Adversities of Childhood Experience and School Readiness

Focus on children born to teen and non-teen mothers in the *Growing Up in New Zealand* data

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Disclaimer

The views and interpretations in this report are those of the researcher and are not the official position of the Ministry of Social Development.

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Executive summary

This report estimates the effects of Adverse Childhood Experiences (ACEs) on children born to teen mothers in New Zealand, and the extent to which these factors are correlated with school readiness outcomes. ACEs are experienced by both the child and mother and include exposure to maltreatment, witnessing violence, living with household members with mental illness, those who abuse substances, have a history of incarceration, or have experienced parental divorce.

In this study, we calculate adjusted associations between ACEs and school readiness indicators using linear regression analysis that controls for family income, neighbourhood deprivation at time of pregnancy, maternal education, child's ethnicity, and maternal cohabiting status at birth.

One of the key findings of the report was that ACEs are more common in children of teen mothers compared to children of non-teen mothers. In children born to teen mothers, 42.9% had two or more ACEs at 54 months compared to 16.4% with two or more ACEs at 54 months in children born to non-teen mothers. We find that at all levels of ACE exposure, children born to teen mothers have less favourable performance on school readiness examinations. Our results suggest that poor school outcomes for the children of teen mothers are not purely due to ACE exposure, and that this may justify children of teen mothers receiving additional support to increase their school readiness even if their observed ACE counts are low.

Introduction

Background

The Children's Action Plan in 2012 outlined the vision that every child born in New Zealand today can thrive, belong, and achieve. According to the Green Paper for Vulnerable Children, one of the factors that places New Zealand children at risk of poor outcomes is being the child of a teen parent (Boden, 2008 and Minister of Social Development and Employment, 2011). In New Zealand, teen parents spend, on average, 17.5 years on a public benefit with an associated cost of NZ$213,000. Early childhood has been identified as an ideal time for policy interventions for reducing long-term disparities (Halfon, 2012).

Although recently declining, New Zealand has a relatively high rate of children born to teen mothers. In 2016, the rate was 16 births per 1,000 women between the ages of 15 and 19. This is half the 2008 rate of 33 births per 1,000 women between the ages of 15 and 19. Of developed OECD countries, only the USA has a higher teenage birth rate than New Zealand (MacPherson, 2017 and Sedgh, 2015). Also, the teenage birth rate for Māori was nearly five times that of European/Pākehā teenagers (Dickson, 2000), and the teen birth rate in the most deprived areas of New Zealand (Dep 9-10) is 6.5 times higher than the teenage birth rate in the least deprived areas (Dep 1-2) (Ministry of Social Development, 2008).

Concerns that children of teen mothers face poor outcomes have led preventive and protective services to focus strongly on teen mothers. For example, children of teen mothers are much more likely to be involved in child protection, including being removed for reasons of maltreatment. A recent population-based cohort study of children born in New Zealand, and followed prospectively up to their 18th birthday, showed that children born to teen mothers had considerably heightened rates of notification, substantiation and placement. For example, 27% of the Māori children in the cohort who were born to teen mothers had a substantiated abuse finding by their 18th birthday (Rouland et al., 2019).

The relationship between teen pregnancy and ACEs

Teen pregnancy has been associated with ACEs. ACEs are adversities that have been shown to be associated with poor adult outcomes in both physical and psychological domains. Teen pregnancy[1] occurred in 16% of women who had experienced no ACE, compared with over 40% of women who had experienced

[1] Teen pregnancy refers to female adolescents becoming pregnant between the ages of 13-19.

over five ACEs (Hillis, 2004). ACEs have also been associated with a range of birth outcomes including infant birth weight and gestational age (McDonnell, 2016). The pathways that intergenerational influence of maternal ACEs have on child outcomes has been less studied. While most studies report findings consistent with intergenerational transmission of child maltreatment, a systematic methodological review found that the body of literature provided mixed results (Thornberry, 2012). In California, children born to teen mothers with a history of Child Protection Services (CPS) involvement (at or after age 10 years) emerged as the strongest predictor of reported and substantiated next-generation maltreatment by age 5; even after adjusting for other sociodemographic risk factors (Putnam-Hornstein, 2015). In the USA, only 40% of teen mothers graduate from high school and less than 2% of those, having a baby before 18 years of age, finish university by age 30 (McCracken, 2014). International research shows that children of teen mothers have a significantly increased risk of economic, social, and health problems (Advocacy, S.C.f.A.a 2008). When compared to children not born to teen mothers, the children born to teen mothers are more likely to have low birth weight, suffer higher rates of abuse and neglect, live in poverty, leave school early, experience unemployment for periods of 12 or more months, commit a violent offence, become teen parents themselves, experience incarceration, and have lower standardised test performance (Boden, 2008).

Contributions of this study

The *Growing Up in New Zealand* (GUiNZ) study is a longitudinal birth cohort of over 6,000 children and their parents (Morton et al., 2012, 2014). A recent study using the GUiNZ cohort showed a high prevalence of ACEs amongst the children in this cohort (Walsh et al, 2019). That study showed that not only was there a high prevalence of ACEs, but also that ACEs were strongly associated with school readiness indicators. The objective of the present paper is to replicate the analysis undertaken by that earlier study with a focus on children of teen mothers. The current paper looks at the prevalence of ACEs amongst teen mothers, and the extent to which it correlates to school readiness. It is important to note that ACEs may be experienced by the child and the mother.

In addition, our research investigates whether children born to teen mothers should be automatically approached for preventative services to reduce ACEs and increase school readiness.

Method

Much of the methodology in the present paper is a replication of the approach taken in previous research using *Growing Up in New Zealand* (GUiNZ) participants (Walsh et al., 2019). We, therefore, provide a brief sketch of the method and refer the reader to the earlier paper to supplement what is presented here.

Data and design

The dataset that we use consists of 5,562 mother[2]-child combinations (also known as 'dyads') born in the Auckland and Waikato region who were recruited to the GUiNZ study before the birth of the child and completed the 54-month wave of the survey. Ethics for the GUiNZ study was approved by the Health and Disability North Y Committee (NTY 08/06/055). The exposure variable we are interested in is the count and type of ACEs that the child experienced in the first 54 months. Appendix 1 shows the mapping between ACEs and the survey responses. All standard ACEs except sexual abuse were able to be mapped. One important difference between the methodology used in Walsh et al. (2019) and the present paper is that we gather all ACE exposure from the surveys of mothers only, and do not use information from partners to ascertain ACEs.

We split the study sample by age of the mother at the birth of the child (less than 18, 18-19, 20-21 and more than 21) and calculate the rates and count of ACE exposure over the first 54 months.

School readiness outcomes

The outcomes of interest are seven school readiness measures as observed at the 54-month survey (see Appendix 2). Restricting attention to the 301 teen mothers (less than 20 years), we calculate the crude and adjusted association between each of the school readiness measures and the count and type of ACEs. The following specific ACE outcomes could not be analysed because of low count: alcohol abuse, maternal jail, and domestic partner violence. For comparison, we also calculate the crude and adjusted associations between each of the school readiness measures and the count and type of ACEs for the entire cohort.

We calculate adjusted associations using linear regression analysis with controls for family income, neighbourhood deprivation at time of pregnancy, maternal education, child's ethnicity, and maternal cohabiting status at birth. We also use

[2] There are no non-biological mothers or caregivers in the sample because the mother-child dyad are enrolled at pregnancy.

a predictive modelling approach to identify which children should be enrolled into preventive services to reduce the risk of ACEs.

All analyses were completed using STATA version 15.0, and standardised coefficients were computed with the *listcoef* command.

Results

Exposure to ACE and maternal age

Table 1 provides the rates of each ACE and total ACE counts by maternal age. The proportion of children with exposure to at least one ACE is similar for maternal ages up to 21 (69.2 to 67.2%) – but substantially lower for maternal ages above 21 (42.4%). The rate of children exposed to four or more ACEs is similar for the teen mothers (6.7% for mothers aged under 18 and 6.6% for mothers aged between 18 and 19). This rate is lower for mothers aged 20-21 (4.6%) and 1% for those with maternal age greater than 21.

Table 1: Exposure to ACE in Study Population by the 54-Month Interview, GUINZ sample from 2009-2015 n = 5,562

	Age of Mother at Birth Percentage and Number with ACE			
Adverse Childhood Experience (ACE)	**Less than 18 (n=104)**	**18-19 (n=197)**	**20-21 (n=259)**	**>21 (n=5,002)**
Child Emotional Abuse Indicator	29.8% (31)	33.0% (65)	35.1% (91)	20.1% (1,007)
Child Physical Abuse Indicator	32.7% (34)	40.1% (79)	25.1% (65)	17.7% (883)
Parent Separation or Divorce Indicator	26.9% (28)	25.9% (51)	22.8% (59)	8.6% (431)
Depression Indicator	15.4% (16)	20.8% (44)	16.2% (42)	7.1% (354)
Illegal Street Drugs Use Indicator	17.3% (18)	13.2% (26)	8.9% (23)	3.6% (182)
Problem Drinker or Alcoholic Indicator	9.6% (10)	9.1% (18)	6.2% (16)	3.8% (191)
Intimate Violence Indicator	*	6.6% (13)	8.1% (21)	2.4% (118)
Conviction and Jail Time Indicator	*	*	0.0% (0)	0.2% (13)
Total Adverse Childhood Experiences				
0	30.8% (32)	30.5% (60)	32.8% (85)	57.6% (2,879)
1	30.8% (32)	24.4% (48)	31.3% (81)	27.0% (1,351)
2	16.4% (17)	21.8% (43)	21.6% (56)	11.0% (548)
3	15.4% (16)	16.8% (33)	9.7% (25)	3.5% (176)
4 or more	*	6.6% (13)	4.6% (12)	1.0% (48)

* Suppressed due to low count.

For children with maternal ages greater than 20, the highest single ACE exposure is to emotional abuse, followed by physical abuse and separation. Looking at each type of ACE across maternal age, parental separation or divorce, street drug use, and problem drinking, shows a systematic decline across maternal age. Emotional abuse, physical abuse, depression, and intimate partner violence show an inverted U-shape relationship.

Exposure to ACE and school readiness

Table 2 presents the association between exposure to ACEs and school readiness outcomes amongst the 301 children born to teen mothers. Overall, there is a pattern that increasing ACEs are associated with decreases in school readiness, although only the Luria Clapping test shows a statistically significant association. However, only one of these were significant at the 0.05 significance level.

Table 2: Crude and Multivariable Adjusted Associations Between 54-month Child Developmental Outcomes and Adverse Childhood Experiences (ACEs) in the* Growing Up in New Zealand *Study for Children born to Teen Mothers (n = 301), New Zealand 2009-2015

Child Developmental Outcome	Sample Size	Mean (Std. Dev.)	Crude Beta (95% C.I.) Multivariable Adjusted Beta (95% C.I.)
Luria Clapping Test Score	263	9.9 (5.6)	**-0.07 (-0.13 to -0.01)** **-0.07 (-0.14 to -0.01)**
DIBELS Letter Naming Score	263	4.2 (7.5)	-0.11 (-0.29 to 0.06) -0.10 (-0.26 to 0.07)
Affective Knowledge Test Score	277	7.3 (2.4)	-0.01 (-0.04 to 0.02) 0.02 (-0.02 to 0.05)
Counting Up Test (1-10) Score	278	7.5 (3.7)	-0.03 (-0.08 to 0.02) -0.03 (-0.08 to 0.02)
Counting Down Test (10-1) Score	278	2.2 (3.3)	-0.08 (-0.24 to 0.09) -0.07 (-0.24 to 0.10)
Name Writing Test: Percent Pass	271	0.44 (0.50)	-0.14 (-0.36 to 0.07) -0.03 (-0.28 to 0.22)
Number Writing Test: Percent Pass	260	0.28 (0.45)	-0.00 (-0.25 to 0.24) -0.07 (-0.21 to 0.35)

Notes: Adjusted for family income, New Zealand deprivation index at time of pregnancy, mother's education, child's ethnicity, and single parent (not cohabiting) status. Sample sizes for each test are less than the total possible sample of teen mothers because of test item non-completion.

School readiness and physical abuse

Table 3 shows the school readiness results for children born to teen mothers based on having the single ACE of physical abuse. Three of the seven school readiness tests were negatively associated with children who have an indication of physical abuse. For example, for the DIBELS letter naming tests, children born to teen mothers that have an indicator of physical abuse were able to, on average, name 3.0 letters in 60 seconds compared to 5.0 letters in 60 seconds in children born to teen mothers without an indication of physical abuse (Multivariable Adjusted Beta of -0.56, and 95% Confidence Interval from -1.11 to -0.01).

Table 3: Child Physical Abuse Indicator: Crude and Multivariable Adjusted Associations Between 54-month Child Developmental Outcomes and Adverse Childhood Experiences (ACEs) in the Growing Up in New Zealand Study in Children born to Teen Mothers (n = 301), New Zealand 2009-2015

Child Developmental Outcome	Sample Size	Multivariable Adjusted Estimated Scores		Crude Beta (95% C.I.) Multivariable Adjusted Beta (95% C.I.)
		No	Yes	
Luria Clapping Test Score	263	10.7	8.6	**-0.20 (-0.35 to -0.05)** **-0.21 (-0.38 to -0.04)**
DIBELS Letter Naming Score	263	5.0	3.0	**-0.50 (-0.99 to -0.00)** **-0.56 (-1.11 to -0.01)**
Affective Knowledge Test Score	277	7.6	6.8	**-0.12 (-0.20 to -0.03)** -0.05 (-0.14 to 0.04)
Counting Up Test (1-10) Score	278	7.9	6.9	-0.13 (-0.26 to 0.00) -0.10 (-0.23 to 0.04)
Counting Down Test (10-1) Score	278	2.6	1.6	**-0.44 (-0.84 to -0.05)** **-0.42 (-0.82 to -0.02)**
Name Writing Test: Percent Pass	271	46.7%	39.3%	-0.32 (-0.82 to 0.18) -0.08 (-0.68 to 0.52)
Number Writing Test: Percent Pass	260	32.1%	22.1%	-0.51 (-1.09 to 0.07) -0.51 (-1.19 to 0.17)

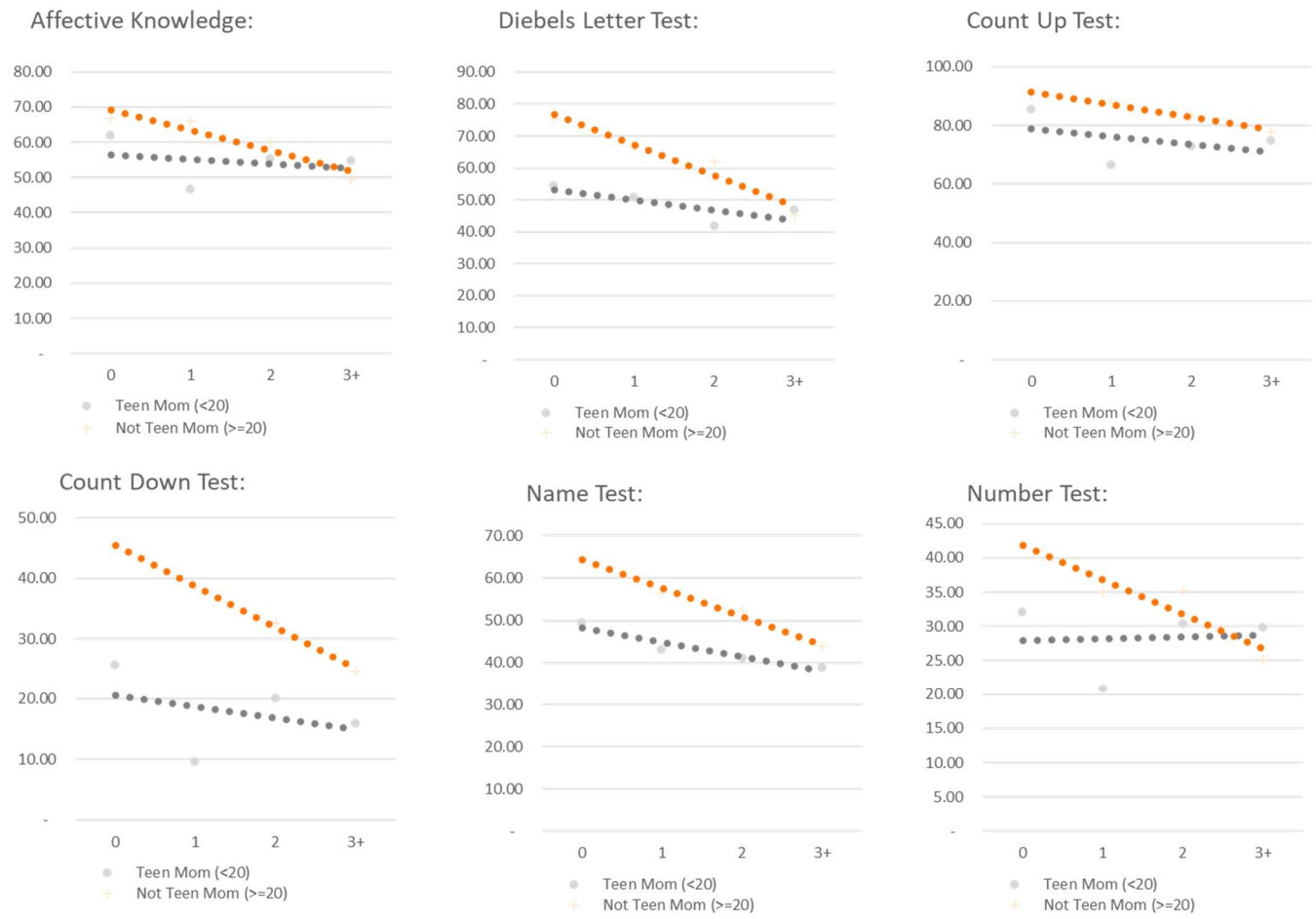
Notes: Adjusted for family income, New Zealand deprivation index at time of pregnancy, mother's education, child's ethnicity, and single parent (not cohabiting) status. Sample sizes for each test are less than the total possible sample of teen mothers because of test item non-completion.

Figure 1 provides a fitted plot of performance on each school readiness test against the number of ACEs, by teen and non-teen mother subgroups. Overall, for both teen and non-teen mothers, increased exposure to ACEs is associated

with lower scores. Additionally, children born to teenage mothers but not exposed to ACEs show worse outcomes across school readiness tests than those born to non-teen mothers. The vertical intercepts and slopes of lines for non-teen mothers are consistently greater than those estimated for teen mothers.

Interestingly, children of non-teen mothers exposed to three or more ACEs, show similar performance across most of the indicators as children of teen mothers exposed to zero ACEs. The exception is the Count Down Test, where children of teen mothers perform worse than children of non-teen mothers even where the latter might be exposed to three or more ACEs.

Figure 1: Percent of GUiNZ children in the mid-high performance categories for each school readiness test by the number of ACEs stratified by age of the mother at the time of the GUiNZ child's birth



Discussion

We found Adverse Childhood Experiences (ACEs) to be more common in children of teen mothers compared to children of non-teen mothers. In children born to teen mothers, 42.9% had two or more ACEs at 54 months compared to 16.4% with two or more ACEs at 54 months in children born to non-teen mothers. Although there was limited power and a lack of statistical significance, a consistent negative relationship between an increasing number of ACEs and school readiness was observed. When looking at the specific ACE indicator of physical abuse, there is a strong negative relationship with school readiness in children born to teen mothers.

In addition, our findings indicate that at all levels of ACE exposure, children born to teen mothers have worse performance on school readiness examinations. For example, children of teen mothers who were not exposed to ACEs performed similarly to children of non-teen mothers with exposure to two or more ACEs. This would indicate that the disparity in school outcomes is not purely due to ACE exposure, and that children born to teen mothers should be offered support to increase their school readiness even if their observed ACEs are low. Our results would seem to indicate that when enrolling children for preventative services aimed at increasing school readiness, children of teen mothers should be prioritised as should children of non-teen mothers with high levels (two or more) of ACEs.

Teen pregnancy rates in the developed world have continued to fall in most countries. In this study, we estimated the percentage of teen mothers in the developed world to be 5.4%. While slightly lower than the 2013 estimate of teen mothers across New Zealand of 5.9%, these numbers are relatively similar.

It is often difficult to separate the outcomes of the teen parent from those of their child. In New Zealand, many services for teen parents attempt to target support for their children. It is important to note that as not all children of teen parents perform poorly, the factors associated with children of teen mothers who "beat the odds" should be investigated.

Researchers have largely overlooked fathers' potential role in buffering their children from the risk associated with teen parenthood (Lewin, 2015). Young fathers have been underrepresented in father involvement research to date (Berger, 2011 and Brown et al., 2012). Additional challenges are that often adolescent fathers do not normally live with their children and are not in stable longer-term relationships. Younger fathers are also often disconnected from work and school and have fewer socio-economic resources (Berger, 2011). Evidence shows that teen mothers do parent 'better' when they have positive social and emotional support from their child's father (Martin, 2012). Additional support should be available for teen fathers to be involved in positive parenting. Previous research (Walsh et al., 2019) has shown the importance of the mother-

partner relationship, and effort is required to include strengthening this relationship in programmes and policies aimed at reducing ACEs in children and preparing children for primary school.

Limitations and future directions

A limitation of the GUiNZ data is that it is not weighted to be population representative. Earlier studies did suggest that for a broad range of demographic and socio-economic characteristics, the families recruited by the GUINZ study did broadly represent the New Zealand populations (Morton Ramke, Kinloch et al., 2014; Morton, Atatoa Carr, Grant et al., 2012). While these comparisons are harder to make for the teen-sub population, they do provide some assurance that our sample is broadly representative. An additional limitation is that GUINZ has not yet been linked to administrative data as part of the Integrated Data Infrastructure (IDI). The IDI is a large research database administered by Statistics New Zealand. It includes data from a variety of government agencies that are linked at an individual level. Embedding GUiNZ data in the IDI could provide a much richer picture of the lives for these children and their parents both before and during the data collection waves for this birth cohort.

The GUiNZ study was not specifically intended to look at differences between children born to teen and non-teen mothers. Unfortunately, there are no current population weights available – and because the sample frame was restricted to the Auckland and Waikato regions, there are few published statistics of the same sample frame that allow us to establish the degree of population representativeness. In addition, the dataset allows for analysis up to the child's age of 54 months only. While it makes sense to focus on this time frame when looking at school readiness outcomes, prediction of ACEs in older children may look different, and this research should be repeated when these children are older.

In addition to possible non-representativeness of the GUiNZ data, we need to acknowledge the relatively small sample size of 301 teen mothers. The available sample is even smaller when we look at specific child development outcomes. The issue here is of inadequate power for our statistical analyses. A lack power means that we may be unable to produce statistically significant findings even if these effects exist.

Our focus in this study is on children being cared for by their birth mothers. We exclude from this analysis children living in other caregiving arrangements where ACEs may be even more prevalent.

One of the factors that we did not explore in this study is whether the teen pregnancy was intentional. Teenage parents who make an active choice to have a child may have planned for some of the issues they might face, and therefore might be able to mitigate some of the negative impacts. Future research might also consider a wider family scope, including support for parents and grandparents and its effect on school readiness and other child outcomes.

This report provides additional evidence to the literature base on the association between early childhood ACEs and pre-school objective measures of early

learning. There appears to be a clear dose-response association between experienced ACEs and school readiness, and an indication of physical abuse appears significant in both children born to teen mothers and all GUiNZ children.

Finally, the data used to measure pre-school ACEs in the GUiNZ data was not intended for this purpose. In particular, the proxy measures used for physical and emotional abuse may overestimate the prevalence of these ACEs in this birth cohort. Caution should therefore be exercised in comparing the prevalence of ACEs among teen mothers in New Zealand to other countries that have different, and potentially more accurate, indicators of ACEs.

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Appendix 1: Adverse Childhood Experience Mappings to GUiNZ study questions

The survey month is highlighted in parentheses for each ACE. For example, (54M) would refer to data used to measure this ACE from the 54-month mother surveys.

Parent or Partner Depression (54M): If the partner or parent had a score of 10 or higher on the Patient Health Questionnaire Depression Screener, we assigned the child as having this ACE.

Parent or Partner Problem Drinker (54M): A child was assigned this ACE if the mother reported 14 or more drinks per week, or reported binge drinking at least weekly.

Parent or Partner Illegal Street Drugs Use (9M): Participants were asked if they had used hard drugs, marijuana, or amphetamines since the birth of the child. If yes, the child was coded as having this ACE.

Parent or Partner Conviction and Jail Time (54M): Participants were asked if they had ever been convicted of a crime that resulted in jail time since the birth of the child. If yes, the child was coded as having this ACE.

Parent or Partner Intimate Partner Violence (9M and 54M): A child was coded as having this ACE when the mother reported pushing, shoving, throwing or breaking things 'quite often' when arguing, or that arguments 'quite often' resulted in hitting, kicking, pushing, or slapping.

Mother Divorce or Separation (9M, 24M, and 54M): Mothers were asked if they had a cohabiting partner during all waves of the interviews. Children were coded as having this ACE if the cohabiting partner was no longer present or switched.

Child Physical Abuse (24M and 54M): When responding to how often they smack their child when naughty, a response of 'often' or 'very often' resulted in coding the child as having this ACE. Also, mothers were asked if they smack, grab, or physically punish their child when disobedient. A response of 'half the time', 'very often', or 'always', resulted in the child being assigned this ACE.

Child Emotional Abuse (24M and 54M): Mothers were asked how often they do the following: criticise their child's ideas, shout at their child when the child misbehaves, and explode with anger when the child misbehaves. A response of 'very often', 'extremely often', or 'all the time' resulted in coding the child as having this ACE. In addition, if a mother reported exploding with anger at least 'half the time' or shouting at the child when he/she misbehaves at least 'very often' the child was also coded as having this ACE.

Appendix 2: School readiness outcomes

Luria-Nebraska Hand Clap Test: The Hand Clap Test measures inhibitory control and the ability to stay focused (Golden 1981).

DIBELS Letter Naming Fluency Test: The DIBELS letter naming fluency test is correlated with reading level at the end of the first year of school (Schaughency 2008). The Grade K/Benchmark 1 version was used with randomly ordered lower-case and upper-case letters.

Gift Wrapping Test: A test of the ability to delay gratification was adapted from the original Marshmallow task by Mischel, Ebbesen and Zeiss (1972). Each child was requested to please not look or peek at the surprise while it was being wrapped for 60 seconds.

Affective Knowledge Test: A modified Affective Knowledge Task (Morgan 2010 and Denham 1986) was administered by giving children six face cards and asking how the person in the face cards feels. The emotions portrayed were 'happy', 'sad', 'scared', 'angry', 'surprised', and 'disgusted'.

Number and Name Writing Test: Children were asked to write their name on a sheet of paper and write some numbers on a sheet of paper. GUiNZ study staff were trained to code the number and name writing tests according to a standard scoring protocol (GUiNZ 2017).

Counting up from 1-10 and down from 10-1: Children were asked, "Please can you count up from 1 to 10?" and "Please can you count down from 10 to 1?". The interviewer wrote down exactly what the child said, and a score was assigned based on the longest correct number sequence given by the child.