

# Parental use of physical punishment in a birth cohort

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## ABSTRACT

**AIM:** To document the prevalence of child physical punishment by parents and associated predictors in the Christchurch Health and Development Study (CHDS) birth cohort over a 15-year period.

**METHOD:** A cohort of 1,265 CHDS individuals were followed from birth (1977) to age 40 years. At ages 25 (n=155), 30 (n=337), 35 (n=585) and 40 years (n=636), the cohort members with dependent children (<16 years of age) were interviewed about their use of child physical punishment in the past 12 months using the Parent-Child Conflict Tactics Scale. Parent, child and family predictors were also examined.

**RESULTS:** The most common forms of physical punishment were smacking on bottom and slapping on hand, arm or leg. Rates of all forms of physical punishment declined with age, ranging from 77% reporting any physical punishment at age 25 to 42% at age 40. In multivariable models, significant predictors included parental age, numbers/ages of children in the household, childhood family socioeconomic status, parental history of adolescent mental health problems and concurrent intimate partner violence.

**CONCLUSION:** Use of physical punishment remains a relatively common form of child discipline despite the 2007 anti-smacking legislation and reduced public tolerance for physical violence towards children. Implications for prevention/intervention are discussed.

New Zealand has very high rates of child maltreatment compared to other developed countries.<sup>1-3</sup> Research shows that childhood physical punishment/physical maltreatment has detrimental effects on an individual's later adult partner relationships,<sup>4</sup> mental and physical health (including suicidal behaviours),<sup>5,6,7</sup> substance use,<sup>8,9</sup> educational achievement<sup>10</sup> and criminal activity.<sup>11</sup> Further, these impacts increase with the severity of physical maltreatment, but adverse effects are observable even at relatively minor levels of physical punishment.<sup>3,12</sup> Societal approval of physical punishment has been declining over more recent decades.<sup>13,14</sup> In 2007, the New Zealand Government introduced "anti-smacking" legislation, which prohibited the use of child physical punishment.<sup>3,13</sup>

Despite this legislation, a 2013 report estimated that 40% of New Zealand adults still agreed that there are certain circumstances when parents may physically

punish their child.<sup>13,14</sup> In addition, national child maltreatment statistics show that many children are still being maltreated by their caregivers.<sup>2</sup> Oranga Tamariki (New Zealand Ministry for Children) figures in the 12 months to 31 December 2019 showed that there were 85,000 reports of concern regarding 61,300 individual children.<sup>15</sup> It has been estimated that almost one in four New Zealand children have been subject to at least one report of abuse or neglect to authorities by age 17.<sup>2</sup> Of these, around one in ten were subjected to substantiated abuse or neglect with a considerable proportion of these complaints relating to parental use of physical punishment/assault.<sup>2</sup> Using these figures, the incidence of notifications to child protective services in New Zealand was higher than the incidence of childhood medicated asthma and similar to the prevalence of obesity.<sup>2</sup>

These findings tend to suggest that, despite the law change in 2007, violence towards

children is still relatively common.<sup>2,13,14</sup> However, none of these analyses have considered rates of physical punishment over time within the New Zealand population, and in particular how these rates may have changed, and hopefully reduced, as a result of legislation and increased public awareness. To help inform further public health efforts, it is important to continue to monitor rates of child physical punishment/abuse among New Zealand parents, ideally using a common measurement approach.

Also important is the need to identify modifiable predictors of child physical punishment that can be targeted by public health and clinical interventions to reduce rates of parental violence towards their children.<sup>13</sup> A number of predictors of child physical punishment have been identified by previous research.<sup>16</sup> These predictors mostly fall into four broad categories: family and social environment factors; parental factors; child characteristics; and socio-cultural influences.<sup>1,16–21</sup>

An analysis of the physical discipline practices of 155 individuals within the Christchurch Health and Development Study (CHDS) cohort who had become parents before the age of 25 years found that 77% had physically punished and around 12% had severely physically assaulted a dependent child in the past year.<sup>1</sup> However, this analysis was conducted prior to the 2007 law change and was based largely on a subset of younger and generally higher risk parents. The CHDS cohort has now been assessed on three further occasions up to age 40: in 2007 (age 30), 2012 (age 35) and 2017 (age 40). Thus, the aim of this study was to extend the 2002 study<sup>1</sup> and report rates and predictors of the use of physical punishment by cohort members towards their children over time.

## Methods

### Participants

Participants were members of the Christchurch Health and Development Study (CHDS) birth cohort. The CHDS is a longitudinal study of 1,265 children (630 females) born in Christchurch over a four-month period during 1977. This cohort has been studied regularly from birth to age 40 using a combination of: interviews with parents and participants; standardised testing;

teacher report; and official record data.<sup>22,23</sup> All phases of the study have been subject to ethical approval by the Regional Health and Disabilities Ethics Committee.

The current analysis is based on a sub-sample of 763 CHDS participants who were parenting a dependent child and had data recorded on their child-management practices at one or more assessments from age 25–40 years. The observed samples at each assessment were: age 25 (n=155), 30 (n=337), 35 (n=585) and 40 years (n=636). To be included in the analysis, the participant had to have at least one resident dependent child under the age of 16 years.

### Parental use of physical punishment

When participants were age 25, 30, 35 and 40 years old, those who were parenting a dependent child were questioned about their use of different forms of physical punishment/abuse using the physical assault sub-scale of the Parent-Child Conflict Tactics Scale (CTS-PC).<sup>24</sup> This 12-item subscale assesses the extent to which parents had used each of the physical punishment methods to discipline their child/children over the previous 12 months. Parents were questioned separately about their own behaviour and that of their partner (if applicable). Items ranged in severity from minor to very severe assault. Minor assault items included: Smacked your child on the bottom with your bare hand; Slapped your child on the hand, arm or leg; Pinched your child; Shook your child; Hit your child on the bottom with something like a belt, hairbrush, a stick or some other hard object. Severe assault items included: Hit your child on some other part of the body besides the bottom with something like a belt, hairbrush, a stick or some other hard object; Slapped your child on the face, head or ears; Hit your child with a fist or kicked her/him hard; Threw or knocked your child down. Very severe assault items included: Grabbed your child around the neck and choked her/him; Hit your child over and over as hard as you could; Burned or scalded your child on purpose. One item from the original CTS-PC, “threatened with a knife or gun,” was excluded due to its very low base rate in the cohort. Items were scored on a 7-point scale from never (0) to 20+ times (6). For the purposes of the present analysis,

parents were classified at each assessment as having used a particular form of physical punishment if they reported having used it on any of their children. The CTS-PC is a widely used and valid measure of parental aggression towards their child/children.<sup>24,25</sup>

### Antecedent and concurrent predictors of child physical punishment

A range of candidate predictor variables were considered from the database as potential indicators of increased risk of parental use of physical punishment. These were selected on the basis of previous research and theory:

- a. *Measures of family structure/composition:* presence of a cohabiting partner, numbers and ages of dependent children.
- b. *Measures of individual characteristics:* sex, ethnicity, educational attainment, adolescent antisocial behaviour (conduct/oppositional disorders), adolescent mental health disorders (depression, anxiety, suicidal ideation).
- c. *Measures of childhood family circumstances:* parental education, family socioeconomic status, family instability, exposure to child physical or sexual abuse, family violence, parental adjustment problems, parental bonding.
- d. *Measures of concurrent family context at the time of assessment:* family income, welfare dependence, parental mental health/substance use problems, adverse family life events, intimate partner violence.

These measures are described in greater detail in the Appendix.

### Statistical methods

Tabular analyses summarised the % (n) of the items and summary measures of physical punishment/assault at each assessment. Chi-square and repeated measures analysis of variance were used to examine variations in the sample characteristics of the parenting samples over time. Tests for age-related trends in the observed rates/frequency of physical punishment were conducted using random effects logistic or negative binomial regression.

The primary outcome for the multi-variable analysis was a dichotomous measure of any use of physical punishment at each age. Random effects logistic regression methods were used to model the repeated measures of physical punishment over time as a function of age, household composition, individual characteristics and other factors. An initial model was fitted to explore the extent to which age-related variations in the use of physical punishment could be explained by age-related variations in family composition, individual characteristics or childhood-background characteristics associated with the timing of parenthood. This analysis was then extended to consider the full set of potential predictors. Predictor variables meeting a  $p \leq 0.30$  criterion were tested in a full model, which was then refined using forward and backward selection methods to identify a consistent and parsimonious set of predictors. A sensitivity analysis was conducted using negative binomial regression to model the frequency (number of instances) of physical punishment summed over all scale items, with frequency estimated at the midpoint of the relevant response category for each item.

Assuming an overall base rate of physical punishment in the region of 40%–50%, the study sample had 80% power at  $\alpha = .05$  to detect odds ratios with a dichotomous risk factor in the range 1.5 to 2.3, depending on the base rate of exposure in the non-punishment group (5% to 50%), or a correlation in excess of .12 with a continuous risk factor.<sup>26</sup> Power is likely to be enhanced by the repeated measures nature of the data. This suggests the study has adequate power to detect small to moderate effect size associations.

## Results

### Characteristics of parenting samples

Appendix Table 1 summarises the demographic and childhood-background characteristics of the parenting samples assessed at each of the four study waves from ages 25–40 years. Consistent with general population demographics, women and those of Māori or Tagata Pasifika ethnicity were more likely to have made an earlier transition to parenthood. The earlier

parenting samples were less likely to have attained degree-level qualifications, more likely to be sole parenting and had fewer dependent children than later parenting samples. They were also more likely to have been raised in families characterised by socioeconomic disadvantage, family instability and exposure to child abuse/family violence.

### Parental use of physical punishment

Table 1 shows the reported rates of child physical punishment in the past 12 months at each parental age (25 to 40 years) by type/severity of punishment. The most common forms of physical punishment were smacking on bottom and slapping on hand, arm or leg. Only a very small minority of parents reported using severe or very severe forms of physical assault. There was a downward trend in the use of all forms of physical punishment with age. This is reflected in the overall rate of use of any form of physical punishment. At age 25, over three quarters of parents reported using physical punishment on their child/children, with this rate declining to just over 40% of parents at age 40. A similar downward trend was observed in parental reports of the frequency of physical punishment use. Specifically, among those parents using physical punishment, the median number of instances declined from 16 at age 25 to 4 at age 40.

The observed age-related decline in the rate of physical punishment could not be explained by age-related differences in family composition, parental demographics or childhood-background characteristics associated with the timing of parenthood. After being adjusted for these differences, the overall rates of physical punishment were negligibly different from the observed rates at each age (marginal adjusted rates: 76.6% at age 25; 58.2% at age 30; 47.5% at age 35; 41.7% at age 40).

Stratifying by sex of parent showed strong gender similarities in the prevalence and frequency of physical punishment (Table 2). Younger female parents reported the highest overall rate of physical punishment, with 82% reporting that they had physically punished their child/children at age 25. Whereas, at age 40, 39% of mothers and 47% of fathers reported physically

punishing their child/children. Extension of this analysis to incorporate use of physical punishment by a partner (if present) as well as the responding parent revealed only very small increases in the prevalence of all types of physical punishment across households, though there was an increase in the median frequency of reported incidents of physical punishment when partner data were included (Table 3).

### Predictors of child physical punishment

Consideration of a wide range of potential predictors in a multivariable model (see section *Methods*) predicting any use of physical punishment identified the following five factors as independent predictors. The two strongest predictors were parental age at assessment ( $p < .001$ ), as reflected in the results above, and the numbers/ages of dependent children in the household ( $p < .001$ ). In particular, use of physical punishment increased with the number of 2–4-year-old children (OR=4.6, 95%CI 3.4–6.2,  $p < .001$ ) and the number of children aged 5–10 years being cared for (OR=2.5, 95%CI 2.0–3.1,  $p < .001$ ), but not with the number of children aged <2 (OR=1.3, 95%CI 0.9–1.8) or 11–15 years (OR=0.9, 95%CI 0.7–1.2). In addition, use of physical punishment was higher among parents who were themselves raised in lower-socioeconomic-status households (OR=1.4, 95%CI 1.1–1.8,  $p = .01$ ); who had experienced mental health problems (depression, anxiety, suicidal ideation) during adolescence (OR=1.9, 95%CI 1.3–2.7,  $p < .001$ ); or who were in romantic relationships characterised by intimate-partner physical violence (OR=2.3, 95%CI 1.5–3.5,  $p < .001$ ). Reanalysis of the data using the estimated number of instances of physical punishment reported at each age as a proxy for severity of physical punishment/abuse identified the same set of predictors.

To illustrate the level of prediction obtained when the identified predictors were considered in combination, a composite risk score was constructed by summing five dichotomous indicators at each age. These included: (i) the participant was raised in a low SES household; (ii) the participant experienced mental health problems in adolescence; (iii) the participant was involved in a relationship characterised by intimate-partner physical violence in the

**Table 1:** Use of child physical punishment in the past 12 months for all parenting respondents at ages 25–40 years.

| Item  | Age 25<br>(N=155) | Age 30<br>(N=337) | Age 35<br>(N=585) | Age 40<br>(N=636) | p <sup>b</sup>  |
|---|-------------------|-------------------|-------------------|-------------------|-----------------|
| Assessment year   | 2002              | 2007              | 2012              | 2017              |                 |
| <b>% (n) Minor assault</b>  | <b>77.4 (120)</b> | <b>58.5 (197)</b> | <b>46.2 (270)</b> | <b>41.7 (265)</b> | <b>&lt;.001</b> |
| Smacked child on bottom with bare hand  | 62.6 (97)         | 46.7 (155)        | 36.6 (214)        | 32.4 (206)        |                 |
| Slapped child on hand, arm or leg   | 66.5 (103)        | 43.4 (145)        | 28.6 (167)        | 24.4 (155)        |                 |
| Pinched child   | - <sup>a</sup>    | 5.1 (17)          | 1.7 (10)          | 1.6 (10)          |                 |
| Hit child on bottom with belt, hairbrush stick or other hard object               | 11.0 (17)         | 3.3 (11)          | 3.6 (21)          | 3.5 (22)          |                 |
| Shook child   | 6.5 (10)          | 3.3 (11)          | 1.2 (7)           | 1.6 (10)          |                 |
| <b>% (n) Severe assault</b>   | <b>12.3 (19)</b>  | <b>4.5 (15)</b>   | <b>4.8 (28)</b>   | <b>3.9 (25)</b>   | <b>.005</b>     |
| Slapped child on face, head or ears   | 10.3 (16)         | 3.0 (10)          | 2.6 (15)          | 2.5 (16)          |                 |
| Hit child on body besides bottom with belt, hairbrush, stick or other hard object | 3.9 (6)           | 0.9 (3)           | 1.0 (6)           | 0.3 (2)           |                 |
| Threw or knocked child down   | 1.9 (3)           | 0.9 (3)           | 0.9 (5)           | 0.8 (5)           |                 |
| Hit child with fist or kicked them  | 1.3 (2)           | 0.6 (2)           | 0.7 (4)           | 0.8 (5)           |                 |
| <b>% (n) Very severe assault</b>  | <b>2.6 (4)</b>    | <b>1.2 (4)</b>    | <b>0.7 (4)</b>    | <b>0.3 (2)</b>    | <b>.007</b>     |
| Choked or grabbed child around the neck   | 1.3 (2)           | 0.3 (1)           | 0.2 (1)           | 0.3 (2)           |                 |
| Hit child over and over as hard as could  | 2.6 (4)           | 0.9 (3)           | 0.5 (3)           | 0.0 (0)           |                 |
| Burned or scalded child on purpose  | 0.7 (1)           | 0.0 (0)           | 0.0 (0)           | 0.0 (0)           |                 |
| <b>% (n) Any form of physical punishment</b>                                      | <b>77.4 (120)</b> | <b>58.5 (197)</b> | <b>47.4 (277)</b> | <b>42.5 (270)</b> | <b>&lt;.001</b> |
| <b>Median (IQR) number of instances (amongst those using physical punishment)</b> | <b>16 (8–40)</b>  | <b>10 (4–27)</b>  | <b>5 (2–15)</b>   | <b>4 (2–10)</b>   | <b>&lt;.001</b> |

<sup>a</sup> Not assessed at age 25.

<sup>b</sup> Tests for trend in major categories of physical punishment.

**Table 2:** Use of child physical punishment in the past 12 months (age 25–40 years) by sex of parent.

| Measure  | Age 25         | Age 30         | Age 35         | Age 40         | p     |
|--|----------------|----------------|----------------|----------------|-------|
| Assessment year  | 2002           | 2007           | 2012           | 2017           |       |
| <b>Females</b>   | <b>(N=110)</b> | <b>(N=204)</b> | <b>(N=333)</b> | <b>(N=343)</b> |       |
| % (n) Minor assault  | 81.8 (90)      | 60.3 (123)     | 43.5 (145)     | 38.5 (132)     | <.001 |
| % (n) Severe assault   | 13.6 (15)      | 3.9 (8)        | 4.8 (16)       | 3.8 (13)       | .006  |
| % (n) Very severe assault  | 2.7 (3)        | 1.0 (2)        | 0.6 (2)        | 0.0 (0)        | .01   |
| % (n) Any form of physical punishment                                      | 81.8 (90)      | 60.3 (123)     | 45.1 (150)     | 38.8 (133)     | <.001 |
| Median (IQR) number of instances (amongst those using physical punishment) | 16 (8-40)      | 14 (4-27)      | 4 (2-15)       | 4 (2-8)        | <.001 |
| <b>Males</b>   | <b>(N=45)</b>  | <b>(N=133)</b> | <b>(N=252)</b> | <b>(N=293)</b> |       |
| % (n) Minor assault  | 66.7 (30)      | 54.9 (73)      | 49.6 (125)     | 45.4 (133)     | .004  |
| % (n) Severe assault   | 8.9 (4)        | 5.3 (7)        | 4.8 (12)       | 4.1 (12)       | .28   |
| % (n) Very severe assault  | 2.2 (1)        | 1.5 (2)        | 0.8 (2)        | 0.7 (2)        | .26   |
| % (n) Any form of physical punishment                                      | 66.7 (30)      | 55.6 (74)      | 50.4 (127)     | 46.8 (137)     | .008  |
| Median (IQR) number of instances (among those using physical punishment)   | 15 (4–50)      | 8 (4–28)       | 6 (2–15)       | 4 (2–10)       | <.001 |

**Table 3:** Use of child physical punishment in the past 12 months for all parenting respondents and their partners at ages 25–40 years.

| Measure   | Age 25 (N=155) | Age 30 (N=337) | Age 35 (N=585) | Age 40 (N=636) | p     |
|---|----------------|----------------|----------------|----------------|-------|
| % (n) Minor assault   | 81.9 (127)     | 62.6 (211)     | 48.6 (284)     | 44.3 (282)     | <.001 |
| % (n) Severe assault  | 15.5 (24)      | 6.5 (22)       | 5.0 (29)       | 5.0 (32)       | <.001 |
| % (n) Very severe assault   | 5.2 (8)        | 1.2 (4)        | 0.9 (5)        | 0.3 (2)        | <.001 |
| % (n) Any form of physical punishment   | 81.9 (127)     | 62.9 (212)     | 49.9 (292)     | 45.4 (289)     | <.001 |
| Median (IQR) number of instances (among households using physical punishment) | 23 (8–56)      | 16 (6–46)      | 8 (4–24)       | 6 (2–16)       | <.001 |

past 12 months; (iv) the family had one or more dependent children aged 2–4 years; (v) the family had one or more dependent children aged 5–10 years. Table 4 describes the relationship between this risk score and the likelihood of a parent using any form of physical punishment in the past 12 months at each age. Results show strong monotonic associations, with parental use of physical punishment increasing rapidly with the number of risk factors present. These trends were most marked at older ages. For example, at age 40, parents with four or more of the above indicators were approximately 14 times more likely to have used physical punishment than those with a risk score of zero (80.0% vs 5.9%). Extension of the model to test for age by risk factor interactions showed no evidence that the effects of predictors varied with the age of the parent.

## Discussion

This study reports data gathered over a 15-year period (2002–2017) spanning the interval from five years prior to introduction of the anti-smacking legislation in 2007 to 10 years after for a cohort of parenting-age New Zealand adults. Results demonstrate a clear downward trend in parental reported use of child physical punishment over this period, both in terms of the proportion of parents still relying on physical punishment, but also how

often they used it. This trend could not be explained by differences in family structure, personal characteristics or the family backgrounds of parents at each age assessment. Other possible explanations include: increasing maturity of the parenting sample over time (less reactive, more experienced, older parents); a cultural shift towards the unacceptability of violence towards children over the period of the study; and the law change in 2007, which prohibited physical punishment and violence towards children. Given the nature of its design, it is not possible for the current study to distinguish between these explanations. However, it does not seem unreasonable to conjecture that all three processes are likely to have played a role. For example, there is good evidence from the wider literature suggesting that older parents use more effective management strategies for child misbehaviour.<sup>20</sup> In addition, over the last two decades, there has been increasing recognition across society of the potential harms associated with physical punishment and violence towards children and, in turn, a decline in the perceived acceptability of physical punishment.<sup>13,14</sup>

Nonetheless, despite the downward trend in the use of physical punishment within this large cohort, it is clear that physical punishment remains a fairly common form of child discipline. Even at age 40, over 40% of parents reported using physical punishment on their child/children in the

**Table 4:** Rates (%) of physical punishment in the past 12 months by risk factor score and age of parent (25–40 years).

| Number of risk factors | 25 years        | 30 years        | 35 years        | 40 years        |
|------------------------|-----------------|-----------------|-----------------|-----------------|
| 0                      | 60.0<br>(n=5)   | 26.8<br>(n=41)  | 6.2<br>(n=65)   | 5.9<br>(n=57)   |
| 1                      | 58.5<br>(n=41)  | 55.2<br>(n=105) | 37.6<br>(n=189) | 33.6<br>(n=217) |
| 2                      | 84.0<br>(n=50)  | 59.8<br>(n=87)  | 56.0<br>(n=207) | 48.2<br>(n=247) |
| 3                      | 83.3<br>(n=48)  | 72.2<br>(n=79)  | 63.0<br>(n=92)  | 58.4<br>(n=101) |
| 4+                     | 100.0<br>(n=11) | 76.0<br>(n=25)  | 87.5<br>(n=32)  | 80.0<br>(n=20)  |
| p                      | <.001           | <.001           | <.001           | <.001           |

previous 12 months. Similar findings were reported in a 2013 study that showed 40% of New Zealand adults still agreed that there were certain circumstances when parents may physically punish their child.<sup>13,14</sup> These findings suggest that, despite both changing perceptions towards physical punishment and violence toward children and the 2007 legislation, a substantial minority of New Zealanders may still view physical punishment as an acceptable form of child discipline. However, on a positive note, these parents do appear to be engaging less frequently in these problematic parenting behaviours, although this may not necessarily mitigate the extent of child harm.

Relatively few predictors of child physical punishment were identified in the analysis. The strong association found with parental intimate-partner physical violence is consistent with the now well-established link between wider family violence and child physical punishment/abuse,<sup>27</sup> reinforcing the need for continued public health interventions to reduce family violence. The more modest links with socioeconomic background and adolescent mental health are also consistent with existing research.<sup>18,28</sup> However, by far the strongest predictor was the number of 2–10 year olds in the household and, in particular, the number of 2–4 year olds. This is consistent with developmental data showing that children between the ages of 2–4 years can pose particular challenges for parents, given their rapidly increasing verbal and motor skills but limited ability to regulate their emotions and behaviours. This developmental period is often referred to as the “terrible twos” or “terrible threes,” given that oppositional behaviour and uncontrolled temper tantrums are common and harder to deal with, especially when a parent may be stressed, tired or lack the resources to cope.<sup>20,21</sup> Collectively, these findings suggest the need for (a) individualised, culturally

responsive and strengths-based efforts to support vulnerable groups of parents, such as those with high-risk personal backgrounds who are parenting very young children, alongside (b) wider public health programmes to promote the use of alternative and more effective strategies for dealing with child behavioural issues in the context of stressful family situations.<sup>20</sup>

This analysis uses data from a well-studied New Zealand-based representative longitudinal birth cohort. Cohort members have been studied prospectively on 24 occasions to age 40, with extensive assessment of potential risk/protective factors. However, the study also needs to be considered in light of a number of limitations. In particular, due to social desirability bias, the chosen measure of child physical punishment (the CTS-PC) may underestimate rates. This study reports rates of physical punishment by parents who were aged 25 in 2002 (before the 2007 legislation to prohibit physical punishment), so it is unclear what rates of physical punishment of children would be in studies of contemporary young parents.

Overall, the findings suggest that, while both the number of parents using physical punishment and the frequency of physical violence have decreased, a large number of New Zealand parents are continuing to use physical punishment when disciplining their children. This is despite the New Zealand Government legislating against physical punishment of children in 2007 and public health efforts to increase awareness of the potential harms of physical violence towards children. There remains a need for continued public education on reducing physical violence; for providing alternative strategies to manage child behaviour; and for ongoing monitoring of parental use of physical punishment against changing societal tolerance of violence toward children.



## Appendix

### Appendix Figure 1: Description of measures.

The following measures were considered as potential candidate predictors of parental use of child physical punishment:

- Measures of family structure/composition
  - *Partnership status*: Participants were classified as either sole parents or cohabiting with a resident partner based on reported partnership status at each assessment.
  - *Numbers/ages of children*: Variability in the age composition of dependent children (<16 years) in the household was represented in the analysis by counts of the numbers of children in the age ranges <2 years, 2–4 years, 5–10 years and 11–15 years at each assessment.
- Measures of individual characteristics
  - *Sex*: The biological sex of the participant was recorded at their birth.
  - *Ethnicity*: At birth, each cohort members' ethnicity was recorded based on parent-reported ethnicity.
  - *Educational attainment*: This was classified into four levels based on the highest educational qualification attained by age 25: no formal qualifications; high school qualifications; tertiary qualifications below degree level; university degree or equivalent.
  - *Adolescent adjustment (14–16 years)*: At ages 15 and 16 years, participants and their parents were interviewed about aspects of the young person's mental health/adjustment over the preceding 12 months. These interviews combined a range of standardised assessment instruments, including components of the relevant version (self- or parent-report) of the Diagnostic Interview Schedule for Children (DISC),<sup>29</sup> together with custom-written survey items to assess DSM-III-R symptom criteria for a range of mental disorders as well as the occurrence of suicidal behaviours (suicidal ideation or attempt) in each interview period.<sup>30</sup> For the purposes of the present analysis these data were combined over the two assessments to derive two dichotomous measures: (a) *adolescent mental health disorders*: whether the young person met diagnostic criteria on the basis of either parent- or self-report for a major depressive episode or an anxiety disorder (generalised anxiety disorder, overanxious disorder, phobias), or they were reported to have experienced suicidal behaviour at any time during the period from age 14–16 years; (b) *adolescent conduct/oppositional disorders*: whether the young person met diagnostic criteria on the basis of either parent- or self-report for a diagnosis of conduct or oppositional defiant disorder from age 14–16 years.
- Measures of childhood family circumstances
  - *Parental education*: This was classified into three levels based on the highest level of educational attainment reported for either parent at the time of the participant's birth (no formal qualifications, high school qualifications, tertiary qualifications).
  - *Family socioeconomic status (birth)*: This was assessed on the basis of paternal occupation at the time of birth using the Elley and Irving scale of socioeconomic status,<sup>31</sup> classified into three levels: professional/managerial; clerical/technical/skilled; semiskilled/unskilled/unemployed.
  - *Changes of parents (0–16 years)*: Childhood family instability was assessed on the basis of a count of the number of changes of parents experienced by the child from birth to age 16 years. Parental changes included separation/divorce, reconciliation, remarriage/cohabitation, fostering and any other changes of custodial parents.

- *Childhood sexual/physical abuse (<16 years):* At ages 18 and 21, participants were questioned about their experience of physical or sexual abuse prior to age 16 years. Physical abuse was assessed based on participant reports of the extent to which their parents used physical punishment /maltreatment during their childhood. Separate ratings were obtained for each parent. These ratings were combined into a single four-point scale of parental physical punishment/maltreatment, based on the most severe rating for either parent at either 18 or 21 years: 0=parents never used physical punishment; 1=parents seldom used physical punishment; 2=at least one parent regularly used physical punishment; 3=at least one parent used frequent or severe punishment or treated the participant in a harsh/abusive manner.<sup>32,33</sup> For childhood sexual abuse, participants were questioned about their exposure to a range of unwanted sexual experiences including non-contact episodes (eg, indecent exposure, public masturbation); episodes involving sexual contact in the form of sexual fondling, genital contact or attempts to undress the participant; and episodes involving attempted or completed vaginal, oral or anal intercourse.<sup>32,33</sup> Using these data participants were classified on a single four-point scale reflecting the most severe form of abuse exposure reported at either age 18 or 21: 0=no childhood sexual abuse; 1=non-contact childhood sexual abuse; 2=contact childhood sexual abuse not involving attempted or completed sexual penetration; and 3=severe childhood sexual abuse involving attempted or completed sexual penetration.
- *Family violence (<16 years):* Witnessing parental intimate partner violence during childhood (prior to age 16 years) was assessed via participant self-report at age 18, through a series of eight items derived from the Conflict Tactics Scale.<sup>34</sup> The eight items included: 1. threaten to hit or throw something; 2. push, grab or shove other parent; 3. slap, hit or punch other parent; 4. throw, hit, kick or smash something (in the other parent's presence); 5. kick the other parent; 6. choke or strangle other parent; 7. threaten other parent with a knife, gun or other weapon; 8. call other parent names or criticize other parent (or put other parent down). An overall measure was created by summing the responses for both father and mother-initiated violence ( $\alpha=0.88$ ).
- *Parental adjustment problems:* At age 11 parents of cohort members were questioned about their history of illicit drug use. At age 15 parents of cohort members were questioned as to whether any parent had a history of alcohol problems/alcoholism or a history of criminality.
- *Parental bonding (16 years):* At age 16, participants were questioned about the quality of their relationship with their parents during childhood using the Parental Bonding Instrument (PBI).<sup>35</sup> This 25-item scale assessed two broad domains of parenting: parental over-protection and parental care. The parental over-protection domain measures variations in the extent to which a parent was perceived to be controlling and unwilling to allow the child autonomy. The parental care dimension assessed the extent to which the parent was perceived to be loving, caring and emotionally supportive. Separate assessments were obtained for mothers and fathers. For the purposes of the present analysis, maternal and paternal ratings were averaged to create overall scores for parental care ( $\alpha=0.90$ ) and over-protection ( $\alpha=0.86$ ).
- Measures of concurrent family context
  - *Gross family Income (past 12 months):* At each assessment from age 25–40 years, participants were questioned about their gross annual income from all sources in the past 12 months and that of their partner (if any). Incomes reported in currencies other than New Zealand dollars (NZD) were converted into NZD using Purchasing Power Parities (Organisation for Economic Co-operation and Development (OECD)). Incomes were adjusted for inflation using the Consumers Price Index (CPI) to NZD 2017.<sup>36</sup>

- *Welfare dependence (past 12 months):* At each assessment, families reporting receipt of social welfare benefits including job seeker, sole parent or supported living payments in the previous 12 months were classified as welfare dependent.
- *Parental mental health/substance use problems (past 12 months):* At each assessment from 25-40 years participants were interviewed using components of the Composite International Diagnostic Interview (CIDI)<sup>29</sup> to assess DSM-IV<sup>37</sup> diagnostic criteria for a range of mental disorders including major depression, anxiety disorders (generalised anxiety, panic, phobias), alcohol and illicit substance abuse/dependence in the previous 12 months, together with custom written items to assess suicidal behaviours. For the purposes of this analysis a measure of the severity of the participant's mental health/substance use problems in the previous 12 months was constructed based on a count of the number of problems reported.
- *Adverse family life events (past 12 months):* At each assessment participants completed a life events checklist spanning a range of adverse life experiences including: relationship problems; employment/financial problems; serious illness, accident or death in the family; victimisation; and related issues. A measure of the extent of exposure to life course stress/adversity was constructed based on a count of the number of reported life events in the previous 12 months at each age.
- *Intimate partner violence (IPV):* At each assessment at ages 25, 30, 35 and 40 years, participants who reported that they were in (or had been in) a married, cohabiting, romantic, intimate or close relationship lasting one month or longer at any time in the past 12 months were questioned about their most recent relationship. Physical IPV over the previous 12 months was assessed using the physical assault sub-scale of the Revised Conflict Tactics Scales (CTS2).<sup>38</sup> The scale comprised a series of 25 questions regarding acts of verbal aggression, physical violence or threats ranging from incidents of minor verbal aggression through to severe physical assault. Separate questioning was conducted concerning violence perpetration and violence victimization. For the purposes of the present analysis only the physical assault sub-scale was used, and participants were classified on a dichotomous measure at each age reflecting whether they reported any incident of physical violence perpetration or victimisation in the previous 12 months.

**Appendix Table 1:** Household demographics and childhood-background characteristics of parenting samples at age 25–40 years.

| Measure  | 25 years<br>(N=155)                  | 30 years<br>(N=337)                  | 35 years<br>(N=585)                  | 40 years<br>(N=636)                  | p      |
|--|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------|
| <b>Household composition</b>                                     |                                      |                                      |                                      |                                      |        |
| Mean (SD) and range of number of dependent children (<16 years)  | 1.77 (0.91)<br>Range 1–5<br>children | 1.98 (1.09)<br>Range 1–8<br>children | 1.97 (0.96)<br>Range 1–8<br>children | 2.16 (0.97)<br>Range 1–8<br>children | <0.001 |
| % (n) Cohabiting partner   | 71.0 (110)                           | 82.2 (277)                           | 88.7 (519)                           | 89.0 (566)                           | 0.067  |
| <b>Individual Characteristics</b>                                |                                      |                                      |                                      |                                      |        |
| % (n) Female   | 71.0 (110)                           | 60.5 (204)                           | 56.9 (333)                           | 53.9 (343)                           | 0.001  |
| % (n) Māori/Tagata Pasifika ethnicity                            | 23.9 (37)                            | 16.6 (56)                            | 14.7 (86)                            | 11.9 (75)                            | 0.001  |
| % (n) Attained university degree by age 25                       | 3.9 (6)                              | 13.5 (45)                            | 25.8 (149)                           | 29.1 (183)                           | <0.001 |
| <b>Childhood-background characteristics</b>                      |                                      |                                      |                                      |                                      |        |
| % (n) Family of semiskilled/unskilled socioeconomic status       | 40.7 (63)                            | 35.0 (118)                           | 26.0 (152)                           | 23.7 (151)                           | <0.001 |
| % (n) Mother lacked formal education qualifications              | 70.0 (109)                           | 63.2 (213)                           | 50.8 (297)                           | 48.1 (306)                           | <0.001 |
| % (n) Entered single parent family at birth                      | 15.5 (24)                            | 8.9 (30)                             | 7.2 (42)                             | 5.8 (37)                             | <0.001 |
| % (n) Experienced 3+ changes of parents (<16 years)              | 36.8 (57)                            | 26.7 (90)                            | 20.0 (117)                           | 17.1 (109)                           | <0.001 |
| % (n) Experienced childhood physical or sexual abuse (<16 years) | 48.4 (75)                            | 37.1 (125)                           | 29.4 (172)                           | 25.0 (159)                           | <0.001 |
| % (n) Witnessed substantial parental IPV (<16 years)             | 36.1 (56)                            | 29.7 (100)                           | 25.3 (148)                           | 23.1 (147)                           | 0.004  |

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