

# Adverse childhood experiences and school readiness outcomes

Results from the Growing up in New Zealand study

April 2019



**MINISTRY OF SOCIAL  
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**CENTRE FOR  
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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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# Contents

<b>Policy summary</b> .....	<b>3</b>
<b>Executive summary</b> .....	<b>4</b>
<b>Introduction</b> .....	<b>7</b>
Background .....	7
Contribution of this study .....	8
<b>Methods</b> .....	<b>9</b>
Adverse childhood experience measurement.....	9
School readiness outcomes.....	10
Statistical analyses.....	10
<b>Results</b> .....	<b>12</b>
Adverse childhood experience in GUiNZ.....	12
ACEs relationship with preschool readiness tests .....	13
<b>Discussion</b> .....	<b>16</b>
<b>Limitations</b> .....	<b>17</b>
Missing data .....	17
External validity .....	17
<b>Policy implications and future directions</b> .....	<b>18</b>
<b>References</b> .....	<b>19</b>

## Table of figures

<b>Figure 1:</b> Percent of Growing Up in New Zealand children who were in the low performance categories for two school readiness tests by the number of adverse childhood experiences, New Zealand, 2009-2015. ....	<b>5</b>
<b>Box 1:</b> Adverse childhood experiences (ACEs) Mapping to GUiNZ study questions .....	<b>9</b>
<b>Figure 2:</b> Percent of Growing Up in New Zealand children who were in the low performance categories for six school readiness tests by the number of adverse childhood experiences, New Zealand, 2009-2015. ....	<b>14</b>

## Table of tables

<b>Table 1:</b> Percentages of Growing Up in New Zealand (GUiNZ) study participants experiencing adverse childhood experiences by the 54 month interview, New Zealand 2009-2015, n=5,562. ....	<b>4</b>
<b>Table 2:</b> Percentages of Growing Up in New Zealand (GUiNZ) study participants experiencing adverse childhood experiences by the 54 month interview, New Zealand 2009-2015, n=5,562. ....	<b>12</b>
<b>Table 3:</b> Crude and multivariable* adjusted association between 54 month child developmental outcomes and a single adverse childhood experience (ACE) in the Growing Up in New Zealand Study (n=5,562)^, New Zealand 2009-2015. ....	<b>15</b>

## Policy summary

This report maps standard 'adverse childhood experiences' (ACEs) to the Growing Up in New Zealand (GUiNZ) study cohort to explore associations between adverse experiences in early childhood and measures of school readiness.

ACEs were common among the GUiNZ cohort. By the 54 month wave of the study (when children were around 4½ years old), over half (52.8%) of all GUiNZ children had experienced at least one ACE and 2.6% had experienced four or more. Our total count of ACEs is likely to be lower than the actual number experienced by GUiNZ children, as we only measured ACEs through the first 54 months of the study, and were unable to include measures for standard ACEs involving sexual abuse as this data is not collected by the GUiNZ study.

Therefore, while our findings for the GUiNZ cohort might be broadly generalisable to New Zealand's current population of births, additional details on response rates within subgroups would be required to get a better estimate of the prevalence of ACEs in New Zealand.

The analysis identified a dose-response relationship between ACEs and tests of cognitive performance administered at 54 months of the GUiNZ study, including letter naming fluency, focus, affective knowledge counting to 10, the ability to write one's name, and to delay gratification. These findings suggest that there are educational benefits to reducing early exposure to adversities and the need to develop trauma-informed initiatives for children entering the school system.

## Executive summary

This report describes using Growing Up in New Zealand (GUiNZ) survey instruments to create a measurement of adverse child experiences (ACEs) and correlates this measurement with school readiness outcomes. The ACEs Study (Felitti et al., 1998) and subsequent research have shown that people exposed to a range of adverse childhood experiences have poor health as adults (Kalmakis & Chandler, 2015; Kerker et al., 2015). ACEs include exposure to maltreatment, witnessing violence, living with household members with mental illness, who abuse substances, have a history of incarceration, or have experienced parental divorce. Even after statistically adjusting for a range of socioeconomic and demographic factors, ACEs predict chronic health conditions and other indicators of poor health (Slack, Font & Jones, 2017). Less is known about the relationship between ACEs and cognitive performance. ACEs were common in the GUiNZ cohort. By the 54 month wave (when children were around 4½ years old), 52.8% of all GUiNZ children had experienced at least one ACE and 2.6% had experienced 4 or more. Emotional and Physical Abuse were the most common ACEs at 23.6% and 19.8% respectively, and Parent or Partner Incarceration was the least common at 1.8% (**Table 1**).

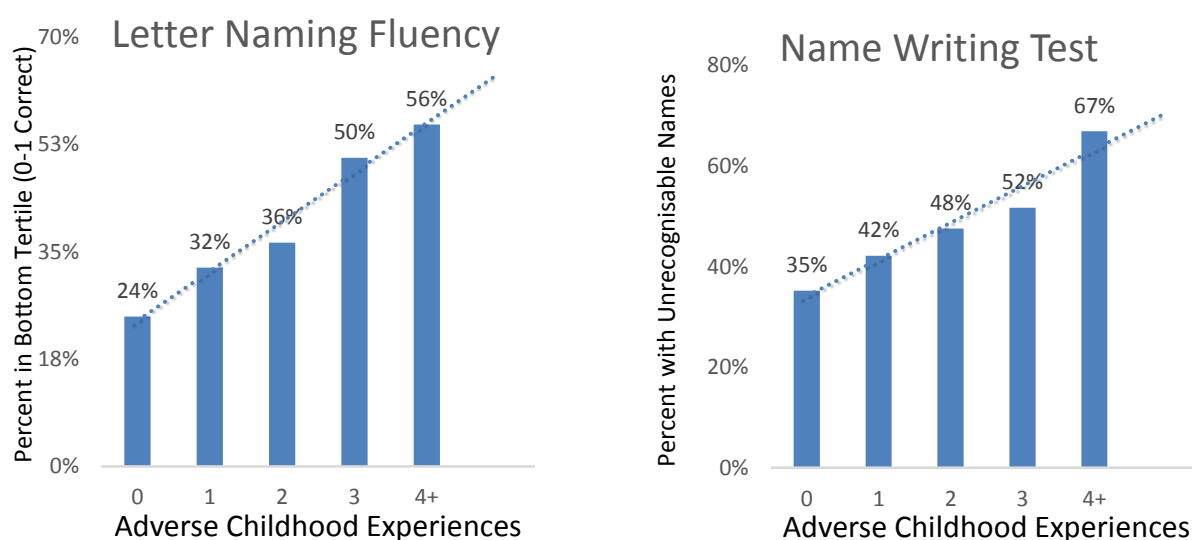
**Table 1: Percentages of Growing Up in New Zealand (GUiNZ) study participants experiencing adverse childhood experiences by the 54 month interview, New Zealand 2009-2015, n=5,562**

Adverse childhood experience (ACE)	Percent of GUiNZ children experiencing ACE	Number of GUiNZ children experiencing ACEs by 54 Months
Child emotional abuse indicator	23.6%	1,310
Child physical abuse indicator	19.8%	1,101
Parent or partner indicator for illegal street drugs use	10.8%	601
Parent or partner indicator for depression	10.5%	584
Parent separation or divorce indicator	10.2%	569
Parent or partner intimate violence indicator	6.6%	366
Parent or partner indicator for problem drinker or alcoholic	4.5%	249
Parent or partner indicator for conviction and jail time	1.8%	99
<b>Total aces</b>		
0	47.2%	2,624
1	29.8%	1,657
2	14.5%	804
3	6.0%	334
4 or more	2.6%	143

Statistically significant associations were found between a child’s experience of ACEs and their performance in cognitive tests administered at 54 months of the GUiNZ study. For example, children with no ACEs performed best at a DIBELS letter naming fluency test, with a mean score of correctly identifying 9.6 letters in 60 seconds. The number of correctly named letters decreases as exposure to ACEs increased, with 2.6% of children who had four or more ACEs only able to correctly name an average of 2.6 letters.

**Figure 1** shows an apparent dose-response relationship between the percent of children at each number of ACEs that performed in the bottom tertile of the DIBELS letter naming fluency test and a standard name writing test. For the DIBELS test, over half of children with three or more ACEs performed in the lowest tertile, compared to 24% of children with zero ACEs. A similar gradient is observed with respect to the name writing test, and for other cognitive tests administered at 54 months of the GUiNZ study, including tests of focus, affective knowledge, counting to 10, and the ability to delay gratification. Significant associations persist even after adjusting for demographic and socio-economic factors (family income, New Zealand deprivation index at time of pregnancy, mother's age, mother's education, child's ethnicity, single parent (not cohabiting) status, and child's gender).

**Figure 1: Percent of Growing Up in New Zealand children who were in the low performance categories for two school readiness tests by the number of adverse childhood experiences, New Zealand, 2009-2015**





The observed relationship between ACEs and school readiness provide policy makers with New Zealand specific data that could be used to support the prioritisation of prevention strategies to reduce the occurrence of ACEs in children. In addition, the Ministry of Education should also be able to use these data to help develop trauma-informed initiatives for improving children's readiness for school.

# Introduction

We had the opportunity to use data from the Growing up in New Zealand study (GUiNZ) to explore adverse childhood experiences (ACEs) in a contemporary New Zealand cohort. The GUiNZ study is a longitudinal birth cohort of over 6,000 children and their parents (Morton et al., 2010, 2012, 2014). Parents were enrolled and interviewed during pregnancy and at several time points including at 9, 24, and 54 months after birth. Collection waves utilised numerous standardised questionnaires and included data on demographics, health histories and behaviours, community and neighbourhood characteristics, and social and cognitive measures. With the wealth of data available at the individual, home, and community level, we could create a predictive model of ACEs to identify children at heightened risk of ACEs. We could then look for children who “beat the odds”; that is, are at risk of multiple ACEs but end up experiencing none. Our results are split into two reports. This report describes mapping ACEs to the GUiNZ survey questionnaires and documents the association between ACEs and school readiness outcomes. The second report (Walsh et al., Protective factors of children and families at highest risk of adverse childhood experiences, 2019) focuses on factors that are associated with children who “beat the odds”.

## Background

The ACEs Study (Felitti et al., 1998) and subsequent research have shown that people exposed to a range of childhood experiences have poor health as adults (Kalmakis & Chandler, 2015; Kerker et al., 2015). ACEs include exposure to maltreatment, witnessing violence, living with household members with mental illness, who abuse substances, have a history of incarceration, or have experienced parental divorce. Even after statistically adjusting for a range of socioeconomic and demographic factors, ACEs predict chronic health conditions and other indicators of poor health (Slack, Font & Jones, 2017). More recently, research has established that exposure to ACEs is also associated with health conditions during childhood (Flaherty et al., 2006, 2009, 2013).

One of the pathways between ACEs and health is hypothesised to be harmful biological responses to stress (Voellmin et al., 2015). These physiological effects include a range of changes in the nervous system (Danese & McEwen, 2012; Thompson & Haskins, 2014) that have behavioural implications, compromising the child's memory and causing cognitive and attention problems that may impact on the child's readiness for school. This suggests that we would expect ACEs to be associated with poor development of skills in children. While several studies have documented ACEs' impact in adolescent children (Stempel et al., 2017; Hunt, Slack & Berger, 2017; Bethell, Newacheck, Hawes & Halfon, 2014), only a few studies have investigated skills and behavioural deficits in early childhood related to ACEs.

One study (Jimenez et al., 2016) which did look at outcomes in early childhood used the Fragile Families and Child Wellbeing Study of children born between 1998 and 2000 in 20 urban cities in the United States. It looked at the association between ACEs recorded in the first five years of life and academic skills and classroom behaviours (as reported by the child's kindergarten teacher). Researchers controlled for the child's age and gender, the mother's race and ethnicity, the mother's education, the relationship status of the parents at the time of child's birth, and household income. They found that ACEs were associated with poorer academic skills and behavioural problems during the final month of kindergarten.

While in New Zealand, the terminology of ACEs has not been used as extensively, there are nonetheless a number of relevant studies on the subject from existing cohorts' studies (Danese et al., 2009; McLeod et al., 2018; Marie et al., 2012; Boden et al., 2010; Marie et al., 2008; Fergusson et al., 2000). One study used the New Zealand Dunedin Multidisciplinary Health and Development Cohort Study to look at exposure to ACEs in a historic New Zealand cohort (Reuben et al., 2016). Adults were asked to recollect the occurrence of ACEs during their childhood. Approximately 35% of their cohort reported zero ACEs while 15% reported four or more ACEs. However, this study is rather old (children born between 1972-1973) and was conducted on a more ethnically homogenous population.

## **Contribution of this study**

The present report contributes to the existing literature in two ways. First it documents ACEs in a contemporary and more ethnically diverse population where ACEs have not consistently been studied. Secondly, it adds to the growing evidence that ACEs have broader implications than just health. We document the association between ACEs and very early childhood developmental problems, suggesting that being alert to ACEs could be important for improving school readiness.

# Methods

## Adverse childhood experience measurement

We used all available GUiNZ study waves and instruments to find correlates to commonly investigated adverse childhood experiences (ACEs) (Felitti et al., 1998). The GUiNZ study collected data on eight ACEs; **Box 1** summarises the measurement of the eight ACEs. Three specific standard ACEs involving child sexual abuse were not specifically collected as part of the GUiNZ study.

### **Box 1: Adverse childhood experiences (ACEs) mapping to GUiNZ study questions.**

The survey month and mother or partner surveys used are highlighted in parentheses for each ACE. For example (9M, 9P, 54CM) would refer to data used to measure this ACE from the 9 month mother and partner and 54 month child-mother surveys

- 1. Parent or Partner Depression (9P, 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 (Kroenke, Spitzer and Williams, 2001).
- 2. Parent or Partner Problem Drinker (9P, 54M):** A child was assigned this ACE if the mother reported 14 or more drinks per week, or reported binge drinking at least weekly. Due to data anonymisation protocols of the GUiNZ study, these definitions were slightly modified for the partner questionnaire and the child was assigned as having this ACE if the partner reported 20 or more drinks containing alcohol per week. Binge drinking behaviour was not asked about during any partner survey.
- 3. Parent or Partner Illegal Street Drugs Use (9M, 9P):** 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.
- 4. Parent or Partner Conviction and Jail Time (9P, 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.
- 5. Parent or Partner Intimate Partner Violence (9M, 9P, 24P, 54M):** A child was coded as having this ACE when the mother or partner reported pushing, shoving, throwing or breaking things 'quite often' when arguing, or that arguments 'quite often' resulted in hitting, kicking, pushing, or slapping (Pryor, 2004).
- 6. Mother Divorce or Separation (9M, 24M, 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.
- 7. Child Physical Abuse (24CM, 54CM):** 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.

**8. Child Emotional Abuse (24M, 24P, 24CM, 54CM):** Mothers and partners were asked how often they do the following: criticize 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.

## 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 and Suggate, 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 Ebbesen (Mischel, Ebbesen, & Raskoff 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, Izard & King, 2010; 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.

## Statistical analyses

The GUiNZ cohort recruited at birth consists of 6,790 births (Morton et al., 2012). We restricted our sample to those who responded to the 54 month wave and were enrolled before the birth of the child to ensure that all relevant outcomes were observed, which reduced the sample to 5,562 children.

The total number of experienced ACEs for each child was calculated by the age of 54 months. There are a total of 60 survey questions from three waves of data collection from partners and mothers used to indicate the presence of the 8 studied ACEs. For purposes of these analyses, missing data for any reason was

coded in such a way as to not add information on the presence of the ACE. For example, for mothers who didn't complete the nine month questionnaire that requested drug use history, those two variables were ignored in the logic when assigning ACEs to the children leaving only data from the partner to be used to determine if the ACE was observed for the child.

To ensure the ACEs were antecedent to the outcomes being observed, all ACEs were developed from data collected prior to collection of the outcome measures. Logistic regression was used to evaluate the crude and multivariable adjusted odds ratios describing the prediction of childhood developmental outcomes using the total number of ACEs as the main independent variable. For multivariable adjusted logistic regression models, the set of adjustment factors included: family income, New Zealand deprivation index of residence at time of pregnancy (Atkinson, Salmond & Crampton, 2014), mother's age, mother's education, child's gender, single parent status, and child's ethnicity. Child development outcomes were all coded as dichotomous variables to indicate low performance on each test. This is to aid comparisons across measures and also as a proxy for additional resources that might be needed to address children not ready for school entry. Analysis of variance and chi-square tests of independence were conducted as indicated. All analyses were completed using STATA version 15.0. Fully standardised coefficients were computed with the listcoef command.

# Results

## Adverse childhood experience in GUiNZ

Adverse childhood experiences (ACEs) were common in this cohort. By the 54 month wave, 52.8% of all GUiNZ children had experienced at least one ACE and 2.6% experienced 4 or more. Emotional and Physical Abuse were the most common ACEs at 23.6% and 19.8% respectively, and Parent or Partner Incarceration was the least common at 1.7% (**Table 2**).

**Table 2: Percentages of Growing Up in New Zealand (GUINZ) study participants experiencing adverse childhood experiences by the 54 month interview, New Zealand 2009-2015, n=5,562**

Adverse childhood experience (ACE)	Percent of GUiNZ children experiencing ACE	Number of GUiNZ children experiencing ACEs by 54 Months
Child emotional abuse indicator	23.6%	1,310
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Parent or partner indicator for problem drinker or alcoholic	4.5%	249
Parent or partner indicator for conviction and jail time	1.8%	99
<b>Total aces</b>		
0	47.2%	2,624
1	29.8%	1,657
2	14.5%	804
3	6.0%	334
4 or more	2.6%	143

ACEs experienced by GUiNZ children were consistently associated with family income, the New Zealand deprivation index at the time of enrolment, mother's education, mother's age, and partner's age (results not shown). For example, children with a family income  $\leq 20,000$  NZD experienced 3.02 times the number of ACEs than children with a family income of  $>150,000$  NZD. The disparity appears higher when looking at the percent with three or more ACEs. For example, children with a mother who reported no secondary qualification were 13.4 times more likely to have three or more ACEs, compared to children with mothers who reported having advanced degrees.

All investigated 54 month child evaluations were statistically significantly associated with both the total number of ACEs and both evaluated dichotomous

variables indicating  $\geq 2$  or  $\geq 3$  experienced ACEs (Table 2). Children who could recognise and name 0-1 letters in the DIBELS letter fluency test had on average 1.8 times as many ACEs, compared to children that named more than seven letters during the 60 seconds test (1.13 ACEs compared to 0.64 ACEs). Similarly, when focusing on the percentage of children who had  $\geq 3$  ACEs, children who could recognise and name 0-1 letters on the DIBELS test were 3.64 times more likely to have  $\geq 3$  ACEs compared to children who could name more than 7 (14.2% compared to 3.9%). With a few minor exceptions, similar results were found throughout all investigated tests.

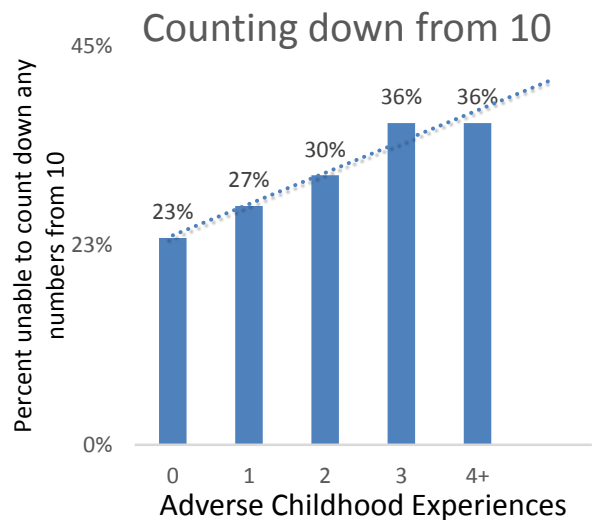
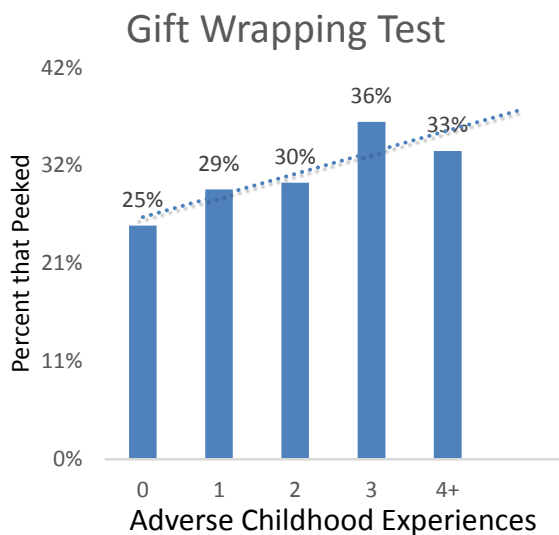
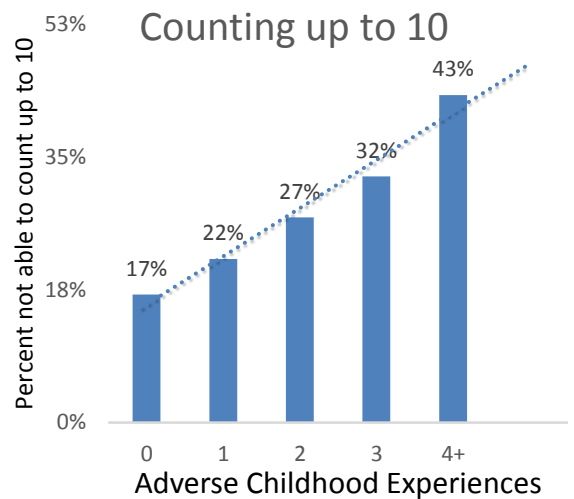
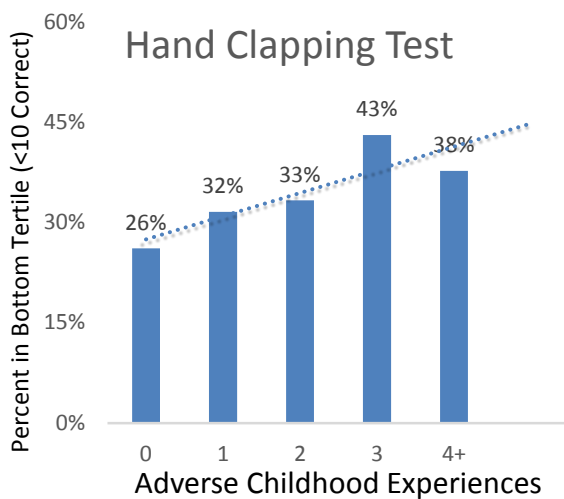
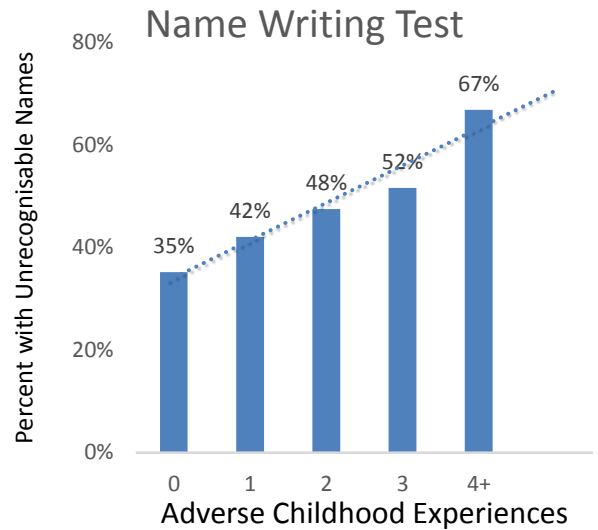
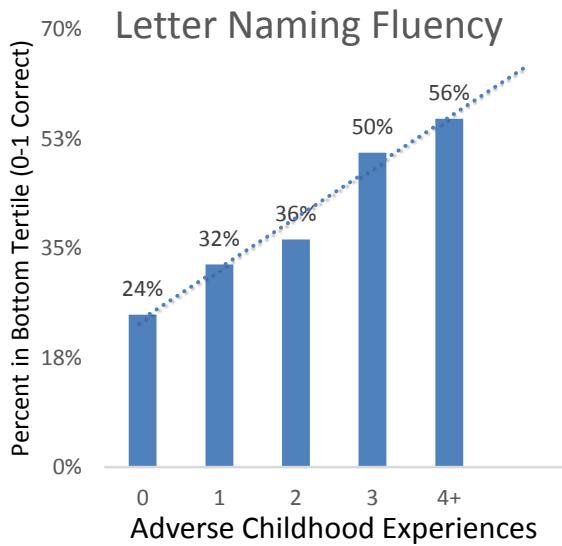
## **ACEs relationship with preschool readiness tests**

Crude analyses showed statistically significant associations between the number of ACE exposures and child development tests administered as part of the GUINZ study. For example, children with no ACEs had a mean DIBELS score of 9.6 letters in 60 seconds. The DIBELS score decreased as ACEs increased: 8.3 (1 ACE), 7.3 (2 ACEs), 4.7 (3 ACEs), 2.58 (4+ ACEs). Similar dose-response results can be found for all tests (data not shown). **Figure 2** shows the percent at each number of ACEs that failed or performed in the bottom tertile of administered tests. For example, the percent in the bottom tertile of performance for the DIBELS test ranged from 24.4% (0 ACEs) to 55.7% (4+ ACEs).

After adjustment for possible confounders (**Table 3**), most of these relationships declined in magnitude, but remained statistically significant. For example, after adjustment for potential confounders, for each additional experienced ACE, the difference in the log of expected counts of correctly identified letters decreased by 0.084 (95% Confidence Interval: 0.05 – 0.12). An additional interpretation is that an increase in 1 experienced ACE led to a reduction of 8.4% in the number of letters named. For example, a child with 0 ACEs was modelled to have an expected number of correctly identified letters in 60 seconds of 9.8 and, as the number of ACEs increased, the expected number decreased; 9.8 (0 ACEs), 8.1 (1 ACE), 6.9 (2 ACEs), and 5.3 (3 ACEs). We tested for the possibility of different effects on ACEs and on child development depending on the gender of the child and found no differences by gender in the results shown in **Table 3**.



**Figure 2: Percent of Growing Up in New Zealand children who were in the low performance categories for six school readiness tests by the number of adverse childhood experiences, New Zealand, 2009-2015**



**Table 3: Crude and multivariable\* adjusted associations between 54 month child developmental outcomes and adverse childhood experiences (ACEs) in the Growing Up in New Zealand Study (n=5,562)^, New Zealand 2009-2015**

Child developmental outcome	Sample size^	Mean (std. dev.)	Number of ACEs				Multivariable* adjusted Beta (95% C.I.)
			Multivariable* adjusted estimated scores				
			0	1	2	3	
Luria Clapping Test Score	4,927	11.2 (5.0)	<b>11.7</b>	<b>11.1</b>	<b>10.5</b>	<b>9.9</b>	<b>-0.028</b> (-0.04 -- -0.01)
DIBELS Letter Naming Score	4,955	8.5 (10.5)	<b>9.8</b>	<b>8.1</b>	<b>6.9</b>	<b>5.3</b>	<b>-0.084</b> (-0.12 -- -0.05)
Affective Knowledge Test Score	5,073	7.9 (2.2)	8.1	7.9	7.6	7.4	-0.006 (-0.01- 0.002)
Counting Up Test (1-10) Score	5,095	8.6 (2.9)	<b>8.9</b>	<b>8.6</b>	<b>8.2</b>	<b>7.9</b>	<b>-0.014</b> (-0.025 -- -0.003)
Counting Down Test (10-1) Score	5095	4.1 (4.1)	<b>4.6</b>	<b>4.0</b>	<b>3.4</b>	<b>2.9</b>	<b>-0.059</b> (-0.09-- -0.03)
Name Writing Test: Percent Pass	4,975	0.41 (0.49))	<b>64.6%</b>	<b>58.4%</b>	<b>52.0%</b>	<b>45.4%</b>	<b>-0.07</b> (-0.13 -- -0.01)
Number Writing Test: Percent Pass	4,827	0.62 (0.49)	<b>41.3%</b>	<b>37.6%</b>	<b>34.2%</b>	<b>29.7%</b>	<b>-0.08</b> (-0.15 -- -0.01)
Gift wrapping task: Child Didn't Peek	5,070	0.28 (0.45)	<b>74.6%</b>	<b>71.9%</b>	<b>68.6%</b>	<b>66.1%</b>	<b>-0.08</b> (-0.15 -- -0.02)

\*Adjusted for family income, New Zealand deprivation index at time of pregnancy, mother's age, mother's education, child's ethnicity, single parent (not co-habiting) status, and child's gender

^ Due to missing responses or when the child did not complete an exam, sample sizes are lower than total participants

\*\* All p-values < 0.05 except for the multivariable adjusted odds ratio for the Affective Knowledge Test

Poisson regression was used for all scores and logistic regression for the dichotomous outcomes (percent pass or did not peek)

## Discussion

ACEs were common among Growing Up in New Zealand (GUiNZ) enrolled children. We found that, by the 54 month interview (when children were around 4½ years old), more than half of the enrolled children had experienced at least one ACE.

One of the considerable strengths of the GUiNZ study is the standardized early childhood tests administered by trained interviewers during the 54 month child interview. Based on previous literature we expected ACEs to be negatively correlated with all administered tests. Our results support this hypothesis, and provide evidence for a dose-response relationship between the number of ACEs a child is exposed to and their school readiness. As various cut points all indicated similar results, we focused on using the total number of ACEs as the main independent variable in logistic regression models predicting poor (bottom third) test performance.

The ability of children to delay gratification has been associated with increased resilience (Mischel, Shoda & Rodriguez, 1989). In addition, this ability has been associated with fewer developmental and mental health issues, conduct disorders, addictive and antisocial behaviours, and increase in scholastic achievement (Mischel, Shoda & Rodriguez, 1989; Mischel & Underwood, 1974). More recently, the ability to delay gratification as a child has been associated with fewer health problems, increased income, and a lower likelihood of raising children in a single parent home (Moffitt, et.al, 2011).

The observed association between the GUiNZ measure of delayed gratification and total ACEs experienced by children, even after controlling for common confounders, is noteworthy and adds to the considerable literature on the negative effects of childhood toxic stress. These results highlight that potentially preventable ACE's could have a measurable effect on the skills and behaviours of children about to enter primary school.

The GUiNZ cohort is broadly generalisable to New Zealand's current population of births, particularly in terms of maternal ethnicity and socioeconomic markers. The study catchment area also included a mix of urban and rural home environments (Bethell, Newacheck, Hawes & Halfon, 2014). However, without a complete registry of pregnant women, no sampling frame could be constructed nor could sampling weights be computed. Therefore, while our findings for this cohort might be broadly generalisable to New Zealand's current population of births, additional details on response rates within subgroups would be required to get a better estimate of the prevalence of ACEs in New Zealand.

# Limitations

## Missing data

A number of ACEs are taken from the partner survey (eg parent or partner depressed), and for 33.7% of GUiNZ children the partner surveys were not collected. In these cases, we code children where the partner had not responded the same as the absence of the ACE (eg partner depression is coded the same if “not depressed” or “partners survey missing”). This means that the gross estimates of ACEs from this study are lower than they would be with full data. Additional analyses are required to more fully understand the effect of missing data from the partners, however, similar dose-response associations between ACEs and school readiness were found when excluding GUiNZ children where a partner did not participate and including only measures of ACEs collected from the mother. As data missing due to partners not completing the survey are not at random, standard techniques to adjust (such as imputation) were not appropriate.

## External validity

In the United States 2010 Behavioral Risk Factor Surveillance Survey (BRFSS), 53,784 participants were interviewed. Researchers found 40.7% had not experienced an ACE compared with 47.2% of the GUiNZ children. The estimated prevalence of all ACEs, with the exception of physical abuse, were higher than we found in GUiNZ children (Centers for Disease Control and Prevention (CDC), n.d.). Differences between BRFSS estimates and the GUiNZ cohort are likely due to several factors including:

- missing or altered measurement of individual ACEs
- retrospective self-reporting of childhood experiences by adults (in BRFSS), compared to proxy reporting by mothers and partners (in GUiNZ)
- only the first 54 months of childhood are included in the calculations for the GUiNZ study
- differences in the actual prevalence of ACEs across populations.

Without recreating the BRFSS ACE study on a representative sample of New Zealand adults, we are unable to make a direct comparison of the experienced ACEs in GUiNZ children compared with other populations.

Also, we were unable to ascertain sexual abuse, so we can assume that our total count of ACEs is lower than the actual experience of GUiNZ children. In fact, all measured ACEs with the exception of physical abuse were less common in the GUiNZ study compared to BRFSS. While some of this might be explained by differences across populations (eg incarceration rates are higher in the United States), most of these differences are likely due to the timeframe of reporting and who was reporting on ACEs.

## **Policy implications and future directions**

This report provides additional evidence to the literature base on the association between early childhood ACEs and preschool objective measures of early learning. There appears to be a clear dose-response association between experienced ACEs and school readiness. The observed relationship between ACEs and school readiness should provide policy makers with New Zealand specific data that could be used to support the prioritisation of prevention strategies to reduce the occurrence of ACEs in children.

Still, many children who experience ACEs do not have negative behavioural or educational skill deficits. In addition, many children who we might expect would have ACEs based on predictive models do not. A key strength of the GUiNZ study is the thorough collection of data about additional potential protective factors and environmental attributes that might explain why some at risk children do not experience ACEs. This is explored in a second report from our study of ACEs in the GUiNZ cohort which uses antenatal data to predict which GUiNZ children might experience ACEs, and looks at correlates of those highest risk children who did not experience ACEs. These results may help inform preventative policies and strategies that mitigate the negative outcomes found in this study (Garmezy, Masten & Tellegen, 1984).

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