

Experiences of New Zealand children actively reading for pleasure

Final research report

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Authors

Ruth Boyask, Robyn May, John Milne, Jayne Jackson, Celeste Harrington, Robin Hankin,
Drew Le Fleming Hall.

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Executive summary

Introduction

There are many benefits to reading for pleasure including improved school achievement, cognitive function, psychological wellbeing, and social inclusion. It also has societal benefits as those who read tend to engage more fully in public, social and economic life. While most children and adults in Aotearoa New Zealand enjoy reading (Chamberlain with Essery, 2020; Horizon Research, 2021), children and young people in this country are also following the international trend of waning enjoyment from, and time spent, reading. Yet children's reading for pleasure in our nation is not well understood beyond these headline statements (Boyask et al., 2021b). This study uses data from the Growing Up in New Zealand (GUiNZ) study, the largest contemporary longitudinal study of children's development in New Zealand that has been following a cohort of over 6000 children since 2009 and 2010. We have selected data from the eight data waves collected since before the children were born until 2019 to identify characteristics and experiences that may influence children's reading for pleasure. With two child proxy variables on reading for pleasure at age 8, this dataset presents an important opportunity to analyse statistically children's reading within a setting closer to the complexity of their socio-material reality.

Our prior studies highlight the social dimensions of reading for pleasure, that it is collaborative and communal rather than a solitary activity (Boyask et al., 2021; Milne, Harrington & Boyask, in press), and that proximity to others who read plays a very important role in motivating and developing children's reading. They also suggest that environment plays an important role in reading, especially environments that facilitate access to reading materials and places to read, although there is generally less known about the significance of locality than about the effect of other people on children's reading.

Research design

Research question

What are the characteristics and experiences of Aotearoa New Zealand children that may influence their frequency and enjoyment of reading?

Methods

This study focuses on two outcome variables (*reading frequency* and *enjoys reading*) collected when children in the GUiNZ longitudinal study were 8 years old. The outcome variables are examined in relation to one another, and with predictor variables from the GUiNZ data waves 0 to 8 that describe networks of *things* (such as environments, people, identities, practices, concepts and artefacts) that may be influential on reading (pre-specified by prior research).

The bivariate analyses include contingency tables (where sensible, categorical variables were split to produce 2x2 contingency tables), Fisher's exact tests, logistic regression (for the categorical variables with more than two groups such as ethnicity, high/med/low deprivation, 1/2/>2 adults, etc), and plots. The relationships presented here are descriptive, and not intended to be read as causal or even independent of other influences. We have highlighted where further multivariate investigation would refine understanding of the issues raised by the analysis.

Ethics

Children have the right to have their cultural, ethnic and gender identities valued and supported. Children's identities are presented as multi-faceted, and analyses show how reading for pleasure emerges within complex arrays of children's experiences and are not defined by singular social characteristics, such as ethnicity or gender.

What we found out

New Zealand children's reading for pleasure

Most children frequently engage in reading for pleasure, and about half of the children very much enjoy reading. Most children read frequently and enjoy it very much, but there is a substantial group which reads frequently and enjoys it less and another group that enjoys reading less and does not read frequently. Enjoying reading means children have higher odds of reading frequently, but there is also a small group of children who very much enjoy reading and do not do it very often.

Table 1: Association between children's reading frequency and enjoyment

Enjoys reading very much	Reads more than once per week	
	No	Yes
No	1,095 (23.3%)	1,278 (27.2%)
Yes	160 (3.4%)	2,170 (46.1%)

Active dispositions for reading

Many children enjoy reading; children who enjoy reading belong to different cultures and ethnicities, live in different home environments, and have different interests.

While reading is associated with some expected characteristics, like children who prefer quiet play or have fewer siblings at home to play with, the results also challenge some stereotypes of readers.

- Children who read are not always quiet, and greater reading frequency and enjoyment is also positively associated with being busy and active.

- Reading for pleasure is commonly associated with being a girl, but we found that at age 8 having a gender *somewhere in the middle* was more positively associated with very much enjoying reading (OR 1.52, 95% CI (1.28, 1.82)).

In the group of readers which enjoys reading very much even though they read less frequently is a high proportion of Māori and Pacific children, but we do not know why. This is something that would benefit from further investigation.

Most children enjoy school, but there are some differences for those who read more often or enjoy reading more.

- Children who read frequently have higher odds of feeling more confident about doing school work than others.
- Children who very much enjoy reading are especially confident in their abilities at school.
- Parents have higher odds of being proud of their children's interest in learning and satisfied with the progress that they are making at school.

Children who read frequently have higher odds of also being involved in extracurricular activities outside of the home.

- Those who read frequently have higher odds of attending organised clubs or lessons related to their interests in the arts (music, performance, drama, dance) or sports (individual sports or team sports).
- Reading enjoyment and frequency is associated with regular library use when children were younger.

Greater enjoyment from reading is also related to some activities outside of the home.

- Reading enjoyment is positively related to arts activities, library use and individual sports.
- There is also a small association between children very much enjoying reading and very much enjoying exercise.

Children who do not read frequently may also be active but have higher odds of being active in free play rather than organised, interest-based activities.

There are some associations with passivity among children who enjoy reading less, for example they have higher odds of having a tablet and spend more time passively consuming media through devices (as opposed to active screen time).

Environments to support reading

The most significant environmental factors in our study in respect of reading frequency are financial. The association between economic position and enjoyment is not very strong, suggesting it does not predict who very much *enjoys* reading.

- The odds of children reading frequently are high if they live in higher income households (OR 1.88, 95% CI (1.63, 2.16)) and considerably higher in less deprived areas (OR 4.39, 95% CI (3.88, 4.99)). In contrast, children who live in an environment of high deprivation have a 68% decrease in the odds of reading frequently.
- Poverty may be preventing children who enjoy reading very much from doing it more frequently.

Some home context predictors that may enhance children's frequency and enjoyment of reading are time spent being read to in early years and being encouraged to read as they get older.

Reading frequency increases when there are more adults in the household, whereas more siblings in a house decreases the odds of reading frequently. Larger households are generally associated with less enjoyment of reading. While greater reading frequency is associated with more adults at home, presently the work of reading to children seems to be falling mainly to mothers.

Parents have emerged as a very important predictor of children's reading.

- Children who have parents proud of progress and interest in learning have between 1.5 and 3.5 higher odds of frequently or very much enjoying reading.
- Children who have parents proud of sporting or performing/visual arts activities have 81% lower odds of enjoying reading very much.
- Children's involvement in sporting and arts activities is usually a predictor of more reading, yet a group of children who are recognised by their parents for showing aptitude in these areas enjoy reading less.

Access to lots of books in the home increases the frequency odds of children reading, and their enjoyment of reading.

Library use, which also facilitates access to books, is another predictor of both greater enjoyment and frequency of reading, indicating the value of libraries especially in high deprivation areas.

Implications

Reading for pleasure is an activity of confident, able, active New Zealand children many of whom have interests outside of school and home and take part in organised arts and/or sports activities; reading for pleasure is part of a well-balanced, active, and good life.

Children's involvement in sports and visual or performing arts is a predictor of more reading, yet children whose parents who are most proud of their achievements in these areas have some of the lowest odds for reading enjoyment.

- What messages are these children receiving from their parents about reading?
- And is reading less sustainable in their future lives as a result?

Recognising reading for pleasure as an important element of a well-balanced and active life is an important finding for literacy curriculum policy.

Reading for pleasure is mentioned in both the New Zealand Curriculum and Te Whāriki but it plays a very marginal role compared with other priorities for reading such as the development of literacy skills, acquiring information, increasing self-belief, or improving educational performance.

If we accept that children will spend more time on devices, we need to find ways to mitigate the negative consequences for reading from passive device use and make the experience more active.

Many children enjoy reading, but children who live in low-income households or areas of high deprivation have higher odds of not reading frequently.

All children deserve to benefit from reading for pleasure, yet our results indicate there are some who benefit more than others; further research may help explain why some children are not reading frequently, especially children who very much enjoy reading.

- Are there other factors for these children we are yet to examine that may predict frequency of reading such as children's health and wellbeing or sense of belonging?

While reading frequency increases when there are more adults in the household, more siblings in a house decreases the odds of reading frequently and larger households generally are associated with less enjoyment of reading.

- More adults in a household are a resource to draw upon, especially if they can find ways to encourage more enjoyment as well as increased frequency of reading.

Families who cannot afford to buy books need alternative ways to access reading materials, such as book exchange, cheaper or secondhand book suppliers, e-books and borrowing from public and school libraries.

- Libraries may be especially valuable for high deprivation areas given the range of materials to which they provide access.

Recommendations

- Use the new literacy strategy to strengthen the visibility in curriculum and school culture of enjoyment in reading and its role in creating active, confident, and able children.
- Help children in school and at home find time for reading by encouraging regulation of time spent passively consuming media on tablets or other devices.

- Support children who live in areas of high deprivation to access high quality and child-appropriate reading materials, through public and school libraries.
- Develop public and community campaigns for reading that highlight its relationship with an active, well-balanced and good life, including:
 - profiling individuals who embody relationships between sport or performing/visual arts and reading,
 - communities reading together to support reading enjoyment.
- Continued and further refinement of data gathering from the GUINZ cohort on factors related to reading for pleasure by finding out more about reading frequency for children reading more than once a week and asking more refined questions about 'reading together'.
- Fund further research on New Zealand children's reading, especially:
 - why some children do not read frequently, particularly when they also very much enjoy reading,
 - topics identified through community consultation that may help us understand differences in the associations between frequency of reading and ethnicity, economic situation, or gender, including from a te ao Māori perspective,
 - mitigating the effects of passive device use on children's reading,
 - relationships between reading outside of school and reading at school.

Introduction

In this study we are interested in the socio-material conditions of children's reading for pleasure, using analysis of Growing Up in New Zealand (GUINZ) data to identify some qualities of children's social and physical environments that may influence their enjoyment and frequency of reading. We aim to identify possible explanations for declining enjoyment from and time spent reading observed since 2009 in international comparative studies (McNaughton, 2020). Children and young people in Aotearoa New Zealand are following the international trend of waning enjoyment from reading over time and as children move into adolescence. There are many benefits to reading for pleasure including improved school achievement, cognitive function, psychological wellbeing, and social inclusion. It also has societal benefits as those who read tend to engage more fully in public, social and economic life. Reading for pleasure is a collaborative and collective activity that is supported within reading relationships and rich literary environments, even though it is not always recognised as such and often thought about only as something you do by yourself in your own time (Boyask et al., 2021a).

The study reported here is exploratory, using descriptive statistics. It is a small-scale project that sought to map out an under-researched field for future study. The methods described here have been designed to be fit-for-purpose and used as a basis for future research on children's reading and other educational experiences within socio-material contexts.

Literature review

The many benefits of reading for pleasure are well understood, and include improved school achievement (Jerrim & Moss, 2019), cognitive function and psychological wellbeing (Sullivan & Brown, 2015; Mak & Fancourt, 2020), and social inclusion (Wilhelm & Smith, 2016). It also has societal benefits as those who read tend to engage more fully in public, social and economic life (National Endowment for the Arts, 2007). Yet, when Fletcher and Nicholas (2016) spoke to adolescents in New Zealand classrooms about their perceptions of reading they found that reading was largely valued for its usefulness as a life skill and few "...students highlighted reading for pleasure as part of their everyday life" (p.489).

While most children and adults in Aotearoa New Zealand are known to enjoy reading (Chamberlain with Essery, 2020; Horizon Research, 2021), children and young people in Aotearoa New Zealand are following two of the main international trends in reading, including declines or stasis in achievement in reading literacy, and waning enjoyment from reading (May, Flockton & Kirkham, 2016; Ministry of Education, 2017a; Medina & McGregor, 2019). There is nationally a considerable body of research on children's reading, yet some areas have notable gaps. Much reading research is concerned with the outcomes of

school-based literacy and achievement. We know little about what goes on in classrooms to support reading (McNaughton, 2020) and we also have little evidence of the nature of children's reading outside of school and its influences (Boyask et al., 2021b). International comparative studies PISA and PIRLS examine both in-school and out-of-school factors in association with reading (Medina & McGregor, 2019). Variables examined in these studies are universal across countries, and while this is useful for national comparison, they also lack cultural nuance. Characteristics defined through universal social categories like gender, ethnicity and economic disadvantage may over-generalise New Zealand children's fluid and complex identities. Their findings are too blunt for fine-grained policy decision-making. It is important for policy to be informed by evidence that considers social categories in educational phenomena but that is not limited by such categories to avoid stereotyping the experiences of children (Boyask et al, 2009).

The GUINZ study collects data on many different facets of children's lives with a diverse and extensive dataset across multiple collection waves and from the perspectives of children, mothers, partners, and researchers. With two child proxy variables on reading for pleasure at aged 8 this dataset presents an important opportunity to analyse statistically children's reading within a setting closer to the complexity of their socio-material reality. However, we noted when working with the data that, for this topic, refinement of some variables might provide useful information (for example, collecting differentiated information on frequency of reading above once-a-week) and that some questions may elicit more or more precise data if reframed using a mana-enhancing ngākau perspective (Derby & Macfarlane, 2020). For example, Derby & Macfarlane argue that a question like "how many times do you read to your child each week?" may be experienced as perniciously judgmental (rākau) and individualising compared with a mana-enhancing ngākau question that could be asked such as "how many times does reading together at home happen each week for your tamaiti?" (p.118).

In this study we supplement our understanding of children's reading with prior recent research that includes a comprehensive review of research on reading for pleasure (Boyask et al., 2021b) and two in-depth case studies on reading communities (Boyask et al., 2021a; Harrington, Milne & Boyask, 2021). These studies highlight the social dimensions of reading for pleasure, that it is collaborative and communal rather than a solitary activity (Milne, Harrington & Boyask, 2022), and that proximity to others who read plays a very important role in motivating and developing children's reading. They also suggest that environment plays an important role in reading, especially environments that facilitate access to reading materials and places to read, although there is generally less known about the significance of locality than about other people's influence on children's reading.

Research aim and questions

Aim

This study describes some of the socio-material conditions of children's reading by investigating factors that may influence children's reading for pleasure and possibly explain declining enjoyment from reading.

As new users of these data a subsidiary aim for the research team is to develop familiarity with and competence using the GUiNZ datasets.

Objectives

- 1) Examine correlations between variables on children's reading for pleasure at eight years of age and other predictor, confounding or mediating variables from the GUiNZ datasets.
- 2) Build the capacity of the research team to work with GUiNZ data on education-related questions.

Research question

What are the characteristics and experiences of Aotearoa New Zealand children that may influence their frequency and enjoyment of reading?

Method

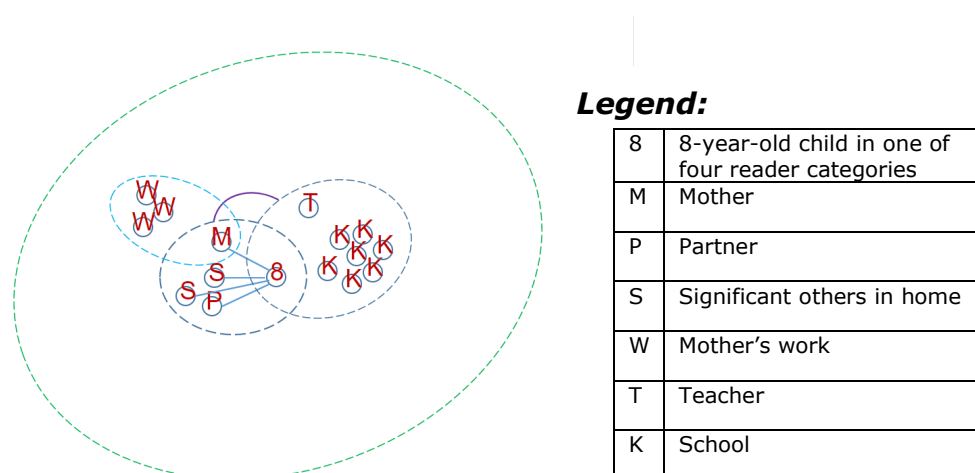
Conceptual framework

We are using a socio-material interpretive framework (Fenwick, Edwards & Sawchuk, 2011) located in a reflexive science paradigm (Burawoy, 1998) to highlight the emergence of children's reading within contextualised networks. This view of childhood extends by considering human and non-human interactions commonly used ecological systems theory frameworks, such as Bronfenbrenner's view of individual children located within ecological systems that are framed by oddscontexts or localities (Neal & Neal, 2013).

Through this lens we examine two outcome variables from the GUiNZ datasets separately and in combination (see Tables 3, 4 and 5) pertaining to children's reading (enjoyment of reading and frequency of reading for pleasure) in relation to other predictor variables from the data waves that describe networks of 'things' (such as environments, people, identities, practices, concepts and artefacts) that may be influential on reading. The predictor variables ('things') we are examining in comparison with the key outcome variables come from two main sources of information: 1) a prior literature review on children and tamariki reading for pleasure in Aotearoa New Zealand, 2) two case studies of children and tamariki reading for pleasure in school-based communities (see Appendix).

In our interpretive framework the 'things' are organised both in interaction with one another (examined through descriptive statistics) and following established child development theory according to proximity to the reader at age 8 (see Figure 1).

Figure 1: Example of an 8-year-old reader within networks of 'things' contextualised at levels of proximity



Statistical methods

The novelty of this area of research has led us to an exploratory methodology that encourages some openness in analysis. We work iteratively with the data, using prior educational, social research and theory to pre-specify predictor variables to examine for correlations. We examine the variables independently and in interaction, and on presentation of the results of our observations the research team, through discussion, makes assessments on what we have seen and which we investigate further (with decisions recorded initially in field notes and then transferred to our working documents). While all results are considered, in this approach the analyses may lead us to further refine our choice of variables and analyses in iterative phases (Telser, 1964), improving the ones that provide most interpretive insights on children's reading for pleasure for use in policy and practice.

The iterative feedback process draws on educational and statistical expertise simultaneously through discussion of results in meetings by an interdisciplinary research team with expertise in statistics, social science research and reading as subject matter, and through the research team's discussions with policy and cultural advisors (see the report's acknowledgements). With mātauranga Māori in mind, we are drawing from the Māori statistics framework He Arotahi Tatauranga that is designed to support the gathering and use of statistics for Māori advancement and wellbeing.

The framework leads us to conceptualise data pertaining to Māori in two ways: first, as data that may be examined comparatively in relation to other population data to develop an overall picture of children’s reading for pleasure in Aotearoa New Zealand, and second, through consultation with Māori identify data and lines of inquiry that may contribute to the aspirations and interests of Māori (Coutts, Morris & Jones, 2016). Note that during this study we have been unable to seek consultation beyond our partnership group due to the pandemic and therefore this report is limited in that it only presents comparative data. We aim to seek wider advice on preliminary findings towards the development of future research, aspiring towards the second conceptualisation of data in the He Arotahi Tatauranga framework.

Using the GUiNZ dataset

The GUiNZ dataset pertains to 6,853 children whose pregnant mothers were originally recruited in 2009 and 2010. Data have been collected in waves from antenatal (data collection wave 0) until age 8 (data collection wave 8) (GUINZ, 2020). For this study we generated a database through merging select data from all collection waves, including all children who participated in age 8 data collection. This was a total of 5,556 children. While 282 had formally left the study, there were another 1,015 whose non-participation was not explained. The attrition of some children from the study is an important consideration in our findings since the GUiNZ team found non-participants at Year 8 more likely to have younger mothers, mothers with fewer educational qualifications, an ethnicity other than European and more likely to live in areas of high deprivation at the time of recruitment (*Ibid.*, p.7). Future work could include an examination of our strongest early years predictor variables for non-participants.

Variable selection: Outcome variables

This study starts with two outcome variables related to reading for pleasure when the children were approximately age 8, which are child proxy reports from mothers (see Table 2) from the questionnaire section on the child’s activities. The two variables are reports of the child’s frequency of reading for pleasure (included as a question in a list of questions for 13 other activities) and enjoyment of reading for pleasure (a stand-alone question). International comparative and longitudinal studies of 8 and 15-year-olds indicate declines in enjoyment of and time spent reading by children and young people (May, Flockton & Kirkham, 2016; Ministry of Education, 2017a; Medina & McGregor, 2019). The GUiNZ variables have been selected to help us understand what may be influencing these declines for tamariki in Aotearoa New Zealand, where there is consistency with international trends.

Table 2: Outcome variables on children’s reading for pleasure

Variable name	Description
---------------	-------------

AE113_Y8CM	<p>Over the past 12 months, thinking about a normal week, how often has {NAME} participated in the following extracurricular activities? – Reading for pleasure</p> <ul style="list-style-type: none"> • More than once per week • Once per week • Once per month • Once every 6 months • Once a year • Never
AE93_Y8CM	<p>In general, how much does {NAME} enjoy reading for pleasure?</p> <ul style="list-style-type: none"> • Very much enjoys • Somewhat enjoys • Neither enjoys nor dislikes • Somewhat dislikes • Strongly dislikes • Prefer not to say • Don't Know

These variables may not accurately describe children’s actual reading for pleasure because they come from questions asked of parents. It would be useful to examine data from the children themselves for comparison. Yet there is value in the child proxy responses for our purposes because they are indicative of the culture of reading within the home, especially when considered in relation to other variables that describe ‘things’ related to the home environment.

Variable selection: Predictor variables

The *Potential factors of influence* variables in the study’s database were selected by comparing variables from the GUiNZ dataset with known factors identified in prior research (Boyask et al., 2021a, Boyask et al., 2021b; Harrington et al., 2021). This produced a dataset of potential predictor variables smaller than the GUiNZ dataset, yet still too large and unwieldy for this study. We were not expecting to examine every variable in our dataset in this exploratory study and anticipate extending the study to examine further variables or examine predictor variables in-depth.

The list of predictor variables reported upon were prioritised by systematically comparing known factors associated with children’s reading with the GUiNZ data dictionaries, questionnaires and selecting variables that most resembled influences on reading for pleasure in extant research. For this study we prioritised the selected variables for examination to obtain observations at three levels of proximity with time for the study as a limiting factor (see Table 22 in Appendix).

Factors from the extant research where there is no comparable GUiNZ variable have been excluded from the study. We acknowledge there may be factors in the GUiNZ dataset that are influential but not examined in the extant research and therefore excluded from the study or our database.

Processes for data analysis

We use an iterative and exploratory form of data analysis to investigate the relationship between the pre-specified predictor variables to the outcome variables of reading frequency and reading enjoyment, and in some cases the reader categories variable.

The exploratory data analysis workflow is as follows:

- Description of predictor variable including the verbatim question as per the questionnaire, possible responses as per the questionnaire and the source data collection wave.
- Univariate analysis of predictor variable (tabulation and plot of responses including count labels).
- Bivariate analysis of predictor variable in combination with each of the outcome variables; these included contingency tables (where sensible, categorical variables were split to produce 2x2 contingency tables), Fisher's exact tests, logistic regression (for the categorical variables with more than two groups such as ethnicity, high/med/low deprivation, 1/2/>2 adults etc.), and plots.

Exploratory data analysis began with predictor variables from the earliest data collection waves pertaining to children's reading (for example, frequency and enjoyment of being read to by mother and partner at 9 months) and their home environment to give perspective on the efficacy of the age 8 categories for the child's life course. From there, the exploratory analysis is widened to include school and in the wider community, and then social, cultural, and demographic factors at age 8 (for example, ethnicity, household income, household variables, etc.). The relationships presented here are descriptive, and not intended to be read as causal or even independent of other influences. We have highlighted where further multivariate investigation would refine understanding of the issues raised by the analysis.

Finally, the research team develops interpretations for a discussion of findings through examining the statistical analyses in the light of extant theory and research on children's reading and education. These interpretations are framed by the socio-material theoretical position outlined earlier, identifying the relations between outcome and predictor variables in children's networks of things that are then interpreted within contexts of proximity.

Ethics

Children have the right to have their cultural, ethnic and gender identities valued and supported. To maintain the focus on reading for this report and work within the scope of the project we have examined only variables reported by the child to represent their complex gendered and ethnic identities. We recognise that children's identities are complex and multi-faceted, and that other measures may produce different findings.

Furthermore, our partnership group has recommended that to extend our analyses beyond the children's home environment we consult with members of the communities or groups identified in our initial findings to assist in the identification of those interactions between variables it would be valuable to examine next. Consultation was postponed because of the extended pandemic lockdown in Auckland yet remains an intention for future studies.

Our research design also offers protection and care of participants by showing how the proxy measures of reading for pleasure emerge within complex arrays of children's experience and are not defined by singular social characteristics, such as ethnicity or gender.

Results

Most but not all eight-year-old children in New Zealand are reported to enjoy reading and read more than once a week. The results provide insight on variations in levels of enjoyment and frequency of reading and what characteristics and experiences are associated with these differences. The results are organised using our socio-material conceptual framework, with examination of variables that represent things closest to the children (such as relationships with parents and close whānau, reading artefacts, and activities in their home environments), things engaged with outside of home (such as attending early childhood education or school, using libraries and time spent at local community groups and clubs), and finally variables that categorise and position children within social and cultural constructs (such as ethnicity, socio-economic status or gender).

Categories of children's reading

Outcome variables

Mothers report that at age 8 most children engage in reading for pleasure more frequently than once per week. They also report about half of all children very much enjoy reading for pleasure. These reports come from two questions asked of the children's mothers in data collection wave 8 that describe the two outcome variables examined in this study.

In a section of the Child Proxy Questionnaire on the child's activities mothers were asked of a list of 13 extracurricular activities: *Over the past 12 months, thinking about a normal week, how often has {NAME} participated in the following extracurricular activities? - Reading for pleasure.* They had the option to report frequency of reading for pleasure on a 6-point scale from *never* to *more than once per week*.

In the same section is the standalone question: *In general, how much does {NAME} enjoy reading for pleasure?* This question had the option to choose one answer from: *very much enjoys, somewhat enjoys, neither enjoys nor dislikes, somewhat dislikes, strongly dislikes, prefer not to say, don't know.*

Table 3: Examining frequency of reading for pleasure for reads frequently outcome variable

Frequency of reading for pleasure	Freq	%
More than once per week	3,448	73.3
Once per week	748	15.9
Once per month	250	5.3
Once every 6 months	57	1.2
Once a year	24	0.5
Never	176	3.7

Table 4: Examining frequency of reading for pleasure enjoyment for very much enjoys reading outcome variable

Reading for pleasure enjoyment	Freq	%
Very much enjoys	2,331	49.6
Somewhat enjoys	1,546	32.9
Neither enjoys nor dislikes	421	8.9
Somewhat dislikes	274	5.8
Strongly dislikes	98	2.1
Prefer not to say/Don't know	34	0.7

Table 5: Relationships between reading frequency and enjoyment in a 6x6 contingency table

Reading frequency by enjoyment	Very much enjoys	Somewhat enjoys	Neither enjoys nor dislikes	Somewhat dislikes	Strongly dislikes	Prefer not to say/Don't Know
More than once per week	2,170	1,074	127	67	<10	<10
Once per week	116	351	160	101	15	<10
Once per month	20	82	66	63	15	<10
Once every 6 months	<10	14	15	12	<10	<10
Once a year	<10	<10	<10	<10	<10	<10
Never	12	18	49	28	49	20

Using our deliberative and iterative methodology, examination of Tables 3, 4 and 5 informed the direction of the analysis for the rest of the study. Through

interpretation of these general statistics on an under-researched field, we sought a sensible and manageable way to derive meaning from them.

Most children in this study read for pleasure more than once per week (Table 3). From an educational perspective, a child of 8 years of age who reads frequently reads more often than once per week (Silinskas et al., 2020). Increased response options for the group of children who read more than once per week in the GUINZ data collection would have revealed more about the socio-material relations of those who read frequently. As the GUINZ data on reading frequency stands, it reveals more about differences between those who read frequently (defined as more than once per week) and those who do not. We think it would be useful to know more about differences in the more than once per week responses.

Research on reading for pleasure is primarily concerned with the benefits of reading that is pleasurable or undertaken for enjoyment (Boyask et al., 2020). To understand whether New Zealand children are accruing the benefits of reading for pleasure we need to know what constitutes reading enjoyment. The data on frequency of enjoyment of reading for pleasure tells us that about half of the children in the GUINZ study at 8 years of age very much enjoy reading, around a third somewhat enjoy reading and much smaller percentages fit into other response categories (see Table 4). Our interpretation of these data is that answering 'somewhat enjoys' indicated parents did not have much confidence in their children's enjoyment of reading, and that we can only have confidence that children in the study enjoy reading if they fall in the 'very much enjoys' category.

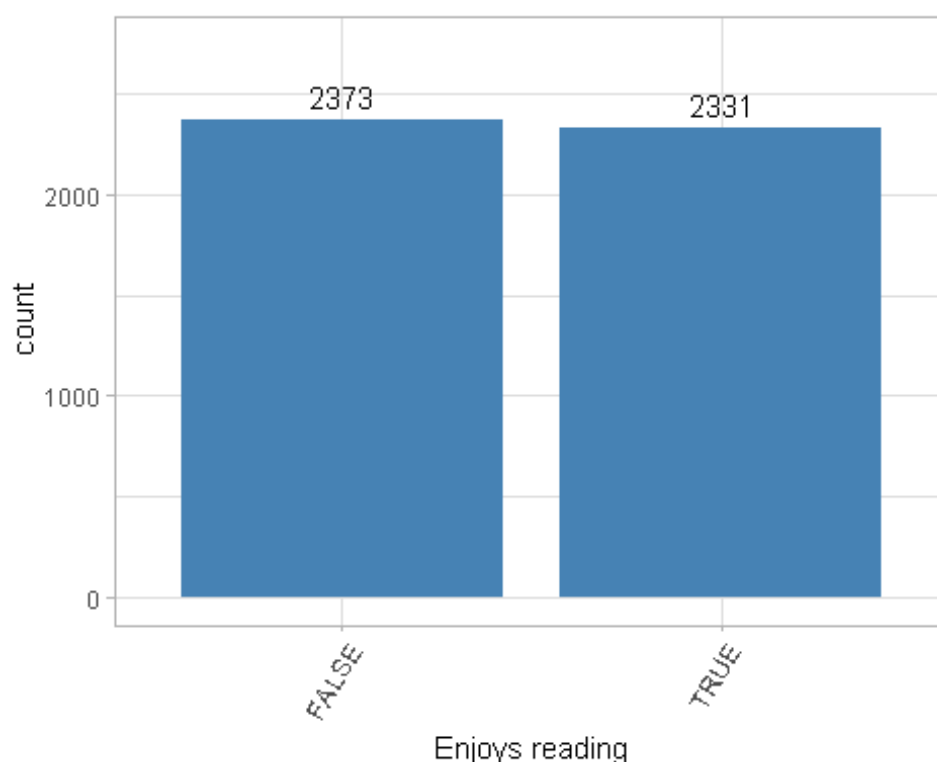
Examination of the association between reading frequency and enjoyment shows that the largest group of children both very much enjoy reading for pleasure and read for pleasure more than once per week (Table 5). As children enjoy reading less than this, they tend to read less frequently.

Foremost, this study was a preliminary investigation of the socio-material relations of children's reading, *with a large number of predictor variables presented*, necessitating the use of easily-understandable descriptive statistics. For our primary analysis we chose to use bivariate analyses, seeing in the data sensible binary divisions within the response categories from both educational and statistical perspectives. Considering the prevalence of readers in the most frequent category it made sense statistically to divide the variable responses for reading frequency between those who read more than once per week (*Reads frequently*) and those who do not. This is the outcome variable used for all subsequent analyses related to reading frequency.

Mothers reported that 3,448 (73%) children read more than once per week (the frequent reading group) and 1,255 children read once per week or less (the less frequent reading group). The odds of reading frequently are 3,448:1,255, or to simplify this, 2.75:1.

We have chosen to split the categorical reading enjoyment variable into a binary variable where children who *very much enjoy* reading for pleasure belong to the *enjoys reading* group. This made sense statistically, creating a binary variable that was very close to a 50% split. The *enjoys reading* variable is the outcome variable used for all subsequent analyses related to enjoyment of reading.

Figure 2: Enjoys reading (outcome variable)



Mothers reported that 2,331 (50%) children enjoy reading for pleasure very much and 2,373 (50%) children enjoy it less. The odds of enjoying reading very much are 2,331:2,373, or to simplify this, 0.98:1 which is to say about equal.

Reader categories

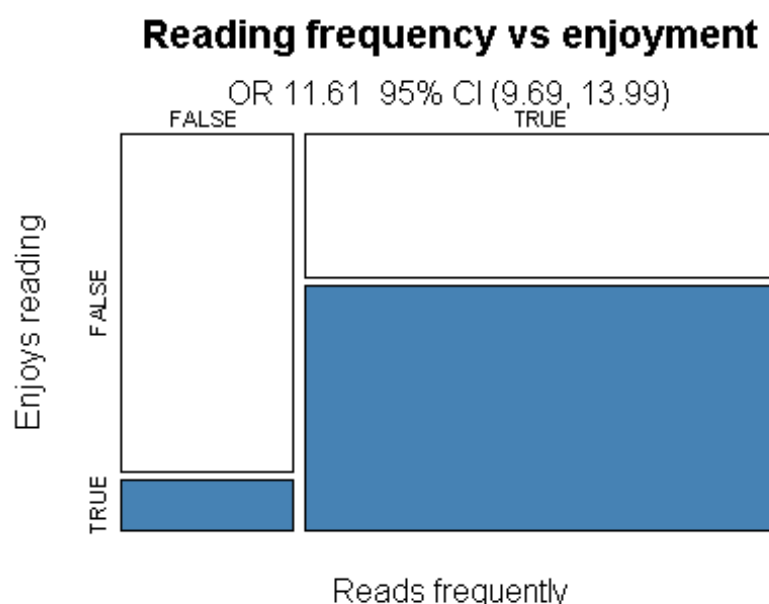
We examine the association between the two reading outcome variables by combining them into reader categories and using the odds ratio, which is the odds of one thing divided by the odds of the other thing. Here we have a comparison of our two outcome variables to show the association between them, and as an example of how we are using the odds ratio and confidence intervals calculated through Fisher's exact test.

Table 6: Association between reading frequency and reading enjoyment

Reading enjoyment	Reading frequency	
	Reads once per week or less	Reads more than once per week
Somewhat enjoys/neither enjoys nor dislikes/dislikes	1,095 (23.3%)	1,278 (27.2%)
Very much enjoys	160 (3.4%)	2,170 (46.1%)

When a comparison is made of reading frequency and reading enjoyment, it is seen that most children both enjoy reading very much and engage in it frequently. However, there are significant numbers of children who read frequently and don't very much enjoy it and a large group of children who do not read frequently or very much enjoy reading. A small group of children (n=160) do not read frequently despite very much enjoying reading. We sought an explanation in the data for the group that very much enjoys yet reads less frequently speculating that it may be a result of lack of access to reading material. With a small sample size there were no strong conclusions apparent, but we have included what we found out in the sections below. Future multi-variate analyses may be more revealing.

Figure 3: Odds ratio in the association between reading frequency and enjoyment



The Fisher's exact test was used to generate the reported odds ratios and confidence intervals. It also gives us a p-value (Appendix Tables 23, 24, 25, 26), however, given that this is a large dataset, the p-value is driven by the large sample size and is of little use in determining the magnitude of the effect. Rather, we rely on the odds ratio as a measure of effect size.

Most children who read more than once a week also very much enjoy reading. The odds of reading frequently if they very much enjoy reading are 2,170:1,278, or 1.7:1. This can be interpreted as children are more likely (odds greater than 1) to read frequently if they enjoy reading very much compared to children who read frequently but do not very much enjoy reading. The odds of not reading

frequently if they very much enjoy reading are 160:1,095, or 0.15:1. This can be interpreted as children are much less likely (odds less than 1) to not read frequently if they enjoy reading very much compared to children who do not read frequently and do not very much enjoy reading.

Finally, these can be combined in the odds ratio $1.7 / 0.15 = 11.62$. The odds ratio can be interpreted as saying that the *odds* of children reading more than once a week are 11.6x higher if children very much enjoy reading compared to children who do not read frequently but very much enjoy reading.

To sum up, when interpreting the odds ratios in this report:

- Odds ratio of 1 means there is no association
- Odds ratio of greater than 1 means one variable is associated with higher *odds* of the other one
- Odds ratio of less than 1 means one variable is associated with lower *odds* of the other one

While the reader categories provided some insight on relations between reading frequency and enjoyment, our primary analysis examines predictor variables in relation to the individual outcome variables rather than the reader categories. We found these results to be more informative and meaningful than examination of reader categories against predictors. The conclusions derived from observations between individual outcome and predictor variables will be examined through finer-grained testing and investigation in future studies.

Home and whānau experiences

Table 7 summarises examination of selected variables describing children's home and whānau experiences that may provide insight on two elements of their reading for pleasure: reading frequency and enjoyment of reading for pleasure. The odds ratios should be interpreted using the guidance above. We found differences in the odds ratios for frequency and enjoyment, with both higher and lower odds found in associations with reading frequency rather than with reading enjoyment. There are also differences in the kinds of factors associated with the two outcome variables, with factors related to other people more prevalent in the highest and lowest odds ratios for children very much enjoying reading than for frequency. The five highest odds ratios for associations with frequency of reading relate to children's unstructured activities in the home environment, not necessarily involving others. This was similar for greater enjoyment although the fifth highest was mother's encouragement to read at 54 months. Unstructured play featured in the five lowest odds in association with both outcome variables, and technological device ownership or use are also associated with lower reading frequency and enjoyment. More siblings in the home lowered the odds for frequency of reading, but more adults and siblings lower the odds of enjoying reading.

Table 7: Summary of the odds of home and whānau experiences associated with reading frequency and enjoyment

Predictors	Frequency Odds ratio	Frequency Lower conf int	Frequency Upper conf int	Enjoyment Odds ratio	Enjoyment Lower conf int	Enjoyment Upper conf int
Quiet/inactive play more than once per week	5.12	4.43	5.92	2.07	1.8	2.38
Has an eReader	3.57	1.54	10.14	1.99	1.16	3.5
Play time: Not enough play time	2.88	2.11	3.94	1.69	1.25	2.27
Play time: Right amount of play time	2.86	2.26	3.61	1.92	1.51	2.44
Free time preference: Usually chooses inactive things	2.53	2.3	2.79	0.93^{ns}	0.85	1.01
51+ other books in the home at 9m	2.29	2	2.62	1.51	1.34	1.7
Homework more than once per week	2.24	1.94	2.58	1.45	1.27	1.66
Mother has diploma or higher at birth	2.13	1.85	2.46	1.46	1.28	1.68
Active play more than once per week	2.13	1.85	2.46	1.06^{ns}	0.92	1.21
Household chores more than once per week	1.92	1.66	2.21	1.23	1.08	1.4
Adults at home: More adults	1.82	1.55	2.14	0.78	0.67	0.91
Enjoys being read to more than half the time at 9m	1.8	1.57	2.06	1.53	1.36	1.73
Adults at home: Two adults	1.73	1.45	2.07	1.35	1.14	1.6
21+ children's books in the home at 9m	1.67	1.46	1.92	1.11^{ns}	0.98	1.26
Partner has diploma or higher at birth	1.65	1.38	1.99	1.38	1.17	1.62

Reads words more than once a week at 54m	1.47	1.28	1.68	1.66	1.47	1.88
Free time preference: Equally likely	1.47	1.26	1.71	1.3	1.14	1.48
Is read to about ethnicity at least sometimes at 54m	1.18	1.01	1.37	1.55	1.36	1.77
Play time: Too much play time	1.13^{ns}	0.9	1.41	0.55	0.44	0.69
Adults at home: Single adult	1.12^{ns}	0.86	1.46	0.98^{ns}	0.76	1.27
Free time preference: Usually chooses active things	0.9^{ns}	0.76	1.07	0.81	0.69	0.95
Has a tablet	0.83	0.72	0.95	0.78	0.69	0.88
Play time: Don't know	0.8^{ns}	0.56	1.16	1.27	0.87	1.84
Has 2 or more siblings at home	0.66	0.57	0.76	0.8	0.7	0.91
Play time: Prefer not to say	0.63^{ns}	0.31	1.27	1.62^{ns}	0.8	3.25
Greater screentime	0.48	0.4	0.56	0.55	0.48	0.63
Free time preference: Don't know	0.22	0.12	0.39	1.12^{ns}	0.65	1.94
Free time preference: Prefer not to say	0.17	0.07	0.41	0.69^{ns}	0.29	1.59

Cell shading indicates a greater association with frequency or enjoyment.

^{ns} denotes a confidence interval that includes 1 and therefore results are not statistically significant.

Other people at home

Parents

Parental education often emerges in studies of reading as having strong association with language development. For example, in their study of reading vocabulary at age 16 Sullivan and Brown (2015) found that parental education was more strongly linked with linguistic fluency than parental material resources, sibling interactions or other academic performance (such as mathematics performance). In the GUiNZ study partners and mothers were asked in the

antenatal data collection about their highest completed qualification, with the choices to select: *No secondary school qualification, Secondary school/NCEA 1-4, Diploma/Trade certificate/NCEA 5-6, Bachelor's degree, Higher degree*. We chose to split the variables at *Diploma/Trade certificate/NCEA 5-6* given that the category may include some advanced vocational qualifications as well as higher school qualifications. For example, early childhood education has both degree and diploma level professionals. Parents who had completed a diploma, trade certificate or NCEA 5-6 or above before birth were associated with reading frequently and to a lesser extent greater reading enjoyment at age 8. Mothers' education at a level of diploma or above is more strongly associated with their children's reading frequency (OR 2.13, 95% CI (1.85, 2.46)) and greater enjoyment than partners. A child whose mother had a diploma or higher qualification at birth has a two-fold increase reading frequently.

Siblings

In data collection wave 5 when children were approximately 54 months, mothers were asked *How many siblings does {name} have?* and *How many of these siblings live in the same house as {name} for at least half the week?*. Mothers responded with a raw number or *Don't know* or *Prefer not to say* and this was recoded in categories from 1 to 7 and 8+ siblings. We had access only to the recoded variable which excluded 0 siblings, don't know and prefer not to say responses.

Table 8: Number of siblings at home

Number of siblings at home	Freq
1 sibling	2,816
2 siblings	1,573
3 siblings	526
4 siblings	200
5 siblings	69
6 siblings	32
7+ siblings	26

This variable was split into two groups: children with one sibling at home compared to those with two or more. Children who have two or more siblings at home have lower odds of reading frequently (OR 0.66, 95% CI (0.57, 0.76)) or enjoying reading (OR 0.8, 95% CI (0.7, 0.91)). We noted that given variation in family structures and housing, questions about *siblings* presumes a nuclear family structure and it may be useful to look at children in the home instead. The GUiNZ database includes data on other children in the home, which is something that could be examined in the future.

Other adults

In data collection wave 8, mothers were asked *How many other adults ages 21 and over, including you, are living in your house?* and could respond with a number.

Table 9: Number of adults at home

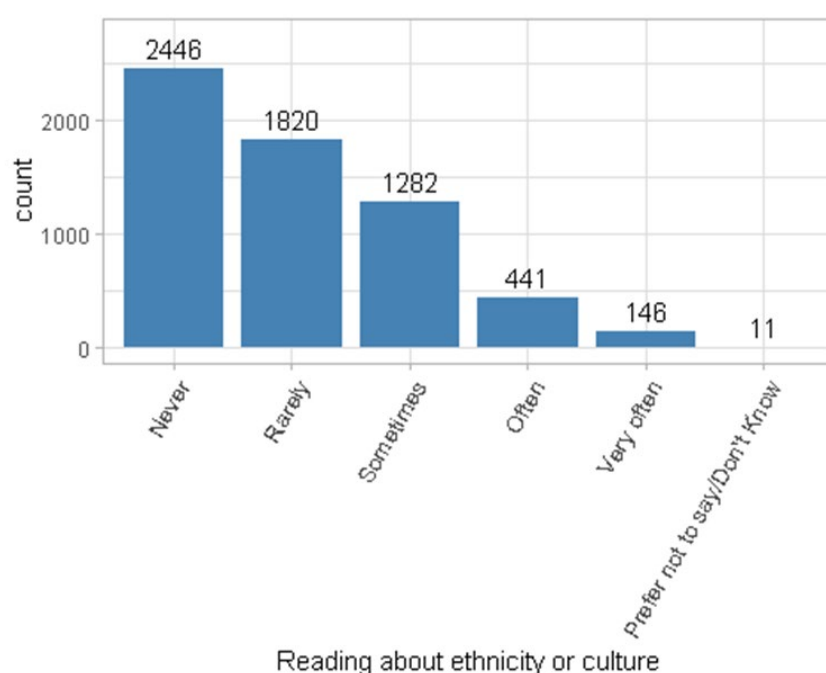
Number of adults at home	Freq
1	435
2	3,700
3	457
4	244
5	67
6 or more	32

Reading frequently was associated with having two adults (OR 1.73, 95% CI (1.45, 2.07)) or more than two adults (OR 1.82, 95% CI (1.55, 2.14)) in the household. In contrast, living in households with more than two adults decreased the odds of very much enjoying reading (OR 0.78, 95% CI (0.67, 0.91)), while two adult households increased them (OR 1.35, 95% CI (1.14, 1.60)). There were no positive or negative associations with being in a single parent household and reading frequency (OR 1.12, 95% CI (0.86, 1.46)) or enjoyment (OR 0.98, 95% CI (0.76, 1.27)).

Culture, language and reading at home

In data collection wave 5 when children were approximately 54 months, mothers were asked *How often do you read to {NAME} about ethnicity or culture?*

Figure 4: Mothers reading to children about ethnicity or culture at 54 months



There was no obvious association between reading about ethnicity or culture and children's later frequency of reading, although children have raised odds of enjoying reading at age 8 (OR 1.55, 95% CI (1.36, 1.77)). Mothers were also asked about the languages spoken by their child at 54 months. There were some additional questions for children who spoke te reo Māori, including one about reading and understanding written words in te reo Māori. We have not yet looked at the association of this variable with frequency or enjoyment.

Table 10: Child who speaks te reo Māori at 54 months reads and understands words in te reo Māori

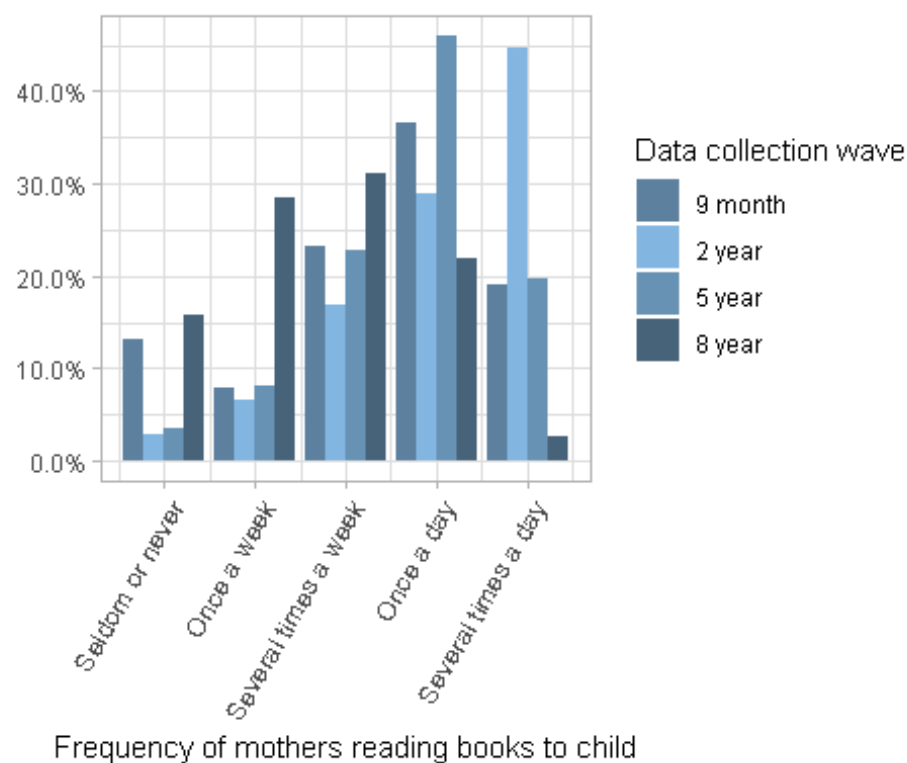
Reads and understands written words in te reo Māori	Freq
Never	346
Rarely	149
Sometimes	65
Often	27

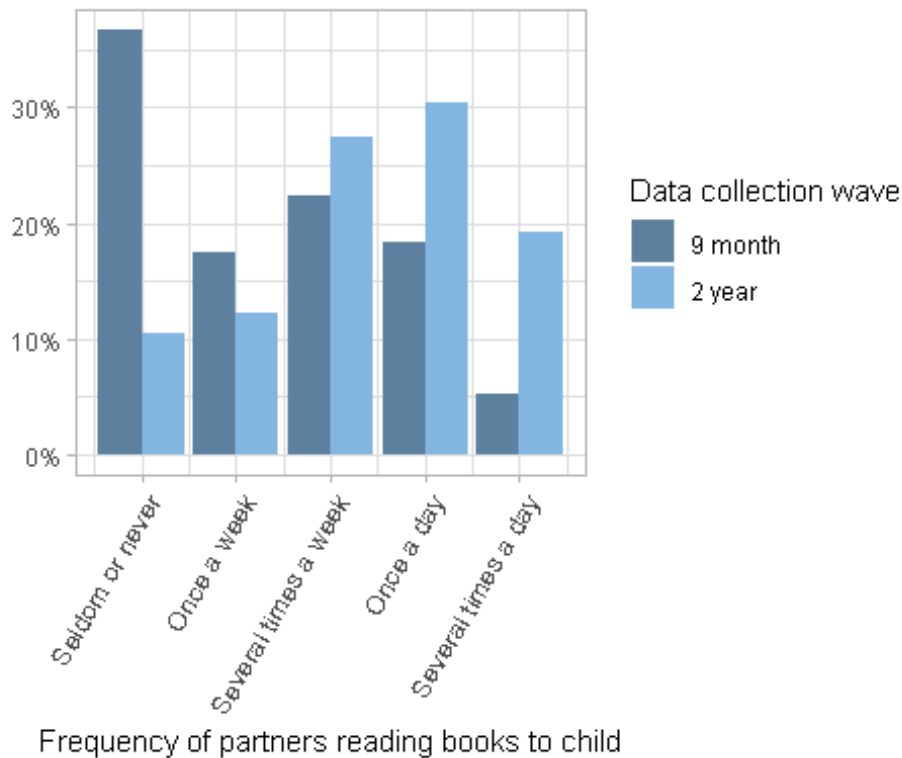
When children were 9 months old, parents were asked about the number of books in the home. We examined mothers' reports on the number of children's books and the number of other books. Generally, parents indicated that there were more other books in the household than children's books, although it is worth remembering that the children were very young when this question was asked. There is a positive correlation between homes with a greater number of children's books and reading frequency at age 8 but there is no association with

reading enjoyment. Higher numbers of other books in the home increased the odds of reading enjoyment (OR 1.51, 95% CI (1.34, 1.7)), but the relationship with greater frequency of reading when there are more other books in the home is moderate (OR 2.29, 95% (2.0, 2.62)).

Mothers were asked in data collection waves at 9 months, 2 years, 54 months and 8 years how often they read books to/with their child. Partners were also asked this question in data collection waves at 9 months and 2 years old.

Figure 5: Mother and partner reading books to child at various ages



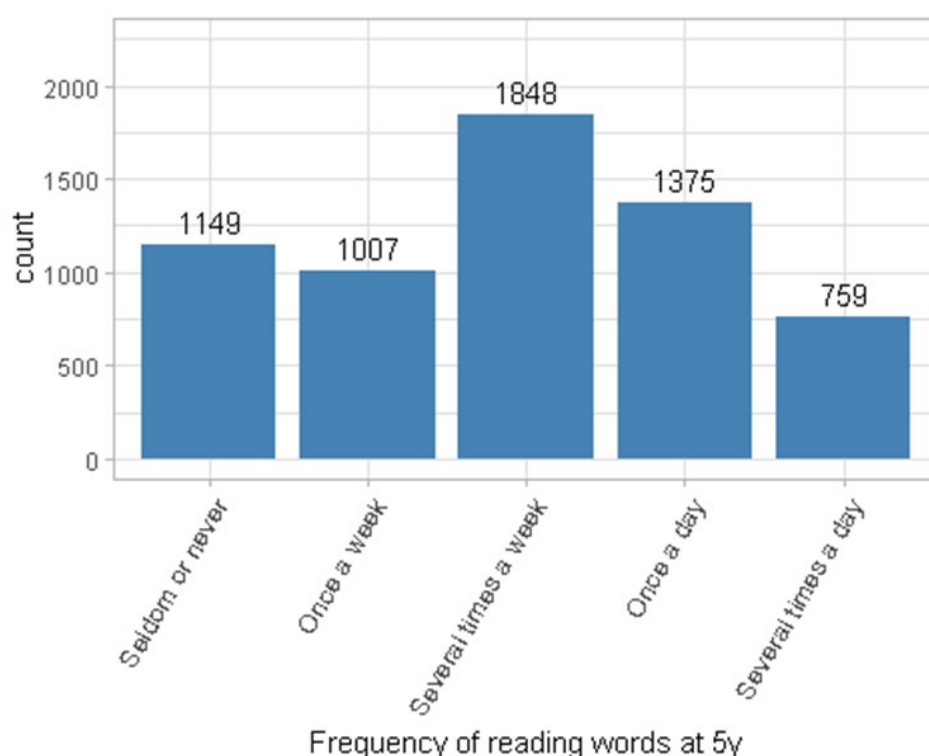


From the plots we observe that mothers read to their children at 9 months and 2 years more often than their partners. When children are 2 years old, mothers and partners read more frequently to their child than at 9 months. This is the case even though mothers reported most children at 9 months enjoy being read to. Baby's reported reading enjoyment at 9 months is related to greater frequency of reading at age 8 (OR 1.8, 95% CI (1.57, 2.06)) and more reading enjoyment (OR 1.53, 95% CI (1.36, 1.73)).

There is an overall decrease in mothers reporting that they read to their child between 4.5 and 8 years of age. This could be indicative of the child's growing independence with reading.

Mothers interviewed when the children were approximately 54 months (6 months before when most children start school in New Zealand) were asked how often they encourage their children to read words. With an odds ratio of 1.66 (95% CI (1.47, 1.88)) there is an association between encouragement to read and greater enjoyment of reading, as well as an association with frequency of reading (OR 1.47, 95% CI (1.28, 1.68)).

Figure 6: Frequency of parents' encouragement to read at 54 months



How children spend their time at home

At 8 years old, most mothers reported that most children have the right amount of time for free or unstructured play during a typical week (n=3,719). Only 112 (35.6%) of the 315 children reported as having too much play time were reported as enjoying reading. This was even lower than for the 442 children with not enough play time, of whom 213 (48.2%) enjoy reading. Only half of children with too much free time read frequently, compared to three-quarters of children with not enough or just the right amount of free time.

Most children are involved in both active and inactive or quiet play at home. Frequent quiet or inactive play has the highest odds ratio for reading frequency in our study (OR 5.12, 95% CI (4.43, 5.92)). Engaging in active play is also a statistically significant predictor for reading frequently, as children who frequently actively play have a two-fold increase in the odds of reading frequently. Reading enjoyment is associated with quiet/inactive play, but there is no clear association with active play. However, there is a marginal association between reading enjoyment and children who are reported to enjoy exercise (OR 1.23, 95% CI (1.09, 1.4)).

Similarly high numbers of children engage in homework more than once a week (n=3,487) and participate in household chores more than once a week (n=3,431). Children have double the odds of reading frequently if they also frequently do homework or household chores, where 'frequently' means 'more than once a week' for all of these activities.

Media and technology use

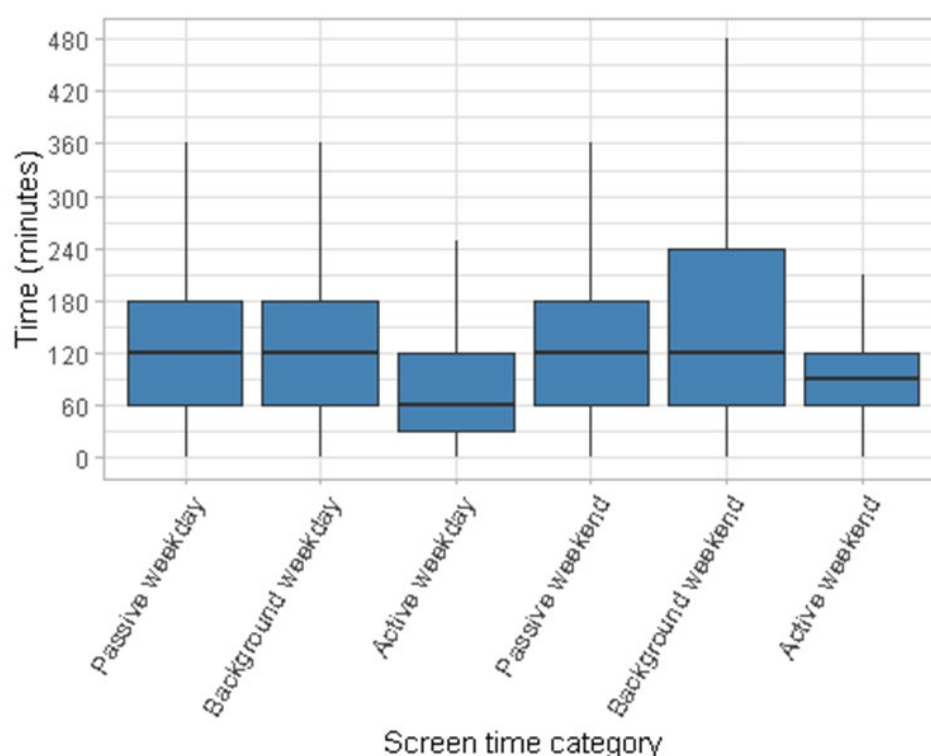
Almost half of 8-year-olds in this cohort owned a tablet computer. Apart from tablets, most children did not own personal devices. Tablet ownership was associated with slightly lower odds of both reading frequently and very much enjoying reading. eReaders are among the rarest items for children to own, and while the high odds ratios against our outcome variables suggest a strong influence on reading, the confidence intervals are large, so there is uncertainty in this assessment.

Mothers were asked about several different forms of screen time in data collection wave 8. They were asked to *think about a usual weekday and weekend day, the number of hours the child spends:*

- *Watching television programming including free-to-air, online, and pay TV or DVDs either on TV or other screen-based devices? Note: please include all programming, including video recordings such as YouTube. (Referred to as passive screen time below)*
- *With the TV on in the same room as {NAME}, whether or not {HE/SHE} is watching it? (Referred to as background screen time below)*
- *Doing activities or tasks, e.g. homework, playing games, or sending messages, on any screen-based device including computers, laptops, tablets, smart phones or gaming devices? (Referred to as active screen time below)*

Active, background and passive screentime are compared in Figure 7 for a usual weekday and weekend day.

Figure 7: Number of minutes at age 8 of passive, background and active screen time on a usual weekday or weekend



Greater passive screen time (that is, screen time greater than the median) during weekdays was associated with significantly lower odds of frequent reading (OR 0.48, 95% CI (0.4, 0.56)) and greater enjoyment of reading (OR 0.55 95% CI (0.48, 0.63)). A clear relationship was found between children who chose to spend their free time doing inactive activities and those who had greater screen time. This may suggest that children who prefer inactive activities are more likely to be spending their time passively watching screens. In contrast, children who are equally likely to choose active as inactive activities are in the lower screentime group and have higher odds of reading frequently and very much enjoying it.

Outside-of-home experiences

Table 11 summarises relationships between the two outcome variables (reads frequently and enjoys reading) and predictor variables that refer to things within children's networks outside the home. The list includes variables that describe children's interactions with early childhood education, libraries, schools, and organised activities. While some of the variables describe the child's own feelings and perceptions, others are the perceptions of parents. Examination of both child and parent views of outside-of-home experiences provides greater insight on the culture in which a child's reading develops, including insight on alignment or variation between home and outside-of-home experiences. Parental views and attitudes towards their children's progress stand out in the results as predictors of children's relationships with reading.

Table 11: Reading frequency and enjoyment in association with outside-of-home experiences

Predictors	Frequency Odds ratio	Frequency Lower conf int	Frequency Upper conf int	Enjoyment Odds ratio	Enjoyment Lower conf int	Enjoyment Upper conf int
Parental pride in: Interest in learning	3.51	3.15	3.91	1.52	1.39	1.67
Parents very satisfied with learning progress at age 8	2.07	1.81	2.37	2.97	2.6	3.38
Organised individual sport once per week or more	1.96	1.72	2.24	1.36	1.21	1.53
Art, music, dance once per week or more	1.94	1.69	2.22	1.65	1.47	1.86
Visits library weekly at 6y	1.6	1.37	1.87	1.35	1.19	1.54
Organised team sport once per week or more	1.57	1.37	1.8	1.03^{ns}	0.91	1.16
Feels good at school work	1.51	1.3	1.75	1.63	1.43	1.87
Does well at class work	1.51	1.3	1.75	1.76	1.48	2.09
Community group or club once per week or more	1.4	1.2	1.63	1.13^{ns}	0.99	1.28
Parents satisfied with ECE reading at 54m	1.27	1.11	1.46	1.42	1.26	1.6
Parents very satisfied with teacher communication	1.21	1.05	1.39	1.33	1.18	1.5
Finds answers easily	1.19	1.03	1.37	1.39	1.23	1.58
Almost always enjoys school	1.17	1.02	1.34	1.16	1.03	1.31
Feels quick at school work	1.15^{ns}	1	1.32	1.27	1.13	1.44
Parental pride in:	1.12^{ns}	0.87	1.45	0.91^{ns}	0.74	1.12

Academic abilities						
Academic lessons once per week or more	0.96^{ns}	0.81	1.13	0.97^{ns}	0.83	1.12
Religious activity once per week or more	0.96^{ns}	0.82	1.12	1.1^{ns}	0.96	1.26
After school care once per week or more	0.94^{ns}	0.81	1.1	0.96^{ns}	0.84	1.09
Parental pride in: Enthusiasm for school	0.93^{ns}	0.77	1.12	0.61	0.52	0.72
Before school care once per week or more	0.87^{ns}	0.71	1.08	0.93^{ns}	0.77	1.12
Parental pride in: More than one	0.78^{ns}	0.27	2.84	0.24	0.07	0.7
Parental pride in: Creativity/ artistic ability/ cultural activities	0.74^{ns}	0.28	2.32	0.19	0.05	0.53
Parental pride in: Music abilities	0.66^{ns}	0.27	1.89	0.35	0.13	0.87
Parental pride in: Confidence	0.57	0.45	0.72	0.44	0.35	0.55
Parental pride in: Diligence/ hard working	0.57^{ns}	0.18	2.14	0.47^{ns}	0.14	1.48
Parental pride in: Behaviour	0.56	0.43	0.73	0.3	0.23	0.38
Parental pride in: Interaction with other children	0.53	0.43	0.66	0.36	0.29	0.44
Parental pride in: Sporting abilities	0.32	0.23	0.45	0.19	0.13	0.28

Parental pride in: Other/Don't know	0.28	0.17	0.44	0.26	0.15	0.42
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Cell shading indicates a greater association with frequency or enjoyment.

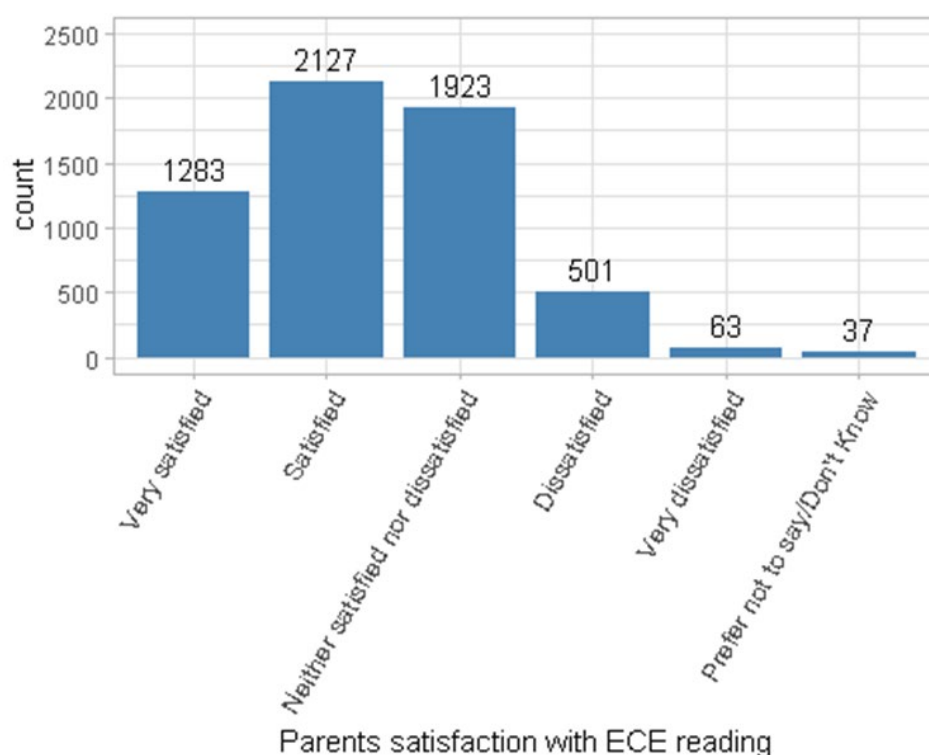
^{ns} denotes a confidence interval that includes 1 and therefore results are not statistically significant.

Parents' perceptions of education

Participation rates for children regularly attending early learning in the six months prior to starting school has increased from 95% in 2011 to 97% in 2021, indicating that most New Zealand children have some experience of early childhood education (ECE) before they arrive at school (Ministry of Education, 2021).

In the data collection wave 5 of the GUiNZ study, mothers whose children received some form of ECE or care service were asked *How satisfied are you with the effect that this early childhood education or care arrangement has had on your {child/children} - pre-reading/reading skills?*

Figure 8: Satisfaction of mothers with ECE or care services on child's pre-reading/reading skills at 54 months



There is a small association between children's increased frequency of reading at age 8 and having parents who were satisfied or very satisfied with ECE support for their child's reading (OR 1.27, 95% CI (1.11, 1.46)), and a similar although slightly stronger association between ECE reading and more enjoyment of reading (OR 1.42, 95% CI (1.26, 1.6)).

In the data collection wave 8, mothers were asked *How satisfied are you with the way in which {NAME} is progressing in their learning?*

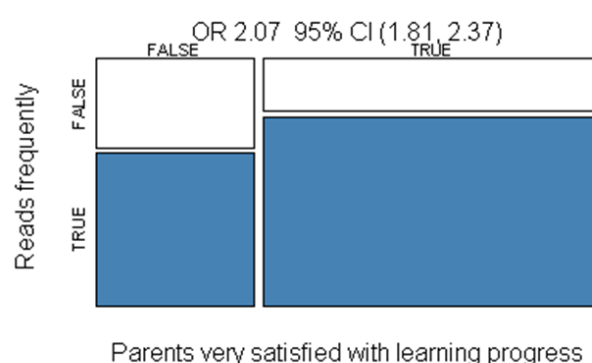
Table 12: Parental satisfaction with learning progress at age 8

Satisfaction with learning progress	Freq
Completely satisfied	1,519
Very satisfied	1,755
Fairly satisfied	1,187
Neither satisfied nor dissatisfied	125
Fairly dissatisfied	154
Very dissatisfied	42
Completely dissatisfied	14
Prefer not to say	16
Don't know	14

The group of children whose mothers reported being completely or very satisfied were compared against all others. Children whose parents are very satisfied with their learning progress at school have twice the odds of reading frequently. They have even higher odds of enjoying reading very much. This suggests there may be a relationship between school performance and reading for pleasure, which is continually observed in the Progress in International Reading Literacy Study (PIRLS), even though the 2016 study indicates a weakening of the correlation between New Zealand children's reading achievement performance and reading for fun (Chamberlain with Essery, 2020).

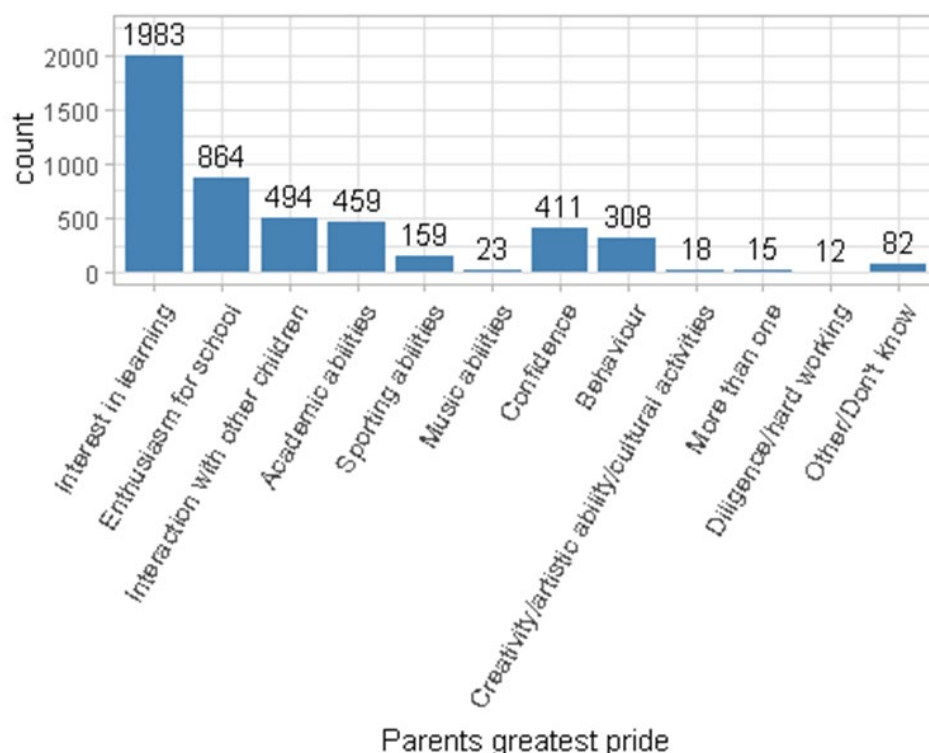
Figure 9: Parental satisfaction with learning at age 8 vs reading frequency at age 8

Parental satisfaction with learning at 8 years vs reading frequency at 8 years



In the data collection wave 8, mothers were asked *In terms of {NAME}'s learning at school, what are you most proud of?* and asked to choose all that apply from a list of 13 options.

Figure 10: Frequency distribution of what parents are most proud of



Parents are most proud of their children's interest in learning, which is also the option that has a very strong association with reading more frequently. Children whose parents report pride in their interest in learning have 3.5 times greater odds of reading frequently. Interest in learning was the first choice on the list which may have affected response rates. It is also a very broad response category compared with some of the other specific options. Interest in learning is a term with many different possible interpretations. There is also an association with greater reading enjoyment, although not as strong.

All other elements of pride in learning have either no association with reading or lower the odds of children reading frequently or enjoying reading. Pride in sporting abilities notably reduces the odds of both reading frequency and enjoyment, suggesting that parents who are very sports-minded may not encourage their children to read for pleasure.

An important consideration for children's reading is whether the reading cultures of home and school are aligned. While a future multivariate analysis may be useful to investigate relations between children's reading enjoyment or frequency, home, and school, in this study we examined a mother's satisfaction with teacher communication variable at 8 years old to provide an indication of alignment. Most mothers are satisfied with the communication they receive from teachers about their child's learning and progress at school, which may indicate

alignment in relations between school and home. There is a small association between mother's satisfaction with teacher communication and reading frequency and enjoyment.

Table 13: Frequency of mothers' satisfaction with teacher communication

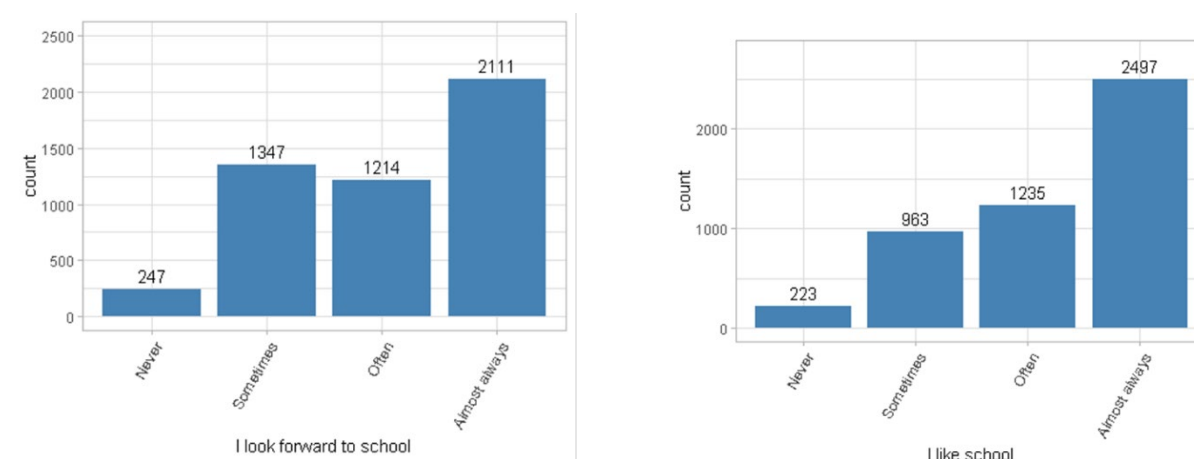
Satisfaction with teacher communication	Freq
Very satisfied	1,740
Satisfied	1,944
Neither satisfied nor dissatisfied	704
Dissatisfied	262
Very dissatisfied	24

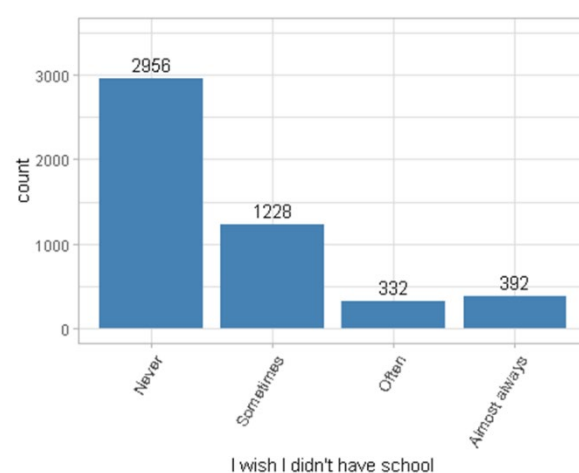
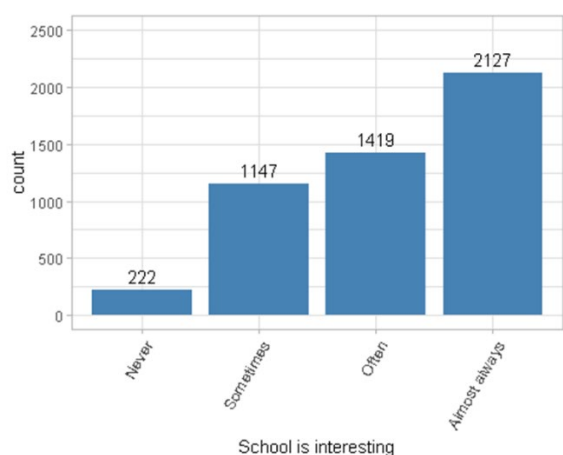
Children's views of schooling

Children's feelings about school at age 8

In data collection wave 8, children were asked a set of questions about the school they were at. They were asked *How often are the following statements true for you?* This question applied whether they attended school, were home schooled or used alternative provider Te Aho O Te Kura Pounamu.

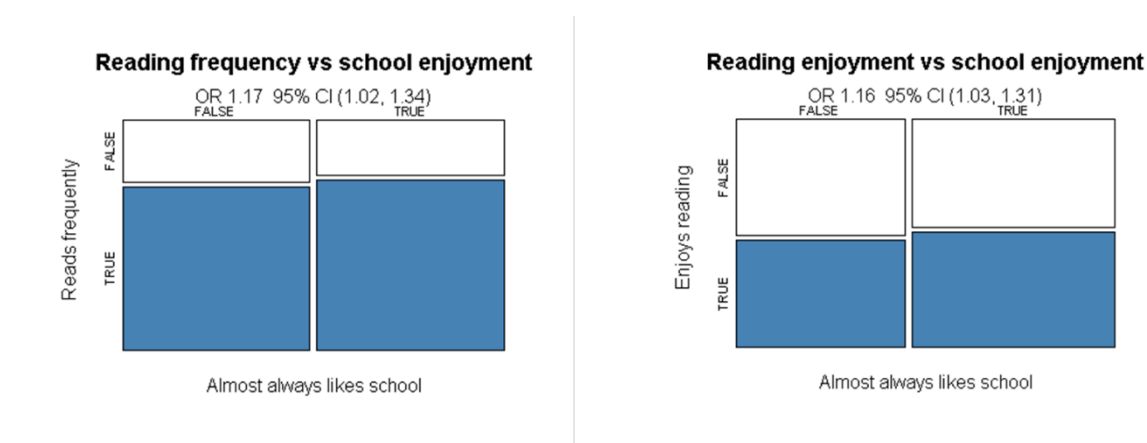
Figure 11: Children's feelings about school





While the data suggest children have slightly higher odds of reading frequently and enjoying it very much if they also enjoy school (see Figure 12), this is a very marginal effect. Enjoyment of school does not seem to be a major factor in children's reading for pleasure.

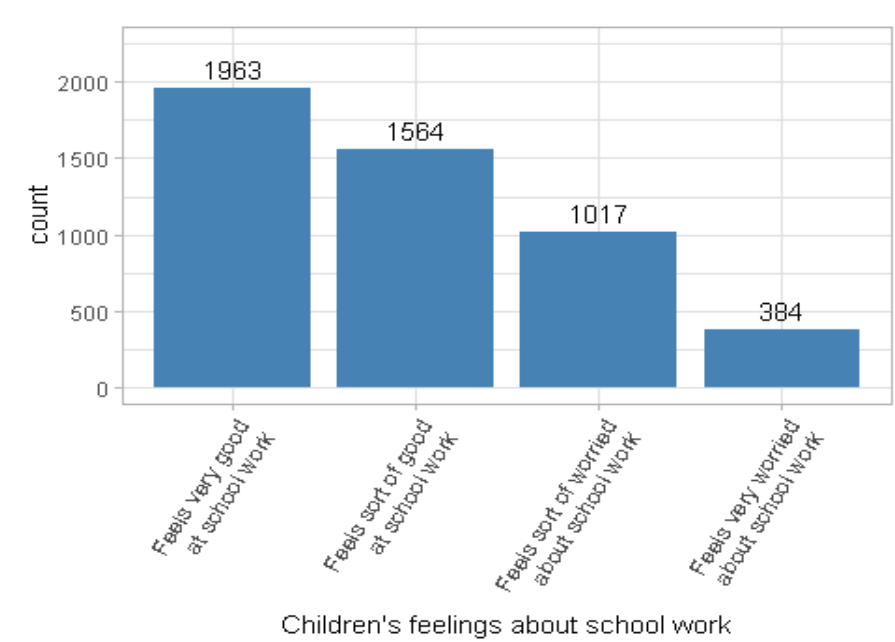
Figure 12: Associations between children's feelings about school vs reading frequency and enjoyment



Children's perceptions of their progress in school

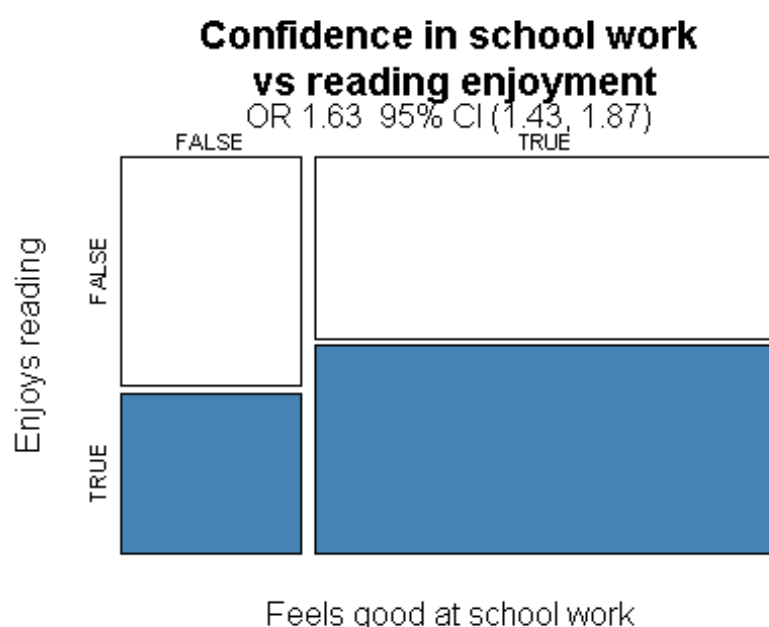
In data collection wave 8, in the *Self-concept and perceived competence* part of the children's questionnaire, children were given a choice between a description of two kinds of children and asked which they related to and how strongly. For example, children were given two options, *Some kids feel that they are very good at their school work* OR *Other kids worry about whether they can do the school work assigned to them*. Between these two options they could choose 'really true for me' or 'sort of true for me' for either and the choice was mutually exclusive.

Figure 13: Children's feelings about school work



Most children feel quite positive about their capability to do school work, suggesting higher self-efficacy. Those that feel very good or sort of good have higher odds of enjoying reading very much or reading more frequently.

Figure 14: Children's confidence in doing school work vs reading enjoyment



Children were also asked to comment on their achievement by choosing between *Some kids do very well at their classwork* OR *Other kids don't do very well at their classwork*. The odds ratios indicate that children who feel confident about their ability to do class work have higher odds of reading frequently (OR 1.51

95% CI(1.3, 1.75)), and enjoying reading very much (OR 1.76 95% CI (1.48, 2.09)). Children who are confident in their performance and their ability seem to have a stronger relationship with greater enjoyment of reading than those who just like school.

Children's response to the choice between *Some kids are pretty slow in finishing their school work OR Other kids can do their school work quickly* was more skewed towards the right of the distribution, with the median, mean and mode in *feels sort of quick finishing school work*. There is no association between frequency of reading for children who feel they are *sort of* or *very quick* at doing their school work, but there is a marginal association with greater enjoyment of reading (OR 1.27 95% CI (1.13, 1.44)). Similarly, children who reported they *almost always* or *sort of* identify with *kids can almost always figure out the answers at school* had a very weak association with reading frequency and greater enjoyment.

Children in the community

Children who are involved in community groups and activities seem in general to have an association with more frequent reading, with some exceptions.

Organised sport (individual and team), arts-related activities, and visits to the library are clustered with odds ratios between 1.96 to 1.57.

Table 14: Organised activities associated with reading frequency

Predictors	Odds ratio	Lower conf int	Upper conf int
Organised individual sport once per week or more	1.96	1.72	2.24
Art, music, dance once per week or more	1.94	1.69	2.22
Visits library weekly at 6y	1.6	1.37	1.87
Organised team sport once per week or more	1.57	1.37	1.8

These are some of the highest odds among our predictor variables. Community group or club (e.g. Cubs, Brownies or cultural group) (OR 1.4, 95% CI (1.2, 1.63)) activity also has a weaker but significant association with more frequent reading. This suggests that children who participate in organised, extracurricular activities have higher odds of reading frequently. There are some community activities that show no relationship with reading frequency, however. These include *academic lessons (reading, maths, second language etc.)* or *religious services or classes* once a week or more.

Table 15: Organised activities not associated with reading frequency

Predictors	Odds ratio	Lower conf int	Upper conf int
Academic lessons once a week or more	0.96	0.81	1.13
Religious service or classes once per week or more	0.96	0.82	1.12

We cannot draw any conclusions about the associations between these activities and reading frequency because their odds ratio confidence intervals include one.

The associations between children's activity in the community and enjoyment of reading is more varied. Arts activities are related to higher odds of enjoyment of reading (OR 1.65, 95% CI (1.47, 1.86)); organised individual sport (OR 1.36, 95% CI (1.21, 1.53)) and visiting the library at 6y (OR 1.35, 95% CI (1.19, 1.54)) are also associated with more enjoyment.

Table 16: Organised activities associated with reading enjoyment

Predictors	Odds ratio	Lower conf int	Upper conf int
Art, music, dance once per week or more	1.65	1.47	1.86
Organised individual sport once per week or more	1.36	1.21	1.53
Visits library weekly at 6y	1.35	1.19	1.54

There is no association between reading enjoyment and attending a community group or club, religious services or classes, organised team sport or academic lessons.

Most children in this dataset did not attend either before or afterschool care, but for those that did there was no clear association with either aspect of children's reading.

Societal positioning of children

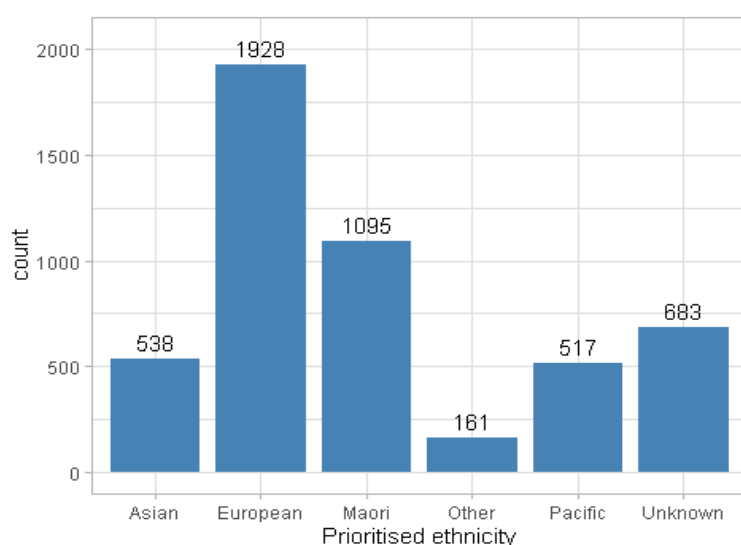
In this section we report on the associations between children's reading and three societal constructs: gender, ethnicity, and socio-economic situation. These constructs are common in social science analyses, yet statistics in these areas tend to be collected in the interests of a generalised population rather than according to the needs and interests of some who are represented within them most visibly. In New Zealand this is notably the case for Māori (Statistics New Zealand, 2002). We present the findings here and have tried to interpret them in ways sensitive to the children, families, and communities to whom the data belong. We have prioritised examination of the children's self-identifications of gender and ethnicity. While we have included odds ratios in the subsections, we have not included summary tables of the predictor odds ratios at the start of this

section as we have for other variables examined since these social constructs viewed in univariate or bivariate analyses are instruments too blunt for policy decision-making and a comparison of their odds is not useful. Respondents also deserve to have these results scrutinised by others with more authority to speak about the communal identities represented and the utility of the analyses for their communities. This is a task for the future when face-to-face interaction is feasible.

Ethnicity

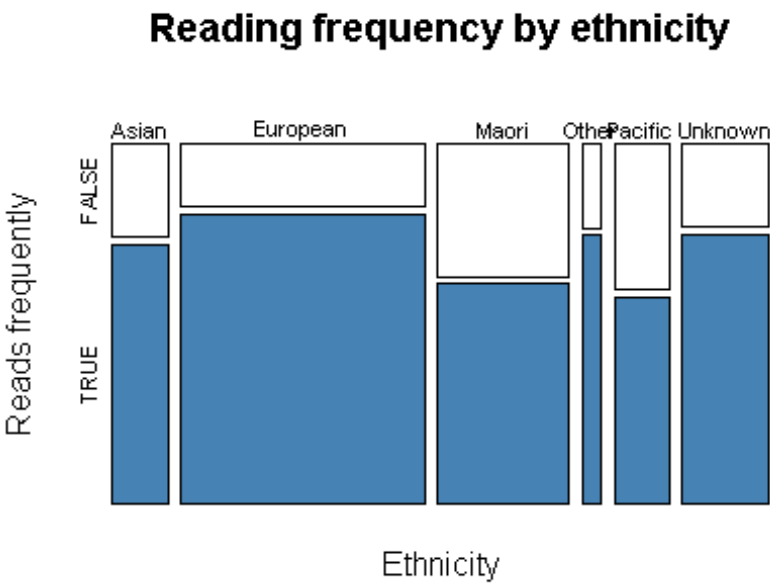
For the first time in data collection wave 8, children were able to report on their own ethnicity. As per the *GUINZ Now We Are 8* report, ethnicity was categorised using the Ministry of Health protocol developed by Stats NZ to allocate each participant to a single Level 1 prioritised ethnicity (Statistics New Zealand, 2005; Ministry of Health, 2017). However, we recognise that the use of prioritised ethnicity is contested, and that Stats NZ Tatauranga Aotearoa (2019) favours different approaches to classifying ethnicity.

Figure 15: Children’s self-identified ethnicity recategorised to Level 1 prioritised ethnicity



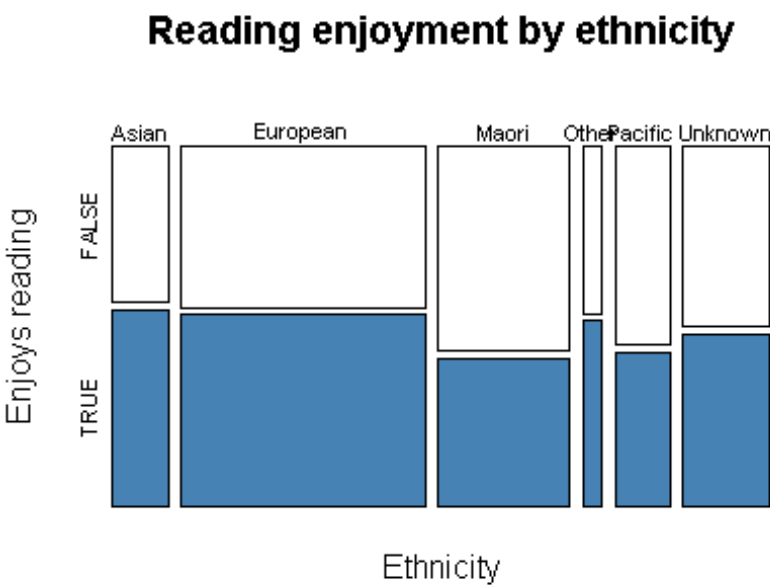
Māori, Pacific, and Asian children are well-represented in this dataset. The greatest proportion of those who read frequently identify as Asian and European. The greatest proportion of children who do not read frequently are Pacific and Māori.

Figure 16: Proportions of frequent readers by self-reported externally-prioritised ethnicity



When we look at reading enjoyment there is less variation between ethnicities. Enjoyment of reading is similar on average across all ethnic groups. Explanations for variation in frequency and enjoyment are unknown, and we contend that they may be best brought to light in consultation with the communities represented in these statistics. These discussions could inform which factors we might in future examine in multivariate analyses for their associations with reading and ethnicity.

Figure 17: Proportions of children who enjoy reading, by ethnicity



Examining the ethnicity of the group of children from our reader category of children who do not read frequently but very much enjoy reading (n=160) it is

apparent that Māori (26%) and Pacific (25%) children are the largest percentage of this group. Further analysis may help us understand what is preventing these children who very much enjoy reading from reading more frequently.

Gender

In data collection wave 1 parents reported that there were 3,528 boys and 3,319 girls in the study. While mothers were asked to report again on gender at age 8 with the options of male and female, the children were also asked to choose 1 of 6 different options for their own self-identification of gender, that is, how they perceive themselves. The *GUINZ Now we are 8* report indicates this question arises because children between age five to seven are believed to have a stable concept of their own gender identity (Morton, 2020).

Table 17: Children's gender self-identity at age 8 and parent-reported identity at birth

Gender identity	Freq at birth	Freq
Boy	2,525	1,879
Mostly a boy		503
Somewhere in the middle		682
Mostly a girl		563
Girl	2,410	1,184
Don't know		124
Total	4,935	4,935

Many studies report that girls are more likely than boys to read for pleasure or have higher literacy achievement (Harrison, 2012; Smith et al., 2012; Medina & McGregor, 2019). Consequently, many policy debates about reading focus on what can be done to improve boys' reading. We have chosen to focus on the children's self-identification to see if these distinctions offer further insight on children's gender and reading. In this study male identity follows trends and is associated with lower odds of reading frequently and even lower odds of very much enjoying reading.

Table 18: Self-identifies as a boy or mostly a boy vs reads frequently

Self-identify as boy	Reads frequently	
	FALSE	TRUE
FALSE	498 (21.8%)	1,792 (78.3%)
TRUE	659 (31.4%)	1,442 (68.6%)

We have examined self-identified gender in relation to reading enjoyment in more detail to see if any insights from the different categories of gender might

be illuminating. While identification with the *boy* category has, as expected, lower odds for reading enjoyment, the highest odds are associated with less determinative or non-binary gender categories.

Table 19: Self-identified gender associations with reading enjoyment

Self-identified gender vs reading enjoyment	OR	Upper CI	Lower CI
Boy	0.56	0.49	0.64
Mostly boy	0.96	0.79	1.18
Somewhere in the middle	1.52	1.28	1.82
Mostly girl	1.52	1.26	1.84
Girl	1.26	1.09	1.45

Socio-economic situation

Household income

In data collection wave 8, mothers were asked: *In the last 12 months what was your household's total income, before tax or anything else was taken out of it? Please include your personal income in this total.*

Table 20: Household income at age 8

Household income	Freq
\$1 - \$20,000	168
\$20,001 - \$30,000	131
\$30,001 - \$50,000	359
\$50,001 - \$70,000	474
\$70,001 - \$100,000	751
\$100,001 - \$150,000	981
\$151,000 or more	1,190
Prefer not to say	286
Don't know	293
Not applicable	21

Attrition in the study means that the results are skewed towards a higher income (as discussed in the methodology), yet the difference appears small since the New Zealand median household for income to June 2019 (towards the end of when the data were collected in 2017-2019) falls in the same income bracket as the GUINZ median (Stats NZ Tatauranga Aotearoa, 2019). The odds of children whose household income is over \$100,000 a year and identify as frequent readers is 1.88 (95% CI (1.63, 2.16)). Children who are from lower income households are also likely to be frequent readers, but the percentage is lower

(67.9% of children from lower income households are frequent readers, compared with 79.9% of children from higher income households). There is also a statistically significant association between higher income and reading enjoyment, that is, children from higher income households have higher odds of very much enjoying reading, but the association is weaker (OR 1.32 95% CI (1.17, 1.49)).

Area-level deprivation

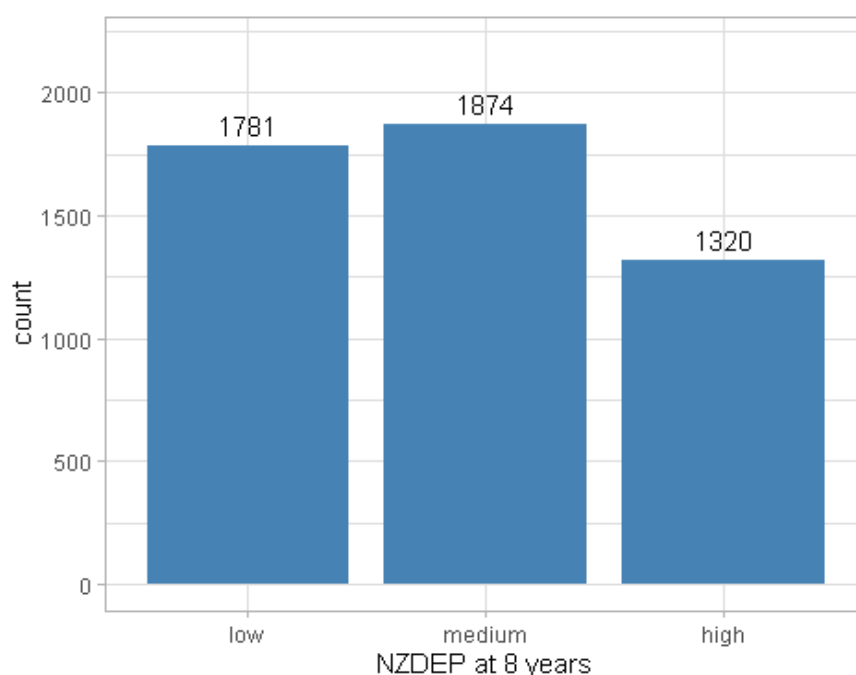
An assessment of area-level deprivation was made using the New Zealand Deprivation Index (NZDep) 2013 edition. Deprivation scores are categorised into deciles, with decile 1 representing the *least* deprived 10% of neighbourhoods and decile 10 the *most* deprived (different from Ministry of Education school deciles). Each participant's current residential address (longitude and latitude) was assigned to a census meshblock to determine the area-level decile as part of the dataset preparation by the GUINZ team. The NZDep scores are available in the external dataset.

Table 21: Frequency of NZ Deprivation Indices

NZ Deprivation Index	Freq
NZDep=1	591
NZDep=2	648
NZDep=3	542
NZDep=4	515
NZDep=5	493
NZDep=6	452
NZDep=7	414
NZDep=8	394
NZDep=9	410
NZDep=10	516

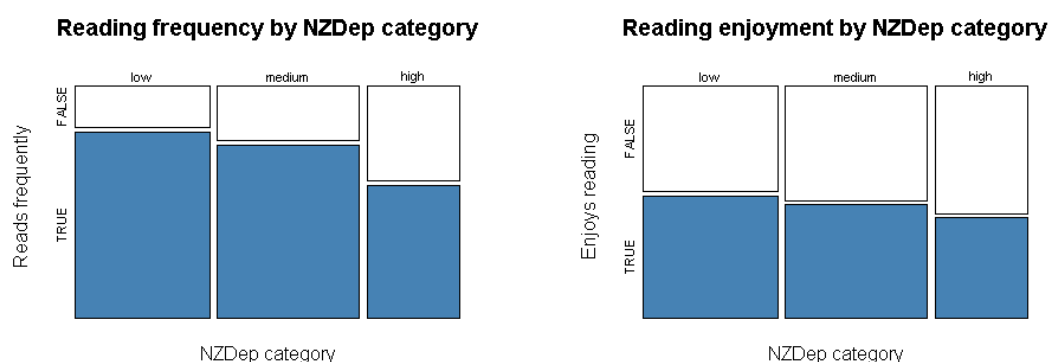
As per the GUINZ *Now We Are 8* report, area-level deprivation can also be categorised into low (deciles 1-3), medium (deciles 4-7) and high (deciles 8-10) deprivation areas.

Figure 18: Readers at age 8 by area-level deprivation in low, medium, and high bands



Looking at the proportion of those who read frequently across the bands it is evident that there is a higher proportion in low deprivation areas, and many more who do not read frequently in areas of high deprivation. An important finding is that this is not the case for reading enjoyment, and that the proportion of children who very much enjoy reading is much more similar across the deprivation categories. Children's self-efficacy, more adults at home and engagement in outside-of-school arts and sports activities may act as protective factors, and this could be examined in future studies. The percentage of children who very much enjoy reading is 53.4% in areas of least deprivation, 49.6% in mid-level areas, and 43.9% in areas of high deprivation.

Figure 19: Proportion of children who enjoy reading and read frequently by areas of deprivation



Discussion

New Zealand children's reading for pleasure

It is heartening to see in these results that most children frequently engage in reading for pleasure, and about half of the children very much enjoy reading. Most children read frequently and enjoy it very much, although there is a substantial group of children who are not enjoying reading as much even though they read frequently, and another group that enjoys reading less and does not read frequently. Enjoying reading means children have higher odds of reading frequently, but there is also a small group of children who very much enjoy reading and do not do it very often.

Apparent from international studies of young people's reading are trends of declining children's reading achievement and enjoyment in New Zealand and overseas, especially as they move into teenage years (May, Flockton & Kirkham, 2016; Ministry of Education, 2017a; Medina & McGregor, 2019). Our investigations of these phenomena are nascent. We report here on children's reading before they reach adolescence, but we hope to continue this work and follow the progress of the cohort. In this study we have already uncovered some predictors that offer compelling explanations for children's reading frequency and enjoyment of reading at age 8 that may help explain these later declines.

Active dispositions for reading

Many children enjoy reading. Children who very much enjoy reading come from different cultures, live in different home environments, and have different interests. While reading is associated with some expected characteristics, like children who prefer quiet play or have fewer siblings at home to play with, the results also challenge some stereotypes of readers. Our findings suggest those who read frequently and enjoy it very much are not always quiet, and that reading is also associated with being busy and active. This finding is congruent with Milne, Harrington & Boyask (2022) who contend that reading is indeed an active pursuit. Though reading for pleasure in reading research is commonly associated with being a girl, we found that at age 8 having a gender somewhere in the middle was more strongly associated with enjoying reading.

Most children enjoy school, but children who read frequently feel good about the work they do there more than others. Children who very much enjoy reading are especially confident in their abilities at school. The parents of readers are proud of their children's interest in learning and satisfied with the progress that they are making at school.

Children who read frequently are also involved in extracurricular activities outside of the home. Frequent readers have higher odds of attending organised clubs or lessons related to their interests in the arts (music, performance,

drama, dance) or sports (individual sports or team sports). The odds are also higher that they used the library regularly when they were younger.

Greater enjoyment from reading is also related to some activities outside the home, including arts activities, library use and individual sports. Children also have marginally higher odds of very much enjoying reading if they also very much enjoy exercise. The positive association between enjoying exercise and reading gives us reason to think the relationships between children's participation in sports and arts activity and higher odds of reading frequency and enjoyment may be part of a general trend for readers to be active and engaged rather than just an outcome of their socio-economic advantage, but this needs further investigation.

Children who do not read frequently may still be active, but they have higher odds of being active in free play rather than organised, interest-based activities. There are some associations with passivity among children who do not very much enjoy reading, for example they have higher odds of having a tablet and spend more time passively consuming media through devices. If we accept that children now have greater access to tablets and other devices then it seems important to find ways to mitigate the negative consequences for reading from passive device use and make the experience more active, such as Danaei et al.'s (2020) study that found reading comprehension could be enhanced with an augmented reality version of a book.

Environments to support reading

The most significant environmental factors in our study in respect of reading frequency are financial. The association between economic position and enjoyment is not very strong, suggesting it does not predict who *enjoys* reading.

The odds of children reading frequently are higher if they live in higher income households (OR 1.88, 95% CI (1.63, 2.16)) and considerably higher in less deprived areas (OR 4.39, 95% CI (3.88, 4.99)) and much lower in areas of high deprivation. Children who live in an environment of high deprivation have a 68% decrease in the odds of reading frequently. Poverty may even be preventing children who enjoy reading very much from doing it more frequently.

Understanding more about the group of children who very much enjoy reading yet do not read often may help us understand whether poverty or other factors are preventing children from reading. Further work exploring the characteristics of this group and examining their reading in combination with other environmental factors that enhance reading frequency may show what might help mitigate the challenges to reading of low income or deprivation, and build children in poverty's reading frequency. This work may also be beneficial for the group of readers who do not read frequently and do not very much enjoy it, as well as finding for them ways to increase enjoyment of reading.

Some home context predictors that may enhance both children's frequency and enjoyment of reading are time spent being read to in early years and being encouraged to read as they get older. While greater reading frequency is associated with two or more adults at home, the picture is more complex for reading enjoyment. Having two adults at home is associated with greater enjoyment of reading, with no association for single adult households and odds 22% lower when there are more than two adults at home. More than two siblings in a household is also associated with lower odds of very much enjoying reading, and lower odds of reading frequently. Presently the work of reading to children seems to be falling mainly to mothers. Are mother/child relations especially important to enjoyment of reading? How might more adults or children in a household be a resource to draw upon, to support children's enjoyment of reading?

The GUiNZ study focuses on parent child relationships. Within these relations parents have emerged as a very important predictor of children's reading. Children who have parents proud of progress and interest in learning have between 1.5 and 3.5 higher odds of reading frequently or enjoying it. Children who have parents proud of sporting or performing/visual arts activities have 81% lower odds of reading enjoyment. Since children's involvement in sporting and arts activities is a predictor of more reading, it may be beneficial for parents to consider what messages about reading they are sending their children.

Access to lots of books in the home increases the frequency odds of children reading, and their enjoyment of reading. Library use, which also facilitates access to books, is another predictor of both greater enjoyment and frequency, indicating the value of libraries especially in high deprivation areas.

Limitations and future directions

Limitations of the study

Research on school aged children's reading outside of school is very rare in New Zealand. This study is an important contribution, but in many ways scratches only the surface of what is useful to know about children's reading. International comparative studies of student achievement tell us some things about reading in New Zealand, such as that enjoyment and achievement is declining. We hope that GUINZ will continue to collect information about children's reading for pleasure as the cohort progress in years so that we can refine our understandings about their experiences and effects. In future data collection waves, a more refined list of responses to the question on frequency of children's reading for pleasure may elicit useful information. The more than once per week option generated a very high response. We expect there could be considerable variation and recommend dividing the category.

While the GUINZ dataset is a rich resource for understanding children's experiences, it contains limited information on children's educational experiences and interactions with people other than their parents. These are potential areas for future research and investigation. We also see value in revisiting questions about reading and looking at them through a lens of a mana-enhancing ngākau perspective (Derby & Macfarlane, 2020). Some questions may elicit more information if reframed, for example broadening questions on who the children are reading with to include the various others who might be interacting with the children and influencing their reading.

The GUINZ study is the largest longitudinal study of children in Aotearoa and this large sample size allows unprecedented insights into children's worlds. However, it is a potential drawback from a statistical perspective, because both sample size and effect size (i.e. the true size of the effect of the predictor on the outcome variable) determine statistical measures of significance, including p-values and confidence intervals. In a dataset with a sample size this large, there is a risk that it can produce overwhelmingly strong statistical significances, while the actual effect sizes may be negligible or too small for real-world relevance. Further, the exploratory statistical analysis undertaken in this project involved statistical analysis of a large number of pre-specified predictor variables in relation to our reading outcome variables. Due to the large number of statistical tests undertaken, when conventional cutoffs for statistical significance are used, some of the significant results could easily be accounted for by chance, rather than provide evidence of a true relationship. For these reasons, we have adopted a language of evidence (Muff et al., 2022), while letting the data speak for themselves with widespread use of descriptive statistics. However, we include the p-values in the Appendix (Tables 23, 24, 25, 26) so that our evidence

approach can be examined in the light of the conventional language of statistical significance.

As a preliminary exploration of the socio-material conditions of children's reading, we have focused on a bivariate statistical approach, i.e. focusing on one predictor variable at a time in combination with each of the reading outcome variables. A limitation of this approach is that it is not able to shed light on possible confounders. This limitation could be overcome to a certain degree with multivariate analyses, allowing a more nuanced understanding of whether apparent associations may be driven by other variables. Multivariate analyses were beyond the scope of the current project but are a promising direction for future research on children's reading for pleasure. This would for example, enable us to examine our current findings on active dispositions for reading and adjust for household income or attrition in the cohort. We could also examine the smaller groups of children within the various response categories of reading frequency and enjoyment to compare their experiences and test the robustness of our current findings. It is also possible there are other (possibly unmeasured) variables that influence the outcome or predictor variables, since the variables examined are only the most plausible explanations (Biesta, Allan & Edwards, 2011).

Future directions

Reading for pleasure is an activity of confident, able, active New Zealand children many of whom have interests outside of school and home and take part in organised arts and/or sports activities; reading for pleasure is part of a well-balanced, active, and good life.

Children's involvement in sports and visual or performing arts activity is a predictor of more reading, yet children whose parents who are most proud of their achievements in these areas have some of the lowest odds of enjoying reading.

- What messages are these children receiving from their parents about reading?
- And is reading less sustainable in their future lives as a result?

Recognising reading for pleasure as an important element of a well-balanced and active life is an important finding for literacy curriculum policy.

Reading for pleasure is mentioned in the New Zealand Curriculum (TKI, 2014), Te Whāriki (Ministry of Education, 2017b), and the Literacy & Communication and Maths Strategy (2022) but it plays a very marginal role compared with other priorities for reading such as the development of literacy skills, acquiring information, increasing self-belief, or improving educational performance.

If we accept that children will spend more time on devices, we need to find ways to mitigate the negative consequences for reading from passive device use and make the experience more active.

Many children very much enjoy reading, but children who live in low-income households or areas of high deprivation have higher odds of not reading frequently.

All children deserve to benefit from reading for pleasure, yet our results indicate there are some who benefit more than others.

Further research may help explain why some children are reading infrequently, especially children who very much enjoy reading.

Are there other factors we are yet to examine that may predict frequency of reading such as children's health and wellbeing or sense of belonging?

While reading frequency increases when there are more adults in the household, more siblings in a house decreases the odds of reading frequently and larger households are generally associated with less enjoyment of reading.

- More adults in a household are a resource to draw upon, especially if they can find ways to encourage more enjoyment as well as increased frequency of reading.

Families who cannot afford to buy books need alternative ways to access reading materials, such as book exchange, cheaper or second-hand book suppliers, e-books and borrowing from public and school libraries.

- Libraries may be especially valuable for high deprivation areas given the range of materials to which they provide access.

Recommendations

- Use the new literacy strategy to strengthen the visibility in curriculum and school culture of enjoyment in reading and its role in creating active, confident, and able children.
- Help children in school and at home find time for reading by encouraging regulation of time spent passively consuming media on tablets or other devices.
- Support children who live in areas of high deprivation to access high quality and child-appropriate reading materials, through public and school libraries.
- Develop public and community campaigns for reading that highlight its relationship with an active, well-balanced and good life, including:
 - profiling individuals who embody relationships between sport or performing/visual arts and reading,
 - communities reading together to support reading enjoyment.
- Continued and further refinement of data gathering from the GUiNZ cohort on factors related to reading for pleasure by finding out more about reading frequency for children reading more than once a week and asking more refined questions about 'reading together'.
- Fund further research on New Zealand children's reading, especially:

- why some children do not read frequently, particularly when they also very much enjoy reading,
- topics identified through community consultation that may help us understand differences in the associations between frequency of reading and ethnicity, economic situation, or gender, including from a te ao Māori perspective,
- mitigating the effects of passive device use on children's reading,
- relationships between reading outside of school and reading at school.

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Appendix

Table 22: Prioritised potential factors of influence on children’s reading from prior research and aligned with GUiNZ data descriptions.

Prioritised potential factors of influence (derived from prior research)	GUiNZ question	GUiNZ data collection wave and respondent
<i>Home and whānau experiences</i>		
Parental education	What is your highest completed qualification?	Antenatal mother and partner
Significant others	How many siblings does {name} have? <i>and</i> How many of these siblings live in the same house as {name} for at least half the week?	5 year child proxy by mother
Being read to in early years	How many other adults ages 21 and over, including you, are living in your house	8 year mother
	How often during the last week did the baby enjoy being read to?	9 month child proxy by mother
	How often do you read books with {name}?	1, 2, 5, 8 year child proxy by mother and 1,2 by partner
	Approximately how many children's books are in your home right now? Counting both books you own and books from the library.	1 year mother and partner
	Approximately how many other books are in your home right now? Counting both books you own and books from the library.	1 year mother and partner
Involvement in other activities – at home	How often do you encourage {name} to read words?	5 year child proxy by mother
	How often do you read to {NAME} about ethnicity or culture?	5 year child proxy by mother
	Over the past 12 months, thinking about a normal week, how often has {NAME} participated in the following extracurricular activities?	8 year child proxy by mother
	<ul style="list-style-type: none"> Active play (e.g. running around playing informal games, bike riding) 	

Use of visual media and digital technologies (including social media usage)

<ul style="list-style-type: none"> • Quiet/inactive play (e.g. Lego, board game, drawing) • Homework • Household chores 	
In general, how much does {NAME} enjoy physical activity or exercise?	8 year child proxy by mother
<p>What does {NAME} usually do when {HE/SHE} has a choice about how to spend free time?</p> <ul style="list-style-type: none"> • Usually chooses inactive things to do, like TV, computer, drawing or reading • Usually chooses active things to do, like bike riding, dancing or sports • Just as likely to choose active as inactive things to do • Don't know • Prefer not to say 	8 year child proxy by mother
<p>Thinking about how many opportunities {NAME} has for free or unstructured play during a typical week I think {NAME}:</p> <ul style="list-style-type: none"> • Has too much time for free or unstructured play • Has the right amount of time for free or unstructured play • Does not have enough time for free or unstructured play • Don't know • Prefer not to say 	8 year child proxy by mother
<p>Do you have your own personal device? Yes/No</p> <ol style="list-style-type: none"> 1. No device 2. A tablet (e.g. an iPad) 3. A desktop computer or laptop 4. A TV 5. A smart phone (e.g. an iPhone or a Samsung Galaxy) 6. A gaming console (e.g. Xbox, PSP, or Playstation) 7. An iPod, iPod touch, or MP3 player 8. A Kindle or other eReader 	8 year child

9. A smart watch	
10. A virtual reality headset	
11. Camera - also includes digital and Go Pro	
Thinking about a usual weekday, approximately how many hours does {NAME} spend...	8 year child proxy by mother
Thinking about a usual weekend day, approximately how many hours does {NAME} spend...	
<ul style="list-style-type: none"> Watching television programming including free-to-air, online, and pay TV or DVDs either on TV or other screen-based devices? <i>Note: please include all programming, including video recordings such as YouTube.</i> (Referred to as passive screentime) With the TV on in the same room as {NAME}, whether or not {HE/SHE} is watching it? (Referred to as background screentime) Doing activities or tasks, e.g. homework, playing games, or sending messages, on any screen-based device including computers, laptops, tablets, smart phones or gaming devices? (Referred to as active screentime) 	

Outside-of-home experiences

Early childhood education	How satisfied are you with the effect that this early childhood education or care arrangement has had on your {child/children} - pre-reading/reading skills?	5 year mother
Library use	In the past month, has your Growing Up in New Zealand study child/children done any of these things with you or another family member? Visited a library	6 year mother
Schooling	How satisfied are you with the way in which {NAME} is progressing in their learning?	8 year child proxy by mother
	In terms of {NAME}'s learning at school, what are you most proud of?	8 year child proxy by mother
Alignment between school and home	Overall, how satisfied are you with the way {NAME}'s teacher communicates with you about {NAME}'s learning and their progress at school?	8 year child proxy by mother

Children's feelings about school

How often are the following statements true for you?	8 year child
<ul style="list-style-type: none"> • I look forward to school • I like school • School is interesting • I wish I didn't have school • There are many things about school that I like • I enjoy school activities 	
<p>This question is about two kinds of children and we want to know which one is more like you.</p> <ul style="list-style-type: none"> • Some kids feel that they are very good at their school work BUT Other kids worry about whether they can do the school work assigned to them • Some kids are pretty slow in finishing their school work BUT Other kids can do their school work quickly • Some kids do very well at their classwork BUT Other kids don't do very well at their classwork • Some kids have trouble figuring out the answers in school BUT Other kids almost always can figure out the answers 	8 year child

Involvement in other activities – outside the home

Over the past 12 months, thinking about a normal week, how often has {NAME} participated in the following extracurricular activities?	8 year child proxy by mother
<ul style="list-style-type: none"> • Community group or club (e.g. Cubs, Brownies or cultural group) • Organised team sport (e.g. football, cricket, netball, cheerleading – includes practice and games) • Organised individual sport (e.g. athletics, swimming, surf lifesaving, tennis, gymnastics, horse riding – includes practice and games) • Art, music, or dance, lessons, practice and performances (e.g. piano, dance, choir, drama, kapa haka) • Academic lessons (reading, maths, second language etc.) • Religious services or classes • Before school care • After school care 	

Societal positioning of children

Gender identity	Thinking about who you are, do you see yourself as a boy, a girl, or somewhere in between? (Choose one only)	8 year child
Ethnicity	Prioritised self-reported ethnicity	8 year child
Household income	In the last 12 months what was your household's total income, before tax or anything else was taken out of it?	8 year mother
	New Zealand Deprivation Index (NZDep) 2013 edition	8 year mother

Table 23: Summary of odd ratios for home and whānau experiences in association with reading frequency

Predictors	Frequency Odds ratio	Frequency Lower conf int	Frequency Upper conf int	Frequency p-value
Quiet/inactive play more than once per week	5.12	4.43	5.92	8.52e-113
Has an eReader	3.57	1.54	10.14	9.29e-04
Play time: Not enough play time	2.88	2.11	3.94	2.96e-11
Play time: Right amount of play time	2.86	2.26	3.61	1.34e-18
Free time preference: Usually chooses inactive things	2.53	2.3	2.79	3.27e-77
51+ other books in the home at 9m	2.29	2	2.62	1.84e-34
Homework more than once per week	2.24	1.94	2.58	1.02e-28
Mother has diploma or higher at birth	2.13	1.85	2.46	2.22e-25
Active play more than once per week	2.13	1.85	2.46	4.06e-25
Household chores more than once per week	1.92	1.66	2.21	1.31e-19

Adults at home: More adults	1.82	1.55	2.14	2.11e-13
Enjoys being read to more than half the time at 9m	1.8	1.57	2.06	6.11e-18
Adults at home: Two adults	1.73	1.45	2.07	1.52e-09
21+ children's books in the home at 9m	1.67	1.46	1.92	9.19e-14
Partner has diploma or higher at birth	1.65	1.38	1.99	5.97e-08
Reads words more than once a week at 5y	1.47	1.28	1.68	2.00e-08
Free time preference: Equally likely	1.47	1.26	1.71	5.41e-07
Is read to about ethnicity at least sometimes at 5y	1.18	1.01	1.37	3.13e-02
Play time: Too much play time	1.13	0.9	1.41	2.85e-01
Adults at home: Single adult	1.12	0.86	1.46	4.18e-01
Free time preference: Usually chooses active things	0.9	0.76	1.07	2.38e-01
Has a tablet	0.83	0.72	0.95	6.75e-03
Play time: Don't know	0.8	0.56	1.16	2.40e-01
Has 2 or more siblings at home	0.66	0.57	0.76	9.40e-09
Play time: Prefer not to say	0.63	0.31	1.27	2.00e-01
Greater screentime	0.48	0.4	0.56	8.46e-20
Free time preference: Don't Know	0.22	0.12	0.39	2.05e-07

Free time preference:	0.17	0.07	0.41	1.18e-04
Prefer not to say				

Table 24: Summary of odd ratios for home and whānau experiences in association with reading enjoyment

Predictors	Enjoyment Odds ratio	Enjoyment Lower conf int	Enjoyment Upper conf int	Enjoyment p-value
Quiet/inactive play more than once per week	2.07	1.8	2.38	2.01e-26
Has an eReader	1.99	1.16	3.5	8.49e-03
Play time: Right amount of play time	1.92	1.51	2.44	1.04e-07
Play time: Not enough play time	1.69	1.25	2.27	5.60e-04
Reads words more than once a week at 5y	1.66	1.47	1.88	1.12e-16
Play time: Prefer not to say	1.62	0.8	3.25	1.72e-01
Is read to about ethnicity at least sometimes at 5y	1.55	1.36	1.77	3.42e-11
Enjoys being read to more than half the time at 9m	1.53	1.36	1.73	2.94e-12
51+ other books in the home at 9m	1.51	1.34	1.7	6.48e-12
Mother has diploma or higher at birth	1.46	1.28	1.68	1.48e-08
Homework more than once per week	1.45	1.27	1.66	3.11e-08
Partner has diploma or higher at birth	1.38	1.17	1.62	8.10e-05
Adults at home: Two adults	1.35	1.14	1.6	4.60e-04

Free time preference: Equally likely	1.3	1.14	1.48	7.49e-05
Play time: Don't Know	1.27	0.87	1.84	2.09e-01
Household chores more than once per week	1.23	1.08	1.4	1.62e-03
Free time preference: Don't Know	1.12	0.65	1.94	6.88e-01
21+ children's books in the home at 9m	1.11	0.98	1.26	9.51e-02
Active play more than once per week	1.06	0.92	1.21	4.19e-01
Adults at home: Single adult	0.98	0.76	1.27	9.05e-01
Free time preference: Usually chooses inactive things	0.93	0.85	1.01	1.01e-01
Free time preference: Usually chooses active things	0.81	0.69	0.95	8.71e-03
Has 2 or more siblings at home	0.8	0.7	0.91	4.91e-04
Has a tablet	0.78	0.69	0.88	4.70e-05
Adults at home: More adults	0.78	0.67	0.91	1.62e-03
Free time preference: Prefer not to say	0.69	0.29	1.59	3.92e-01
Greater screentime	0.55	0.48	0.63	4.38e-19
Play time: Too much play time	0.55	0.44	0.69	4.36e-07

Table 25: Summary of odd ratios for outside-of-home experiences in association with reading frequency

Predictors	Frequency Odds ratio	Frequency Lower conf int	Frequency Upper conf int	Frequency p-value
Parental pride in: Interest in learning	3.51	3.15	3.91	1.19e-115
Parents very satisfied with learning progress at 8y	2.07	1.81	2.37	4.42e-26
Organised individual sport once per week or more	1.96	1.72	2.24	2.80e-24
Art, music, dance once per week or more	1.94	1.69	2.22	5.93e-23
Visits library weekly at 6y	1.6	1.37	1.87	8.67e-10
Organised team sport once per week or more	1.57	1.37	1.8	2.10e-11
Feels good at school work	1.51	1.3	1.75	3.10e-08
Does well at class work	1.51	1.3	1.75	3.10e-08
Community group or club once per week or more	1.4	1.2	1.63	1.12e-05
Parents satisfied with ECE reading at 5y	1.27	1.11	1.46	3.50e-04
Parents very satisfied with teacher communication	1.21	1.05	1.39	6.21e-03
Finds answers easily	1.19	1.03	1.37	1.44e-02
Almost always enjoys school	1.17	1.02	1.34	2.59e-02
Feels quick at school work	1.15	1	1.32	5.09e-02

Parental pride in: Academic abilities	1.12	0.87	1.45	3.78e-01
Academic lessons once per week or more	0.96	0.81	1.13	6.18e-01
Religious activity once per week or more	0.96	0.82	1.12	5.93e-01
After school care once per week or more	0.94	0.81	1.1	4.50e-01
Parental pride in: Enthusiasm for school	0.93	0.77	1.12	4.35e-01
Before school care once per week or more	0.87	0.71	1.08	2.03e-01
Parental pride in: More than one	0.78	0.27	2.84	6.78e-01
Parental pride in: Creativity/artistic ability/cultural activities	0.74	0.28	2.32	5.71e-01
Parental pride in: Music abilities	0.66	0.27	1.89	4.06e-01
Parental pride in: Confidence	0.57	0.45	0.72	1.80e-06
Parental pride in: Diligence/hard working	0.57	0.18	2.14	3.60e-01
Parental pride in: Behaviour	0.56	0.43	0.73	1.40e-05
Parental pride in: Interaction with other children	0.53	0.43	0.66	8.90e-09
Parental pride in: Sporting abilities	0.32	0.23	0.45	2.18e-11
Parental pride in: Other/Don't know	0.28	0.17	0.44	6.64e-08

Table 26: Summary of odd ratios for outside-of-home experiences in association with reading enjoyment

Predictors	Enjoyment Odds ratio	Enjoyment Lower conf int	Enjoyment Upper conf int	Enjoyment p-value
Parents very satisfied with learning progress at 8y	2.97	2.6	3.38	4.29e-64
Does well at class work	1.76	1.48	2.09	3.74e-11
Art, music, dance once per week or more	1.65	1.47	1.86	1.10e-17
Feels good at school work	1.63	1.43	1.87	4.56e-13
Parental pride in: Interest in learning	1.52	1.39	1.67	2.03e-19
Parents satisfied with ECE reading at 5y	1.42	1.26	1.6	4.88e-09
Finds answers easily	1.39	1.23	1.58	1.27e-07
Organised individual sport once per week or more	1.36	1.21	1.53	1.78e-07
Visits library weekly at 6y	1.35	1.19	1.54	3.60e-06
Parents very satisfied with teacher communication	1.33	1.18	1.5	3.30e-06
Feels quick at school work	1.27	1.13	1.44	8.39e-05
Almost always enjoys school	1.16	1.03	1.31	1.53e-02
Community group or club once per week or more	1.13	0.99	1.28	7.28e-02

Religious activity once per week or more	1.1	0.96	1.26	1.77e-01
Organised team sport once per week or more	1.03	0.91	1.16	6.08e-01
Academic lessons once per week or more	0.97	0.83	1.12	6.59e-01
After school care once per week or more	0.96	0.84	1.09	5.25e-01
Before school care once per week or more	0.93	0.77	1.12	4.53e-01
Parental pride in: Academic abilities	0.91	0.74	1.12	3.87e-01
Parental pride in: Enthusiasm for school	0.61	0.52	0.72	2.43e-09
Parental pride in: Diligence/hard working	0.47	0.14	1.48	1.98e-01
Parental pride in: Confidence	0.44	0.35	0.55	3.54e-13
Parental pride in: Interaction with other children	0.36	0.29	0.44	1.83e-22
Parental pride in: Music abilities	0.35	0.13	0.87	2.74e-02
Parental pride in: Behaviour	0.3	0.23	0.38	7.84e-20
Parental pride in: Other/Don't know	0.26	0.15	0.42	1.78e-07
Parental pride in: More than one	0.24	0.07	0.7	1.45e-02
Parental pride in: Sporting abilities	0.19	0.13	0.28	4.45e-17

Parental pride in: Creativity/artistic ability/cultural activities	0.19	0.05	0.53	3.27e-03
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