide range of child adjustment variables (for example, social competence, school performance, prosocial behaviour, internalizing and externalizing problems). In project years 3, 6 and 9 children completed computerized batteries in the form of games to assess aspects of executive functioning, such as reward sensitivity and impulse control. Measures were administered in the predominant language of each country, following forward- and back-translation and meetings to resolve any item-by-item ambiguities in linguistic or semantic content. In addition to translating the measures, translators noted and suggested improvements to items that did not translate well, were inappropriate for the participants, were culturally insensitive or elicited multiple meanings. Site coordinators and the translators reviewed the discrepant items

and made appropriate modifications. A full list of project measures is available at parentingacrosscultures.org.

Implications of select PAC findings for the SDGs

Findings from the PAC project inform understanding of how to realize six SDGs. However, realization of many SDGs is interconnected. For example, both SDG 1 (no poverty) and SDG 3 (good health and well-being) are more attainable with higher levels of quality education (advanced in SDG 4).

SDG 1: Ending poverty in all its forms

A large body of international research has demonstrated that poverty has detrimental effects on children's growth and physical health. Using longitudinal data from PAC, this international focus was extended to children's emotional and behavioural development. It was found that higher household income was related to decreases in children's internalizing and externalizing problems from age 8 to age 10, above and beyond effects of mothers' and fathers' education (Lansford et al, 2019). For families with household incomes at or below the mean, mother-reported child externalizing behaviour declined modestly over time, but for families with household incomes above the mean, mother-reported child externalizing behaviour remained fairly stable over time, and always lower than mother-reported child externalizing for families with incomes at or below the mean. This means that even just a little increase in income for families at the lowest levels of income makes the biggest difference in terms of decreasing children's externalizing problems over time. The findings highlight that family-level income is important for child development regardless of macro-level poverty in low-, middle- and high-income countries. The longitudinal data made it possible to examine how poverty related to children's internalizing and externalizing behaviours at a single point in time and how poverty related to changes in internalizing and externalizing behaviours over time.

It was also found that even when household income remained stable over time, parents' perceptions of material deprivation predicted their use of psychological aggression towards their child and children's self- and parent-reported externalizing behaviour problems (Schenck-Fontaine et al, [forthcoming](#)). These findings were consistent across, high-, middle- and low-income countries, suggesting that perceived material deprivation likely influences children's outcomes regardless of actual income level.

SDG 3: Ensure healthy lives and promote well-being for all at all ages

SDG target 3.4 is to promote well-being and mental health. Positive social relationships are among the best predictors of well-being and mental health, and harsh treatment by parents, peers and others predicts poorer mental health and behavioural adjustment. For example, in PAC it was found that children's perceptions of their parents' rejection predicted increases in children's mother- and father-reported internalizing and externalizing behaviour problems and decreases in parent-reported school performance and child-reported prosocial behaviour across three years, controlling for concurrent associations between parenting and child adjustment, stability across time in parenting and child adjustment, parental age, parental education and parents' likelihood of responding in socially desirable ways (Putnick et al, 2015). More similarities than differences were found across cultures in links between mothers', fathers' and children's reports of five aspects of parenting (expectations regarding family obligations, monitoring, psychological control, behavioural control and parental warmth) and five aspects of child well-being (social competence, prosocial behaviour, academic achievement, externalizing behaviour and internalizing behaviour); whether each aspect of parenting was culturally normative affected the strength of some of these links (Lansford et al, 2018b). For example, children were more socially competent when their mothers held higher expectations regarding the child's family obligations, particularly if high expectations regarding family obligations were culturally normative.

Both individual- and culture-level predictors of the development of externalizing behaviour problems were found, such as aggression and delinquency, from age 7 to 14 (Lansford et al, 2018a). For example, not only did individual mothers' and children's endorsement of aggression and authoritarian attitudes predict higher initial levels of externalizing behaviour problems and growth in externalizing behaviours over time, but cultural norms endorsing aggression and authoritarian attitudes exacerbated these effects. These findings suggest that intervention efforts to change cultural norms that increase the risk of children's behavioural problems may be a necessary part of promoting children's well-being to achieve the SDGs.

SDG 4: Inclusive quality education for all

Collaborators from the nine PAC countries have compiled an edited volume that provides an overview of each country's current school

system, discusses parenting in light of the school system, and provides evidence from that country regarding links between parenting and students' academic performance (Sorbring and Lansford, 2019). Several themes relevant to realizing the goal of inclusive quality education for all emerged across countries. First, even when public education is theoretically free, hidden costs often keep young people out of school. For example, families may not be able to afford to pay for uniforms, books and activity fees, or may be able to afford these expenses for only some of their children, keeping the others out of school. Second, access to quality education often varies as a function of social class, ethnicity, urban versus rural residence and other within-country demographic differences. Third, with the increased focus, especially in low- and middle-income countries, on access to free primary and secondary education, the quality of available education may have decreased in some countries, largely because of an insufficient number of trained teachers, books and other educational materials to serve the higher numbers of enrolled students. For example, in Colombia, to accommodate the large volume of students, half rather than full school days are the norm so that students can attend in shifts. Only 11% of public school students in Colombia are able to attend even one full day of school per week, which puts them at a severe disadvantage compared to Colombian students who attend private schools, which are more often full-day programmes, as well as compared to students from other countries in scores on international standardized tests of reading, mathematics and science (Di Giunta and Uribe Tirado, 2019).

Understanding different countries' education systems, policies, programmes that countries have implemented to improve access to and quality of education, and how parents can facilitate students' academic achievement makes it possible for countries to learn from one another ways to realize educational targets. For example, school enrolment in the Philippines has increased by 9% among those eligible for a cash transfer programme (Chaudhury and Okamura, 2012), suggesting a model that could be used in other countries to make it financially feasible for families to keep their adolescents in secondary school. Likewise 'mother tongue' programmes in which 12 local languages have been added as languages of instruction in the first years of primary school in the Philippines have shown promise in enhancing children's and parents' comprehension (Alampay and Garcia, 2019), providing another avenue that could be adopted by other countries where students have many different native languages. Children living in poverty are particularly vulnerable to a lack of quality education, so would especially benefit from scholarships and macro-level supports

such as better staffing and infrastructure. Longitudinal data are essential for evaluating the impact of education reforms. Without baseline data prior to a reform and follow-up data after implementing reforms, it is impossible to know whether changes in policies or educational practices are having their desired effects.

SDG 5: Gender parity and equitable life chances

Longitudinal studies can advance understanding of ways in which boys and girls may benefit from different supports for their development and ways in which they typically develop similarly. For example, consistent with many other studies, in PAC it was found that boys report more physical aggressive than girls; however, boys and girls did not differ in their reported use of relationally aggressive behaviour (that is, excluding another child from a group, saying mean things about that person, and saying things about another child to make people laugh; Lansford et al, 2012).

It was found that both mothers' and fathers' positive evaluations of aggressive responses to hypothetical childrearing vignettes at one time predicted parents' subsequent self-reported use of corporal punishment and harsh verbal discipline (Lansford et al, 2014b). Mothers and fathers make similar attributions for successes and failures in caregiving situations, but fathers hold more authoritarian attitudes than do mothers (Bornstein et al, 2011). Within the same family, mothers' and fathers' attitudes are moderately correlated with each other.

Many similarities were also found in the ways in which mothers' and fathers' parenting is related to children's development. For example, no differences were found between mothers and fathers in the ways in which their warmth toward children was related to increases in children's prosocial behaviour over the course of three years (Putnick et al, 2018) or the ways in which mothers' and fathers' reports of their use of corporal punishment were related to an increase in children's self- or parent-reported externalizing behaviours over time (Alampay et al, 2017). It was also found that parental warmth and behavioural control reported by mothers, fathers and children convey similarly protective effects on child externalizing and internalizing behaviours (also reported by mothers, fathers and children) from ages 8 to 13, but that both mother and father effects convey unique protections over and above one another (Rothenberg et al, 2020). In other words, it appears that both mothers' and fathers' parenting play important and, for some child outcomes, unique roles in child development in similar ways across cultures. Therefore, our collective findings argue for the

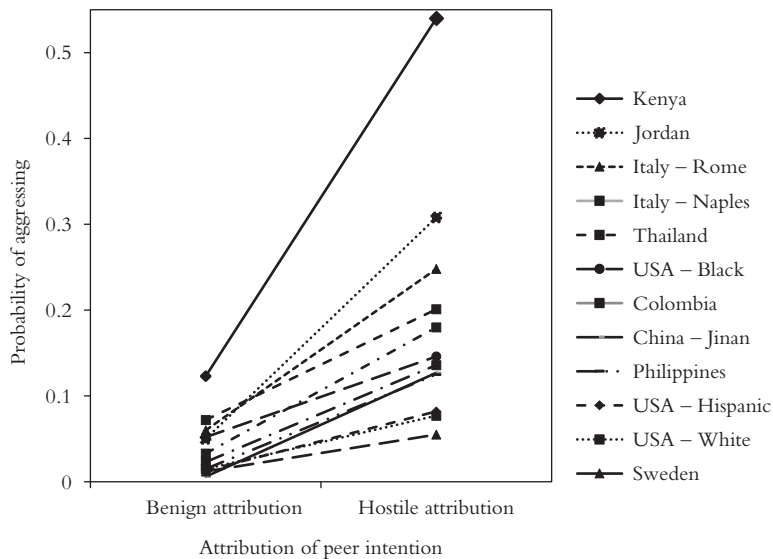
importance of increasing gender parity by including both mothers and fathers in parenting programmes that are designed to change parents' knowledge, attitudes and behaviours.

SDG 11: Create safe, secure and sustainable cities and communities

It was found, using mothers', fathers' and children's reports, that children who live in unsafe neighbourhoods, have chaotic home environments, have fluctuating household incomes and experience stressful life events behave more aggressively and perform more poorly in school later in childhood and adolescence (Chang et al, 2019). The longitudinal data in PAC made it possible for us to understand mechanisms through which unsafe and insecure families and communities contribute to poor developmental outcomes for children and adolescents, again using reports from mothers, fathers and children. For example, household chaos and neighbourhood danger when children are 13 years old predicted harsher maternal parenting when they were 14 years old, which predicted more externalizing, internalizing and scholastic problems when they were 15 years old (Deater-Deckard et al, 2019). Additionally, it was found that 9-year-old children whose families experienced financial difficulties and whose parents used corporal punishment exhibited more aggressive and delinquent behaviour at age 12 than children who did not experience those adversities, in part because children who experienced early adversities developed poorer impulse control and became more likely to attribute hostile intent to others in ambiguous social situations (Lansford et al, 2017). Even when parents reported monitoring their child's whereabouts, activities and companions, the link between perceptions of living in a dangerous neighbourhood and more child aggression remained (Skinner et al, 2014a). All of these findings highlight the importance of creating safe and secure communities to promote positive child development.

Children were presented with hypothetical vignettes depicting an ambiguous social situation in which the main character experiences a negative outcome and asked children why the provocateur in the vignette behaved as they did (Dodge et al, 2015). Responses were coded as either hostile (for example, he was being mean) or benign (for example, it was an accident) intent. Children also indicated how likely they would be to respond with aggression in that situation, and children and mothers rated children's aggression in real-life situations. It was found that cultural groups that were above average in children's propensity for making hostile attributions were also above average in

Figure 4.1: The relation between attribution of intention and probability of aggressing, by cultural group



Source: Adapted from Dodge et al, 2015

children's aggression, according to mothers' and children's reports. In addition, it was found that within a cultural group, children who were above average for their cultural group in their likelihood of making hostile attributions also were above average for their cultural group in aggressive behaviour. Finally, it was found that individual children were more likely to indicate they would respond to aggression in vignettes for which they made a hostile attribution than in vignettes for which they made a benign attribution (see Figure 4.1). Identifying this psychological mechanism in children's aggressive behaviour suggests that aggressive behaviour could be reduced at a societal level by focusing on how groups socialize children to respond to provocations with hostile or benign attributions and to generate non-aggressive solutions in provocative situations.

SDG 16: Achieve peace, justice and strong institutions

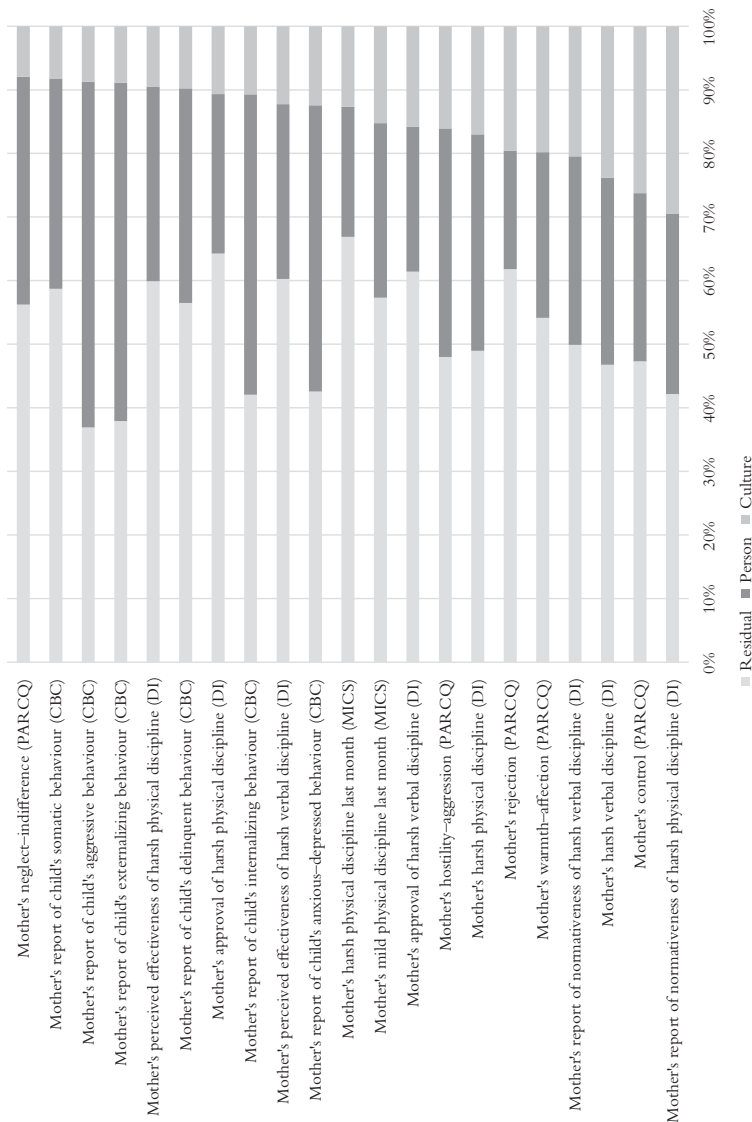
Target 16.2 is to end abuse, exploitation, trafficking and all forms of violence against and torture of children. Indicator 16.2.1 is the proportion of children aged 1–17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month. In PAC, it was found that across the nine participating

countries, 54% of girls' and 58% of boys' parents reported that their child had experienced corporal punishment by their parents or someone in their household in the last month (Lansford et al, 2010). Across countries, 17% of parents reported believing that using corporal punishment is necessary to rear their child properly, but that ranged from none of the parents in Sweden to 48% and 54% of the parents in Kenya believing that corporal punishment is necessary to rear their daughter or son, respectively. Use and endorsement of different forms of discipline show larger between-country differences than most other aspects of parenting and child development in PAC (Deater-Deckard et al, 2018; see Figure 4.2).

It has been found that parents' perceptions of the severity and justness of corporal punishment do not moderate the relation between corporal punishment and negative child outcomes (Alampay et al, 2017). That is, corporal punishment is related to more child internalizing and externalizing behaviour problems, even when it is mild and when parents believe they are justified in using it. Likewise, it was found that more frequent corporal punishment is related to more child self- and mother-reported anxiety and aggression even when parents also show warmth towards their child; indeed, children were most anxious when parents used corporal punishment in conjunction with warmth, perhaps because it was difficult for children to reconcile parental warmth with the experience of being hit by their parents (Lansford et al, 2014a; see Figure 4.3). Parents' use of corporal punishment is predicted by both individual-level factors (especially child externalizing behaviours, because children who misbehave more often elicit more discipline from their parents in response) as well as cultural-level factors (especially normativeness of corporal punishment in the community, because parents tend to behave in ways that are endorsed and practised by their cultural group; Lansford et al, 2015).

The analyses focusing on links between corporal punishment and different aspects of child development exclude Sweden, which outlawed all forms of corporal punishment in 1979. Despite measures taken to ensure that Swedish participants could report corporal punishment if they or their parents were using it (for example, having the questions about discipline separate from other measures and mailing them directly to the United States rather than to the investigators in Sweden), almost none of the Swedish parents reported using corporal punishment. As of November 2019, corporal punishment has been outlawed by 58 countries and is one of the chief means by which countries are trying to realize SDG Target 16.2. Kenya outlawed corporal punishment in 2010, providing a natural experiment because data were collected for

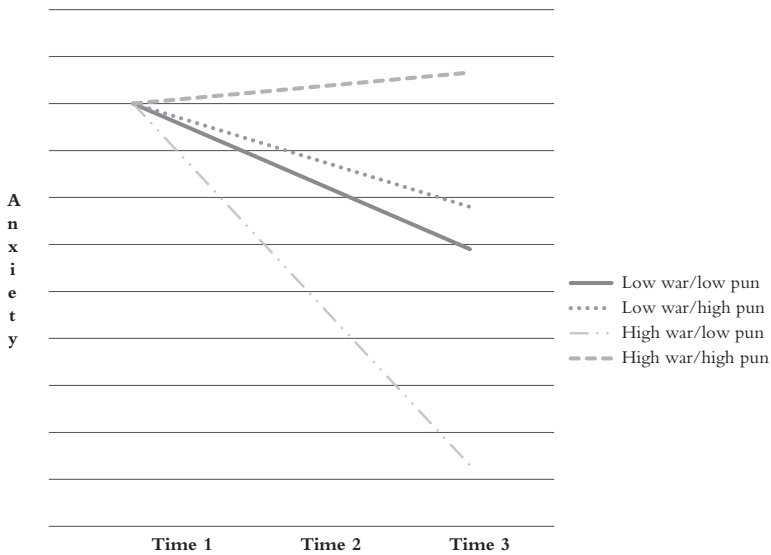
Figure 4.2: Percentage of variance accounted for by between-culture, between-person within-culture, and residual effects for mother-reported variables



Note: CBC = Child Behaviour Checklist, DI = Discipline Interview, MICS = Multiple Indicator Cluster Survey, PARCQ = Parental Acceptance-Rejection/Control Questionnaire

Source: Adapted from Deater-Deckard et al, 2018

Figure 4.3: Model-implied slopes representing change in anxiety over three years at different levels of corporal punishment and maternal warmth



Note: The scaling is zeroed at Time 1 to highlight the slope differences, instead of confounding them with intercept differences. The y-axis is an effect size scale, relative to standard deviations of the slope.

Source: Adapted from Lansford et al, 2014a

PAC both before and after the legal ban. Preliminary analyses conducted suggest a decrease in reported use of corporal punishment following the legal ban in 2010 that is not reflected in other PAC countries that did not ban corporal punishment. Additional longitudinal analyses will clarify the extent to which legally banning corporal punishment results in desired changes in parenting and child outcomes.

Important policy decisions related to the realization of SDG Target 16.2 sometimes involve decisions regarding ages at which children should be treated as adults in legal systems, including when they should be criminally tried as an adult. In an extension of the PAC study that included data from 10- to 30-year-olds in Cyprus and India in addition to the PAC countries, evidence was found that in all 11 countries, individuals' sensation-seeking increased through adolescence and peaked around age 19 before declining, whereas self-regulation continues to develop into early adulthood before reaching a plateau between the ages of 23 and 26 (Steinberg et al, 2018). These findings provide cross-national support for the dual-systems theory, which has

likened brain development in adolescence and early adulthood to a car that has a functioning engine before brakes are in place (Steinberg, 2008). However, risk-taking propensity in laboratory-based tasks was more consistent across countries than risk-taking in real-world settings, suggesting that, although reward sensitivity peaks in adolescence across cultures, opportunities for and constraints on risk-taking may promote or limit risky behaviour in real life (Duell et al, 2018). In an explicit consideration of the implications of these findings for legal systems, it was concluded that a maturity gap exists between the age at which adolescents are able to engage in complex reasoning in controlled settings and the age at which adolescents can exercise self-restraint in emotional situations. In legal systems, adolescents may be capable of making decisions in situations that involve careful deliberation at an age younger than when they can be held responsible for decisions made quickly in emotionally charged situations (Icenogle et al, 2019).

How longitudinal data offer advantages over cross-sectional data

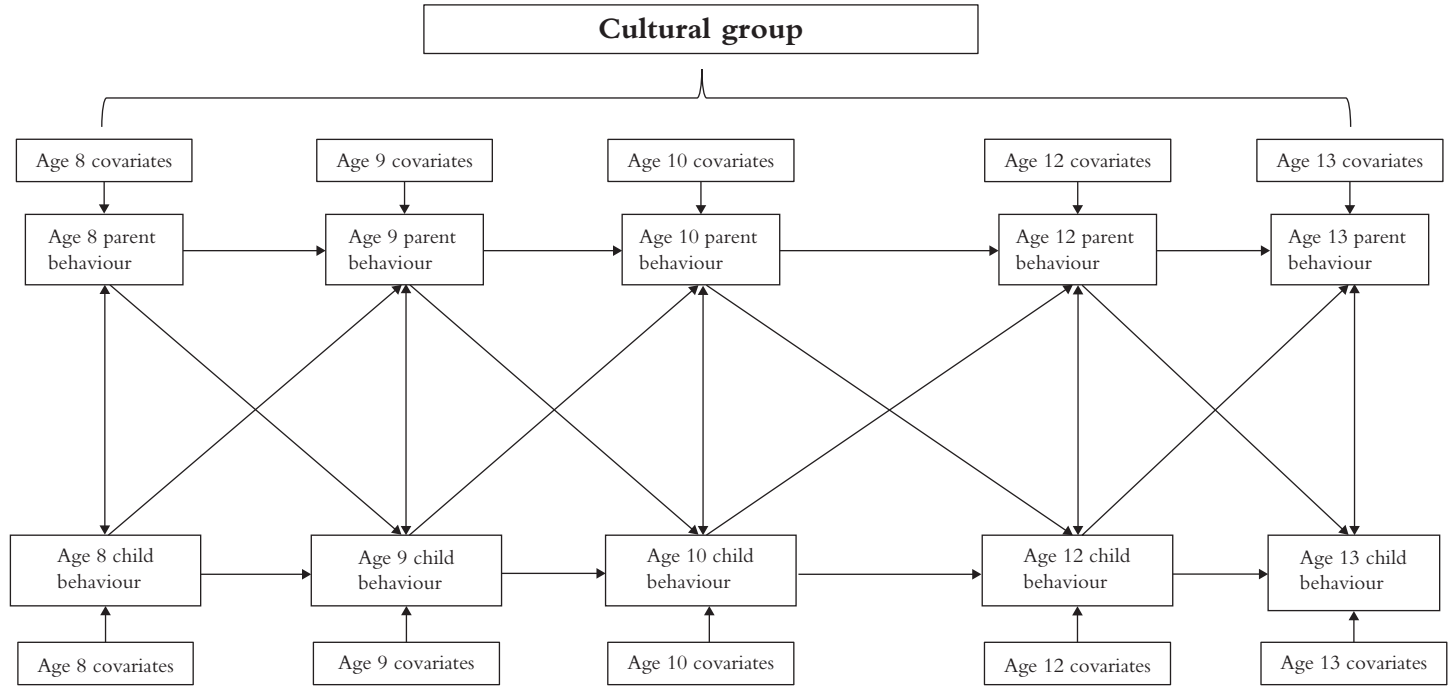
The design of the PAC project, with family members nested within families, which are nested within cultures and assessed over time is optimal for understanding whether variance is explained by within-individual factors that change over time, by within-family factors, by within-culture factors or by between-culture factors. In an analysis parsing these different sources of variance for a large number of parenting and child adjustment variables, it was found that more variance is explained by within-culture than between-culture factors (Deater-Deckard et al, 2018). That is, the variation in parenting and child adjustment within cultural groups is greater than the variation in parenting and child adjustment between cultural groups. Some of the within-culture variation is accounted for by factors that change over time, such as by changes in how parents treat children as they develop, and other within-culture variation is accounted for by factors to which some but not other members of a cultural group are exposed, such as a traumatic life event or the presence of a supportive parent.

Longitudinal data also make it possible to examine reciprocal relations between children and parents over time. Using cross-sectional data, one would be able to say whether a particular aspect of parenting (or another aspect of the child's environment) is correlated with a particular child outcome, but could not determine the direction of effects. To speak definitively about cause and effect, one would need to use an experimental design. But, using longitudinal data, it is possible to

control for early parenting or child variables in the statistical prediction of these variables at a later point in time to determine whether a change in parenting predicts a change in child outcomes (see [Figure 4.4](#)). In addition, longitudinal models are able to test directions of effects from children to parents and parents to children (Putnick et al, 2018). In PAC, for example, it was found that effects of parental warmth and control on children's externalizing and internalizing behaviours are more pronounced in childhood than in adolescence and that effects of children's externalizing and internalizing behaviours on parents' subsequent warmth and control are stronger and more consistent than parents' effects on children's externalizing and internalizing behaviours (Lansford et al, 2018c). Similarly, children who behave prosocially elicit subsequently positive discipline and have warmer relationships with their mothers than do children who are initially low in prosocial behaviour (Pastorelli et al, 2016). Longitudinal findings about the importance of child effects on parents have significant implications for the development of parenting programmes, which are often implemented in an attempt to alter child behaviours. In PAC analyses, the robustness of findings is enhanced by the inclusion of data reported by mothers, fathers and children rather than relying only on a single source of data, which can artificially inflate relations through same-source biases.

Because political, environmental and other societal-level circumstances change over time, it may become necessary to operationalize SDG targets in different ways over time and in different cultural groups so as to capture the changing environments to which families are exposed. For example, during the course of the PAC project, a disputed political election in Kenya resulted in more than 1,200 deaths, thousands of internal displacements, and destroyed homes and businesses. Recognizing the opportunity to understand how exposure to political violence was related to parenting and child outcomes both in close temporal proximity to the election and at more distal times, questions were added to the PAC measure regarding exposure to political violence for the interviews with Kenyan mothers and fathers, who reported whether they had experienced each of 14 forms of violence and whether their child had been exposed to these forms of violence. It was found that children who were exposed to more post-election violence exhibited more externalizing behaviour problems the following year, which in turn predicted parents' use of more childrearing violence in the next year (Skinner et al, 2014b). These findings suggest that exposure to even short-term political violence can set in motion negative, reciprocal developmental trajectories for children and their parents.

Figure 4.4: Framework for analyses examining longitudinal associations between a parent's behaviour and a child's behaviour across different cultural groups (Source: Adapted from Lansford et al, 2018c)



Note: Cross-lagged paths examine how parenting at one time predicts child behaviour at the next time and how child behaviour at one time predicts parenting at the next time. The model controls for time-specific associations with study covariates (child gender, parent education), stability in parent and child behaviour over time (as depicted by the autoregressive paths), and contemporaneous associations between parent and child behaviour. Associations between measures at non-adjacent time points (for example, child behaviour at age 8 and 10) can also be controlled.

Limitations and future directions

Despite its strengths in having longitudinal data available from mothers, fathers and children from age 8 into early adulthood from nine countries, the PAC project also has limitations. The samples are not nationally representative so cannot be used to make claims about national prevalence rates of particular aspects of parenting or child outcomes. Recruiting nationally representative samples from several countries and following them annually over several years would exceed the budgets of most funding agencies. The Multiple Indicator Cluster Surveys include nationally representative samples from dozens of low- and middle-income countries and have been administered at several points in time, albeit with different participants at each time point rather than following the same participants over time (<http://mics.unicef.org/>). Several high-income countries have recruited nationally representative samples to follow longitudinally over time (for example, the Millennium Cohort Study in the United Kingdom, the National Longitudinal Survey of Youth in the United States), but these surveys cannot compare across countries. Combining the advantages of nationally representative samples with longitudinal data collection in many high-, middle- and low-income countries remains an aspiration for future research.

The PAC project also is limited to development from middle childhood through early adulthood. Early childhood typically has received more attention than middle childhood and adolescence in international development work. Future research that includes the full developmental range from birth (or even prenatally) through early adulthood will be important to understand developmental trajectories that often are set in motion early in life, as well as how later risks and supports may alter these developmental trajectories.

Ecological momentary assessments (EMA) are a relatively new mode of data collection that can be used to advance realization of the SDGs. In a typical design using ecological momentary assessments, brief questions are sent to participants' mobile phones two or three times per day over a period of several days or weeks. As part of PAC, questions were sent three times per day for 15 days to the mobile phones of adolescents in Rome. Across the two-week study period, adolescents responded to 90% of the questions (Rothenberg et al, 2019). Because the majority of adolescents globally now have mobile phones, using EMA offers the potential in future research to monitor a number of indicators related to the SDGs (such as school attendance, experiences of violence) in real time and to assess change over time for less expense than other forms

of data collection would entail. EMA also drastically reduce the typical length of time between assessment points compared to annual data collection in more traditional longitudinal designs, making it possible to assess changes that occur more rapidly and to look at variation over relatively short periods of time.

Another important direction for future research will be to capitalize on advances in neuroscience and biomarkers to enhance understanding of ways to realize the SDGs. To date in PAC, functional magnetic resonance imaging has been used in the United States sample to examine how exposure to poverty, neurobiological circuitry connected to emotion dysregulation, later exposure to stressful life events and symptoms of psychopathology develop over time. Exposure to poverty at age 10 was related to changes in the resting state coupling between the amygdala and ventromedial prefrontal cortex, two brain structures centrally involved with emotion processing and regulation, at age 15. Lower coupling of these two brain regions, in combination with early poverty and concurrent exposure to stressful life events, predicted mental health problems at age 16 (Hanson et al, 2019). Costs of and access to equipment for conducting brain imaging can pose a barrier to neuroscientific studies in low- and middle-income countries, but it is possible to collect biomarkers in hair, saliva and blood for lower costs. Findings from brain imaging and biomarkers often are especially influential with policy makers so can be used to garner financial and political support for interventions, practices or policies that would advance the SDGs in ways that are connected to improvements in biological functioning.

Conclusions

The Parenting Across Cultures project provides evidence regarding the development of children and adolescents in nine countries that vary widely in sociodemographic and cultural factors that can be used to inform understanding of how to achieve the SDGs. The longitudinal design makes possible analyses that examine bi-directional influences between children and their parents, taking into account stability of children's mental health, behavioural adjustment, academic performance and features in their environment, such as parenting and household income. If changes in parenting or income, for example, predict subsequent changes in children's well-being, these suggest particularly meaningful targets for achieving the SDGs. Realization of some of the SDGs depends directly on accurately measuring children's experiences, such as with the operationalization of Indicator 16.2.1 as the proportion of children aged 1–17 years who experienced any physical punishment

Table 4.1: Highlights for policy makers and practitioners

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- The Parenting Across Cultures project recruited 8-year-old children, their mothers and fathers in nine countries (China, Colombia, Italy, Jordan, Kenya, Philippines, Sweden, Thailand and United States) and continues with annual interviews through early adulthood.
 - **SDG 1 (Ending poverty in all its forms):** Living in poverty and perceptions of material deprivation are risk factors for increases in children's behaviour and mental health problems over time.
 - **SDG 3 (Ensure healthy lives and promote well-being for all at all ages):** Positive social relationships are among the best predictors of well-being and mental health, and harsh treatment by parents, peers and others predicts poorer mental health and behavioural adjustment.
 - **SDG 4 (Inclusive quality education for all):** Even when public education is theoretically free, costs of uniforms, books and fees keep students out of school. Decreased quality may accompany increased access if an insufficient number of trained teachers, books and other materials cannot serve the higher numbers of enrolled students.
 - **SDG 5 (Gender parity and equitable life chances):** Mothers' and fathers' parenting each relates to children's development in many similar ways, arguing for the importance of including both mothers and fathers in programmes that are designed to change parents' knowledge, attitudes and behaviours.
 - **SDG 11 (Create safe, secure, and sustainable cities and communities):** Children who live in an unsafe neighbourhood, have chaotic home environments, have fluctuating household income and experience stressful life events behave more aggressively and perform more poorly in school than do children without these difficulties.
 - **SDG 16 (Achieve peace, justice, and strong institutions):** As of August 2019, corporal punishment is outlawed by 56 countries and is one means by which countries try to realize SDG 16. Decisions regarding ages at which children should be criminally tried as an adult or jailed with adult offenders should be informed by findings regarding adolescent brain development.
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and/or psychological aggression by caregivers in the past month. Realization of other aspects of SDG 16 involving just social institutions is only possible with a solid understanding of adolescent brain development because of the implications of differences in the developmental timeframes of sensation-seeking and self-regulation for understanding adolescents' propensity for risky behaviours, suggesting they should not be treated as legally responsible for their actions committed in emotion-charged situations. Understanding the development of children and adolescents is important for achieving the international development agenda set forth in the SDGs.

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