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When parental aspirations aren't enough: An exploration of the importance of parental aspirations in the socioeconomic gradient in child outcomes

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Disclaimer

This report uses Growing Up in New Zealand (GUiNZ) data collected by the University of Auckland. The data have been accessed and used in accordance with the GUiNZ Data Access Protocol. The views and interpretations in this report are those of the researchers and are not the official position of Manatū Wāhine Ministry for Women or Te Manatū Whakahiato Ora, the Ministry of Social Development (MSD).

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Abstract

We use data from the Growing Up in New Zealand (GUiNZ) longitudinal study on child development, which follows a cohort of children from before they were born in 2009/2010, to investigate the importance of parents' aspirations for their children in the positive correlations between parents' socioeconomic status and children's pre-school educational and socioemotional outcomes.

We first show that GUiNZ data exhibit a strong positive correlation between mothers' education and children's pre-literacy skills, early numeracy skills, and socioemotional outcomes measured at age four-and-a-half. We then investigate the extent to which differences in mothers' aspirations explain the relationship between mothers' SES and children's outcomes. Next, we examine the extent to which parents' financial resources, other time commitments, and involvement with their children's education explain the relationship between mothers' SES and child outcomes. Finally, we examine how these associations differ for mothers of different ethnic backgrounds.

We find that, although some parental aspirations differ with socioeconomic status (SES), these differing aspirations play at most a minor role in the socioeconomic gradient of children's educational and socioemotional outcomes at the pre-school age.

In contrast, parental involvement is a consistent predictor of early literacy and numeracy skills.

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Introduction

It is often stated that the most important determinant of a child's future is the parents to whom they are born; children from low socioeconomic backgrounds are more likely to experience poorer economic outcomes throughout their adult lives, and these tend to be coupled with worse socioemotional, cognitive, and health outcomes (Bradley & Corwyn, 2002). Children who experience volatile income, poverty, or adverse experiences linked to poverty tend to have poor socioemotional outcomes as children (Evans & Kim, 2013; McLoyd, 1997; Zhang & Han, 2020) and low education, employment, and income as adults (Metzler et al., 2017).

In this report we investigate the role of parents' aspirations for their children in this association. We find that, although some parental aspirations measured when their children are infants differ with socioeconomic status (SES), these differing aspirations play at most a minor role in the socioeconomic gradient of children's educational and socioemotional outcomes at the pre-school age. This finding supports the research suggesting that structural factors, such as socioeconomic status, play a larger role in children's developmental trajectories, and that systematic differences in parental aspirations is likely not a mechanism explaining these inequities.

We use data from the Growing Up in New Zealand (GUiNZ) longitudinal study on child development, which follows a cohort of children from before they were born in 2009/2010, and plans to continue until their adulthood. We first show these data exhibit the expected strong correlation between mothers' education and children's pre-literacy skills, early numeracy skills, and socioemotional outcomes measured at age four-and-a-half.

In the survey wave when children are 9 months old, mothers are asked the importance of a range of characteristics, e.g., ambition, for the development of their children. We find the importance mothers place on some[1] aspirations varies by SES. We then investigate the extent to which these differences in aspirations relate to differences in the relationship between mothers' SES and children's outcomes.

In addition to parental aspirations, we also consider the extent to which parents' involvement with their children's education, demands on the parents' time, and the families' financial situation coincide with differences in the relationship between mothers' SES and children's outcomes.

We find most aspirations are insignificantly correlated with the early child outcomes considered, and aspirations jointly account for very little of the socioeconomic gradient in children's outcomes. In particular, the importance a mother places on her child being ambitious and the importance she places on them taking on challenges, which might be expected to affect the emphasis placed on education, are minimally and insignificantly correlated with all outcomes even in regressions with few other controls. Aspirational values are most strongly related to socioemotional outcomes, though even here they have little explanatory power.

In contrast, parental involvement that is not accounted for by differences in aspirations is a consistent predictor of early literacy and numeracy skills. Specifically, parents encouraging their children in a range of learning activities is associated with improvements in children's pre-literacy and early numeracy skills, and parents reading to their children regularly is associated with improvements in their pre-literacy skills and socioemotional outcomes.

Our experimental design does not take advantage of any natural experiment or exogenous variation in our independent variables that would allow us to identify causal effects. Nor do we undertake formal mediation analysis. Instead, we opt for a descriptive approach that provides early evidence of the likely low importance of parental aspirations for their children in socioeconomic differences in child outcomes.

Literature

The socioeconomic status of parents is well known to strongly predict the outcomes of their children (Bradley & Corwyn, 2002; Davis-Kean, 2005; Eccles, 2005; Sirin, 2005). However, many children do attain higher socioeconomic status than their parents, and the seeds of this upward mobility are likely sown in childhood. Regardless of socioeconomic background, children with greater literacy and numeracy when they enter school

[1] SES predicts differences in four of the ten parental aspiration variables we investigate.

have a head start on their peers (Duncan et al., 2007), and this advantage tends to translate into greater educational success and higher SES as adults (Sylva, 2014). Children with strong socioemotional outcomes also tend to do better as adults (Bohlin & Hagekull, 2009).

Policy and academia have long been interested in the levers that can be used to improve the outcomes of children from low SES backgrounds, and parental aspirations are one area upon which they have focused (Chowdry et al., 2011; Gore et al., 2015; Lupton & Kintrea, 2011; St Clair & Benjamin, 2011). A broad literature, particularly focused in the UK, has investigated how parental aspirations for their children's education vary with parental characteristics, the determinants of children's own educational aspirations, and how children's aspirations translate into realised outcomes (Gorard, 2012; Gutman & Akerman, 2008).

Parental aspirations are more likely to be high among more educated parents (Spera et al., 2009). In general, higher parental aspirations translate into better outcomes, but this is less the case for children from low socioeconomic backgrounds and some minority ethnic groups (Chiapa et al., 2012; Gutman & Akerman, 2008; Marjoribanks, 2005). The age at which a mother gives birth is also related to the formation of aspirations for their child; Sosu (2014) finds that older mothers tend to set higher educational aspirations for their children.

As well as a possible direct effect, parental aspirations could affect children's outcomes through various parental actions and behaviours. Parents' involvement in their children's education (henceforth, 'parental involvement') is one such possible mechanism; it has been shown to be positively associated with greater educational attainment for children (Desforges & Abouchaar, 2003; Gubbins & Otero, 2016). Parental involvement takes many forms, from home-based discussion, stimulation, working closely with the child's education provider (*e.g.,* kindergarten or school), volunteering with their provider or getting involved in its governance. Parents from low socioeconomic backgrounds, particularly mothers with low education, tend to be less involved with their children's education (Desforges & Abouchaar, 2003).

Parents from low socioeconomic backgrounds are also exposed to a range of other factors that can impede effective parenting practices and lead to poorer child outcomes. For instance, parents being preoccupied with financial worries can reduce mental resources available for other tasks (Mani et al., 2013). Literature also suggests that low SES is associated with larger families, with family resources stretched across more children (Lebowitz, 1974; Hanushek, 1992; Rosenzweig & Wolpin, 1980; Li et al, 2008; Ponczek and Souza, 2012; Lee, 2008; Kugler & Kumar, 2017; Caceres-Delpiano, 2006; Conley & Glauber, 2006, as cited in Guo et al., 2022).

Parents with few work opportunities may also be more exposed to irregular (evening, night, or weekend) work. Parents working these irregular work schedules have reported poorer family functioning, more depressive symptoms, and less effective parenting (Strazdins et al., 2006), and these work schedules have been associated with poorer child cognitive development and expressive language at 2 and 3 years old respectively (Han, 2005). Strazdins *et al.* (2006) find that non-standard work schedules are more common for low-SES parents and the detrimental association of irregular work hours with child outcomes is stronger for parents of low-SES families. However, other literature suggests that in terms of time spent on developmentally-rich activities, mothers being engaged in full-time work seems to matter little (Prickett & Augustine, 2021). We test this idea in the New Zealand context.

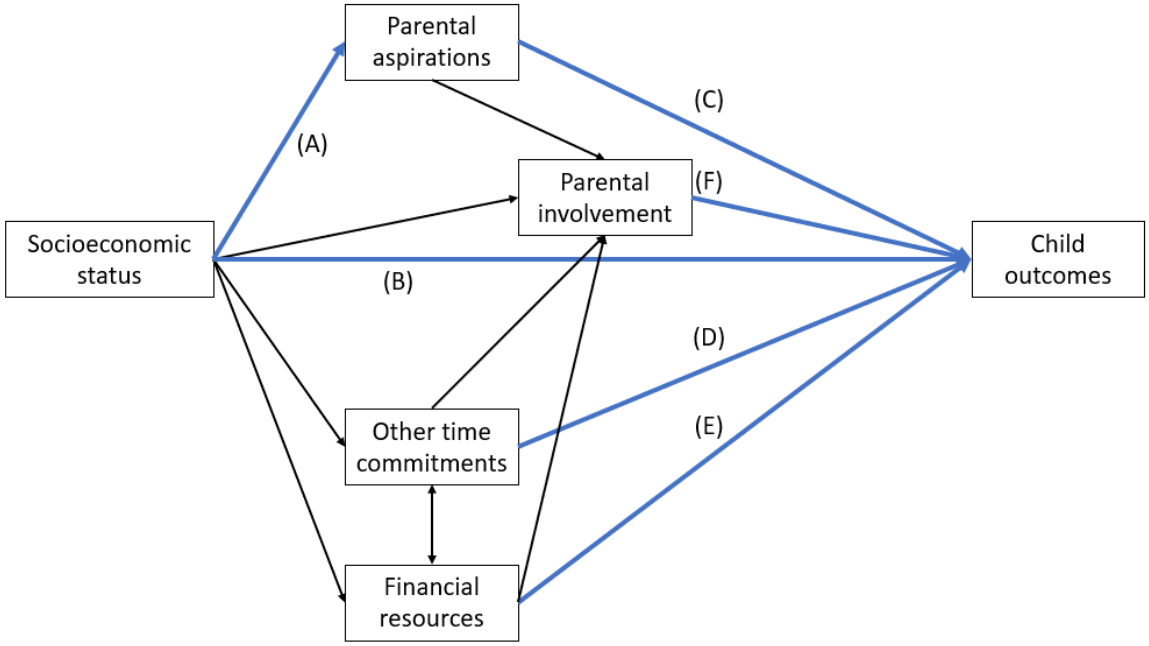
New Zealand research on parental aspirations is scarce. Chung *et al.* (1997) find NZ-born Chinese students have higher educational aspirations than European students, consistent with higher parental expectations. Reese *et al.* (2016) use GUiNZ data to explore how parents' hopes, dreams, and expectations for their unborn children differ with parental background. They find differences with parental ethnicity and education, but less with socioeconomic status measured at the area level using the New Zealand Deprivation Index. However, they do not investigate how parental aspirations are associated with children's outcomes. Walkey *et al.* (2013) find NZ students with high aspirations for completing high school qualifications are more likely to successfully complete them.

Our research complements existing literature by exploring the relationship in New Zealand between parental background, parental aspirations for their children, and early indicators for children's cognitive and socioemotional outcomes. It investigates the potential for parents' aspirational values to improve educational and socioemotional outcomes of children from low socioeconomic backgrounds. Our research also investigates other factors which may promote or impede children's outcomes. In doing so, it suggests levers for improving the long-term outcomes of children from disadvantaged backgrounds.

Conceptual relationship between parental SES and child outcomes

Based on the literature, we formulate a simple conceptual model to capture the relationship between parents' socioeconomic status and their children's outcomes. This model is illustrated in Figure 1.

Figure 1: Conceptual relationship between SES and child outcomes



In our conceptual model, parents' SES can affect children's outcomes via parental aspirations for their children, parents' involvement with their children's education, parents' other time commitments, and parents' financial resources.[2] SES may also affect child outcomes directly or through other mechanisms, both of which we illustrate as a direct pathway from SES to child outcomes. In addition, our model shows parental aspirations, other time commitments, and financial resources can all affect children's outcomes via parental involvement.

In this report, we examine the association between SES and parental aspirations – labelled (A) in Figure 1. We then investigate the associations between SES and our measures of child outcomes, sequentially adding controls intended to capture parental aspirations, other time commitments, financial resources, and parental involvement.

In our analytical approach we do not isolate the causal associations nor test meditational pathways. However, we build our models in ways that provide suggestive evidence of the relative importance of the links labelled (B) through (F).

We do not investigate the determinants of parental involvement. Nor do we investigate the interconnected relationship between SES, other time commitments, and financial resources.

Data

Data set and sample construction

We use data from the Growing Up in New Zealand (GUiNZ) study. This is a longitudinal data set consisting of over 6,000 children born in Auckland, Counties Manukau, and Waikato District Health Board regions between

[2] Here parental SES is conceptually an amalgamation of a range of characteristics including education, earning potential, wealth and so on, so is distinct from financial resources. However, when it comes to measuring these concepts the two may overlap.

March 2009 and May 2010 and their caregivers. It longitudinally follows the children from before their births, collecting new information at increasing intervals, and intends to continue to collect data until the children are at least 21 years old. At the time of writing this report, survey waves up to and including the 8-year wave (when the children were roughly eight years old) were available for analysis. We use linked child-mother level data in our analysis, which includes variables drawn from the antenatal, 9-month, 2-year, 54-month, and 8-year survey waves. Child-mother pairs are retained only where the mother is observed consistently across the survey waves used in our analysis. Partner data is seen much less consistently across the GUiNZ cohort. We do not use partner data, and therefore do not require that partners need to be observed, because this would lead to excessive sample attrition. Of the 6,896 child-mother pairs in the full GUiNZ study, we retain 4,274.

Main variables of interest

This section describes the variables used in our analysis. *Appendix 1* gives descriptive statistics for these variables.

Socioeconomic status

SES is a broad term that may encompass several concepts; we use mother's education as a proxy for it. This is a common practice in studies of SES and is one of the most consistent and important predictors of children's longer-term developmental trajectories, comparable to income or occupation, and often seen more favorably than other structural factors (Bradley & Corwyn, 2002; Hauser, 1994). To test this assertion, we rerun our main results tables using household income in the antenatal wave as our proxy for SES. The results reported in *Appendix 8.1-8.3* show few differences, supporting our use of mother's education as a proxy for SES.

Mothers are asked for their highest level of qualification in the antenatal wave. Although mothers are asked for any further qualifications attained by the 8-year wave, we don't use these updated data because our outcome measures precede this later wave.[3] Mothers' education is categorised into four levels: NCEA level 4 qualification or lower; trade certificate, diploma, or NCEA levels 5-6; bachelor's degree; and higher qualification.

Child outcomes

To measure child outcomes, we construct indicators of pre-literacy skills, early numeracy skills, and socioemotional outcomes from data collected in the 54-month survey wave. Each outcome is a combination of scores, where each measure is standardised by subtracting the mean and then dividing by the standard deviation. This ensures that each score is given equal weight, regardless of the scale of the original component.

This standardisation process is repeated once measures are combined, which enables the regression coefficients to be interpreted in terms of standard deviation changes, and allows us to compare the coefficients of explanatory variables across our models.

Educational / school readiness outcomes

Children are asked in the 54-month wave to complete a 'name and numbers' task.[4] Interviewers ask the children to write their name, whereby a score from 1 to 4 is given for how clearly formed the name is. Children are then prompted to write numbers on a clear page. Children are prompted and encouraged but not instructed to write specific numbers. A score from 1 to 4 is given for how clearly formed the numbers are. The 'name and numbers' task is followed by interviewers asking children to count up from 1 to 10, then count down from 10 to 1, whereby a score from 0 to 10 is given.

Interviewers in the 54-month wave also administer a shortened version of the Peabody Picture Vocabulary Test (PPVT), adapted by Rothman (2010). The PPVT is conducted by the interviewer saying words, to which the child has to select one of four picture cards that best illustrates the word.

[3] Most mothers do not attain additional qualifications in the intervening period.

[4] The 'name and numbers' tasks are a component of the 'Who am I?' developmental assessment – consisting of 11 tasks which ask children to write their name, copy shapes, and write numbers, letters, and words. These are licensed by the Australian Council for Educational Research Ltd. The GUiNZ study only administers the 'name and numbers' component to the main cohort.

The final educational measure we consider is the Dynamic Indicators of Basic Early Literacy Skills subtest of Letter Naming Fluency (DIBELS LNF). Children are assessed on their knowledge of letters, their ability to say the letters, and their naming speed and fluency. Children are presented with a range of letters, and given a score equal to the number of correctly named letters within one minute.

We categorise educational outcomes into 'pre-literacy skills' or 'early numeracy skills' based on what aspect they most closely relate to. The pre-literacy skill measure combines children's scores in: the letter naming fluency task; the Peabody picture vocabulary test; and the 'name' component of the name and numbers task. Combining these measures (as described in the previous section) results in a Cronbach's alpha of 0.147.[5] Early numeracy skills include: the 'count up from 1 to 10'; 'count down from 10 to 1'; and 'I can write numbers' scores. Combining these measures results in an alpha of 0.496.

Socioemotional outcomes

Socioemotional outcomes combine measures from the 'Strengths and Difficulties' questionnaire introduced by Goodman (1997). This scale consists of five questions each from five different dimensions: hyperactivity; emotional symptoms; conduct problems; peer problems; and prosocial behaviour. We focus our attention on the emotional symptoms scale, which consists of indicators for: 'complains of aches/sickness'; 'worries/seems worried'; 'often unhappy/down-hearted/tearful'; 'nervous/clingy in new situations, easily loses confidence'; and 'fearful/scared'.

Interviewers ask mothers to respond on behalf of their child, and may say that the behaviour is "not true", "somewhat true", or "certainly true". A score of 0, 1, or 2 is assigned to these responses respectively. This is summed to give a score out of 10. The alpha of the emotional symptoms scale is 0.611 in our analysis sample. The socioemotional outcome scale is inverted, so that more positive values can be interpreted as desirable for the child, as with the other outcomes.

Parental aspirations

Parents are asked in the 9-month survey wave what are the three most and least important values for their children's development out of ten options: to be ambitious; to be a good person; to take on challenges; to have a concern for our world and environment; to have a sense of family/whanau; to have an understanding of their culture; to be successful; to enjoy life; to have initiative; and/or to respect others. To make full use of the information provided, we create a measure of the importance of each aspirational value that is equal to 1 if the value is ranked among the three most important, -1 if ranked among the three least important, and 0 if neither.[6]

Parental involvement

We use three separate controls for parental involvement at the time of the 54-month survey: how often the mother encourages her child to print letters/words/numbers, read words, count, and recognise numbers; how often the mother reads to her child (asked on a 5-point scale from 1 'seldom or never' to 5 'several times a day'); and how involved the mother is with the childcare provider.[7] Learning encouragement and childcare involvement are combined in the same manner as child outcomes, resulting in alphas of 0.820 and 0.483 respectively.

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[5] We note that this is very low, and comment on overall suitability of measures suggested by alpha tests later in this report.

[6] For robustness, we alternatively code our aspirations variables as indicators that take the value 1 if the mother rates the aspiration as one of the most important three aspirations and that take the value 0 otherwise. Our qualitative findings are unchanged, so we do not present these results.

[7] Involvement with the childcare provider is an aggregated measure for whether parents are involved with their child's childcare provider by: teaching/supervising; helping with/attending activities/trips/events; serving on committees; training/course work; fund raising / working groups / providing supplies / cleaning; or any other form of involvement. Types of involvement are given equal weight in this measure, though we note their effects are unlikely to be the same.

Demands on parents' time

The findings of Strazdins et al. (2006); Han (2005); and Prickett and Augustine (2021) suggest that measures of mother time commitments in relation to workforce participation are likely to be informative in our study. We include a measure for the number of hours per week that the mother works at the time of the 54-month survey. We also control for the number of children living in the household[8] and whether the mother has a partner in the 54-month wave.

Financial factors

Financial factors have the potential to play a role in the relationship between SES and child outcomes. Parents with more financial resources have increased ability to pay for resources and experiences that will aid the development of their children or allow them to avoid time-consuming activities to free up time for parenting (*e.g.* household activities such as cleaning). We use three indicators of the financial situation of parents: income sufficiency, being how well household income meets the family's everyday needs; financial stress – the extent to which worrying about money causes stress for the mother; and household income. Household income is measured in the 54-month wave, contemporaneously with the child outcomes we examine. Income sufficiency and financial stress are not available in this survey wave, so these measures are from the 2-year wave. Although we control for SES using the mother's education, these financial measures are likely to capture other aspects of SES and their coefficients should be interpreted accordingly.

Child outcomes, parental aspirations, parental involvement, and financial factors are standardised to have a mean of 0 and standard deviation of 1. Similar to the way our standardisation of child outcomes allows us to compare coefficients across models, standardising explanatory variables aids in the interpretation of different coefficients within our models.[9] However, we do not standardise time demand factors because their units have a natural interpretation.

Methods and results

We begin this section by discussing how we deal with sample attrition. Because our main objective is to understand the relationships between variables rather than estimate how commonly certain characteristics appear in a population, we choose not to weight our regressions.

We then use simple graphical analysis to establish that, consistently with the literature, a mother's socioeconomic status strongly positively predicts her child's outcomes in our data. Following that, we use ordinary least squares regressions of each aspirational value on mother's education and controls to establish which values vary with parental SES (measured by mother's education). We limit subsequent analysis to the aspirational values that are correlated with SES.

We then use regression analysis to explore the extent to which parental aspirations and other parental behaviours and characteristics account for the correlation between parental SES and children's literacy, numeracy, and socioemotional outcomes. We conclude by examining how these relationships vary by mother's ethnicity.

Sample attrition and missing values

Sample attrition

We include only mothers who have participated in all the waves of the GUiNZ survey used for our analysis. As with most longitudinal surveys, there is a tendency for respondents drop out of the GUiNZ survey over time. If mothers who drop out of this survey are systematically different to mothers who stay in the survey, then this attrition can affect findings from the data in two ways. First, while the GUiNZ survey was initially designed to be representative of the New Zealand population in terms of ethnicity and socioeconomic background, non-random attrition will mean that this is no longer the case in later collection waves. Sample averages of characteristics will no longer be unbiased estimates of the population averages. For example, if mothers who

[8] This is not measured in the 54-month survey, so we use a measure from the 8-year survey.

[9] Coefficients on standardised coefficients can be interpreted as the change in outcomes, given a 1 standard deviation change in the explanatory variable.

drop out of the survey have lower education on average than mothers who complete all waves, then the average education of mothers in the sample will be higher than that of mothers in the population. This issue is not important for our analysis because we are not aiming to estimate population averages of characteristics.

Second, attrition may bias the estimates of the relationships between variables if these relationships are systematically different for mothers who drop out of the sample. For example, suppose the positive correlation between mothers reading to their children and their children's pre-literacy skills were weaker for mothers who drop out of the survey than for those who remain. Then estimates of this correlation based on the mothers who remain would be larger than the true correlation for the full population.

Appendix 2 compares the sample of mothers in the antenatal wave with those retained in our analysis sample. While 6,896 mother-child pairs are identified in the antenatal wave, only 4,274 (61.98% of these) are retained in the analysis sample. Compared with the sample of mothers in the antenatal wave, mothers in our analysis sample are more educated and more likely to be European.

To address the issue of missing data in the GUiNZ study, Monk (2022) suggests the application of a Heckman correction method, which treats missing data like an omitted variable problem. It uses a two-step procedure that first predicts the likelihood of missing data, then estimates the dependent variable correcting for this selection bias. This method requires the use of an instrument which is independent of the outcomes of interest yet predicts participation in the survey. We were unable to determine an appropriate instrument for our analysis, so we do not implement a Heckman correction.

Solon *et al.* (2015) note that where sampling (or in our case, sample attrition) is endogenous, meaning the probability an observation is in the sample varies with the dependent variable even after conditioning on the explanatory variables, parameter estimates can be corrected by applying sample weights that are based on the true probability an observation is included. However, they also note that if sampling is exogenous, depending only on the included controls, using survey weights becomes unnecessary and may induce an efficiency cost in estimates (Woolridge, 1999 as cited in Solon et al., 2015).

In our case, we do not know the probability of any given observation being sampled, and are only able to estimate it based on observable characteristics that are included as controls. We can thus use weights to correct only for exogenous selection, which is not recommended, so we choose not to weight at all in our main results. Solon *et al.* (2015) recommend presenting a set of weighted results alongside the unweighted results to compare the impact of results. We do so in *Appendix 7.1-7.3*, and find small, unimpactful differences when compared with the main results in *Tables 2.1-2.3*.

Missing values

Within survey waves that mothers complete, there are instances where specific questions are not answered or recorded. We drop these mothers from the sample if the unanswered question is the dependent variable in our regressions (*i.e.,* aspirational values in *Table 1*, or child outcomes in *Tables 2.1 to 2.3*). This is done separately for each outcome, meaning that observation counts fluctuate below our full analysis sample of 4,274 mothers. If question non-response is related to the underlying associations of interest, then these missing values introduce the same types of bias as sample attrition, discussed above. 222 mothers (5.19%) have no recorded aspirational values; 306 mother-child pairs (7.16%) from our analysis sample have no associated pre-literacy scores; 151 (3.53%) no early numeracy scores; and a trivially small number have no socioemotional scores.

Child outcomes increase strongly with mother's SES

Existing research shows that parental SES is strongly correlated with child outcomes. In this section we establish that such a relationship is present in our sample, and can be modelled as approximately linear.[10]

[10] In supplementary, unreported tables, we rerun the main results using two dummy variables to differentiate between: NCEA 4 or less; diploma/trade cert/NCEA 5-6; or bachelor's degree or higher. We use NCEA 4 or less as the reference category. The overall story from these supplementary regressions does not change, therefore we do not report them.

Figures 2.1 to 2.3 illustrate the relationship between mothers' education and their children's educational and socioemotional development. There is a clear SES gradient for each of these outcomes, which are positively and strongly associated with mother's education.

Figures 2.1 and 2.2 show the relationships between SES and educational outcomes (literacy and numeracy) are monotonic across the educational categories we use. Furthermore, if we assume the four educational levels are equally spaced, both relationships are broadly linear. For simplicity, in subsequent analysis we model these relationships as linear.

In contrast, *Figure 2.3* shows that socioemotional outcomes increase with mother's education up to the bachelor's level, but children of mothers with bachelor's degrees and of those with higher degrees have very similar outcomes. For the set of analyses that investigate socioemotional outcomes we thus aggregate bachelor's degrees with higher education and impose linearity across the three remaining categories, assumed equally spaced.

Figure 2.1: SES gradient of pre-literacy skills

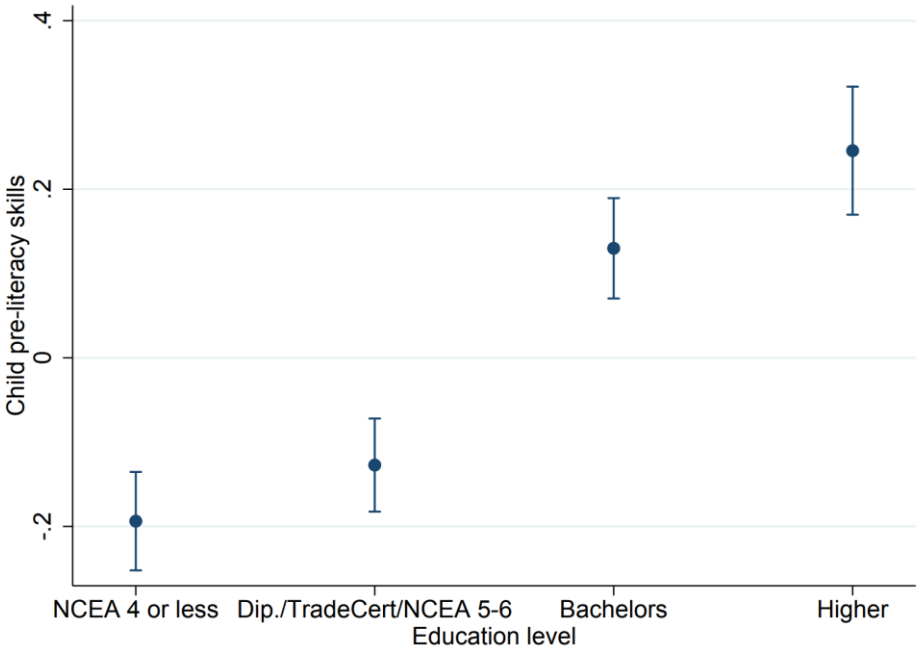


Figure 2.2: SES gradient of early numeracy skills

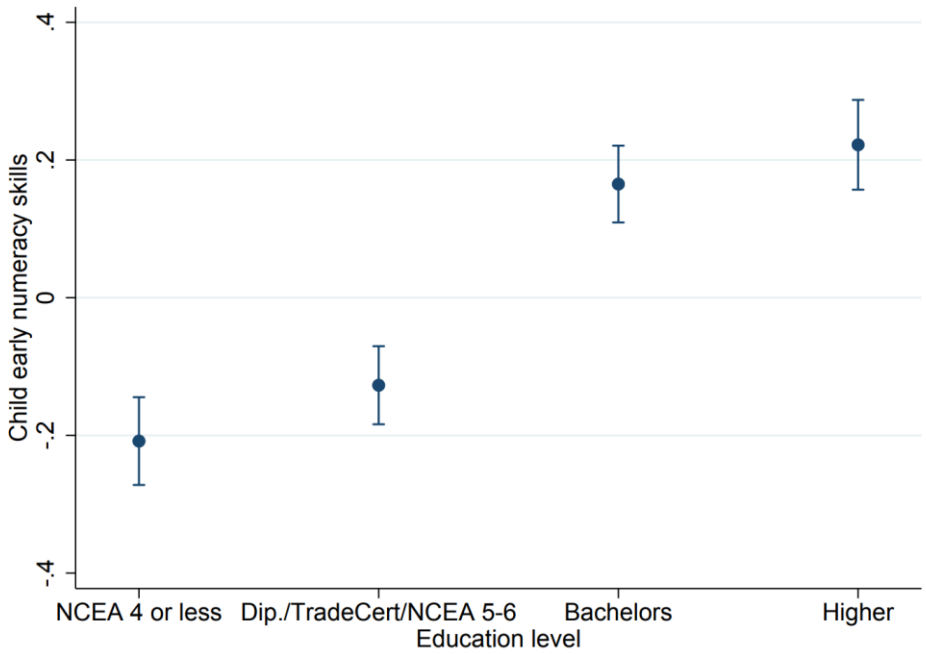
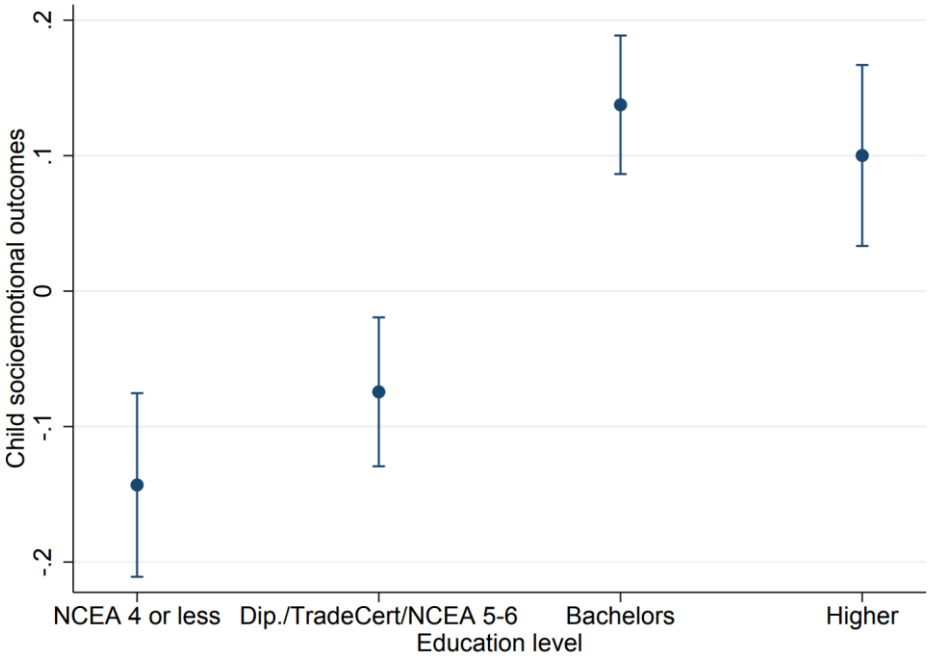


Figure 2.3: SES gradient of socioemotional outcomes



Some parental aspirations differ by SES

In this section, we establish that some of parents' aspirations for their children differ by SES.

We use regression analysis to investigate how mothers' ratings of aspirations differ by their SES, conditional on their demographics.[11] We impose cardinality in our measures of aspirations and use ordinary least squares regression models for simplicity and ease of interpretation.[12]

Table 1 shows the SES gradient for each of the 10 aspirations, controlling for demographic characteristics. When we control for demographics, only 'to be ambitious', 'to take on challenges', 'to have a concern for our world and environment', and (to a lesser extent) 'to respect others' differ significantly by SES. For parsimony, we use these four aspirations to investigate the association of child outcomes with aspirational values. These aspirations have the greatest potential to explain the association between SES and child outcomes, which is our primary interest.

[11] Specifically, we control for mother's self-prioritised ethnicity, mother's age at the antenatal survey, and gender of the child.

[12] While other regression models such as ordered logits may be more technically correct in such situations, in practical terms different models yield very similar results.

Table 1: Aspirations' association with SES

VARIABLES	(1) To be ambitious	(2) To be a good person	(3) To take on challenges	(4) To have a concern for our world and environment	(5) To have a sense of family/ whānau	(6) To have an understanding of their culture	(7) To be successful	(8) To enjoy life	(9) To have initiative	(10) To respect others
Education level (Base category: NCEA level 4 or less)										
Diploma/trade certificate / NCEA level 5-6	0.024	-0.017	0.015	0.005	-0.006	0.025	0.013	0.008	-0.026	0.009
	(0.028)	(0.022)	(0.029)	(0.026)	(0.026)	(0.025)	(0.030)	(0.023)	(0.023)	(0.023)
Bachelor's degree	-0.137***	-0.039*	0.098***	0.072***	0.033	0.040	-0.042	0.025	0.029	-0.033
	(0.029)	(0.023)	(0.030)	(0.028)	(0.027)	(0.026)	(0.032)	(0.024)	(0.025)	(0.025)
Higher degree	-0.167***	-0.014	0.100***	0.147***	-0.003	0.050*	0.001	0.014	0.014	-0.066**
	(0.033)	(0.026)	(0.034)	(0.031)	(0.030)	(0.029)	(0.035)	(0.027)	(0.027)	(0.027)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052	4,052
R-squared	0.054	0.017	0.015	0.026	0.020	0.178	0.037	0.098	0.035	0.015

The dependent variables of all regressions in *Table 1* are mother's ratings of aspirational values indicated on a 3-point scale (=1 if ranked in three most important; =-1 if ranked in three least important, =0 if not ranked in either). Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender. Standard errors are indicated in parentheses. Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Investigating the relationships between SES, child outcomes, and potentially mediating factors

In *Tables 2.1-2.3* we run a series of regressions for each child outcome on SES, sequentially adding variables that relate to the various causal pathways between SES and child outcomes illustrated in *Figure 1*. This provides suggestive evidence of mediation through these pathways.

Each following regression table is structured thus: column (1) investigates the uncontrolled correlation between SES and the child outcome, regressing the outcome on SES only. Column (2) adds controls for demographic characteristics, specifically the mother's age in the antenatal wave and self-prioritised ethnicity, and the child's gender. The decrease in the coefficient on mother's education between columns (1) and (2) is suggestive of the extent to which the uncontrolled correlation between SES and the child outcome is explained by these basic demographics. Column (3) adds controls for aspirational values. Here the coefficients on the aspirations variables are informative about the relevance of parental aspirations for children's outcomes, and the decrease in the coefficient on SES from column (2) tells us the extent to which differences in aspirations explain the socioeconomic gradient in child outcomes.[13]

Subsequent columns successively add sets of controls. Column (4) adds measures of demands on parental time, column (5) measures of financial resources, and column (6) parental involvement variables. We are interested in two parts of these regressions. First, the extent to which the addition of the new controls attenuates the relationship between SES and child outcomes, and second, how individual controls relate to child outcomes.

Limitation on identifying causal relationships

Ideally, a study would leverage a natural experiment (e.g. an external event that would affect outcomes) or some source of exogenous variation[14] in our independent variables to establish causal relationships. However, we are unable to do so within the scope of this study.

Therefore, although we expect some of the relationships we find are likely to be at least partially causal, we do not claim to be isolating causal effects. Rather, we interpret our results in terms of the factors that can statistically explain the correlation between socioeconomic status and child outcomes. Throughout our discussion of the regression results, we consider a relationship to be statistically significant if the coefficient has a p-value below 0.05.

Testing for heterogeneity

Parental aspirations have been found to differ by ethnicity in some cases (Gutman & Akerman, 2008; Spera et al., 2009). Furthermore, demographic variables, including ethnicity, are influential in explaining the association between SES and child outcomes in our analysis. We test for heterogeneity in the relationships between aspirations, outcomes, SES, and the various barriers and facilitating factors for families of different ethnicities. We conduct sub-group analyses for children and families from each of the four most common ethnic groups. These ethnic groups are: European, Māori, Pasifika, and Asian.

Mothers' inclusion in these groups is based on their 'all-response' ethnicity from the antenatal wave. This means mothers may report multiple ethnicities, and are included in more than one subsample if they do. As with the aggregate model, we retain controls for mother's self-prioritised ethnicity.

We rerun the regressions in *Tables 2.1-2.3* for ethnic subsamples based on all-response ethnicity. These regressions are reported in the appendices. *Appendix 3.1-3.3* considers all Māori mothers in our sample, *Appendix 4.1-4.3* Pasifika mothers, *Appendix 5.1-5.3* Asian mothers, and *Appendix 6.1-6.3* European mothers.

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[13] We also ran regressions that interacted SES with aspirations to test whether aspirations matter more for outcomes for high (or low) SES parents. None of the interactions were significant, so these results are not presented.

[14] *I.e.* characteristics that cause differences in the attributes or outcomes we investigate, without being dependent on any of the attributes or the outcomes in our study

Results on children's educational outcomes

Full sample

Column (1) of Tables 2.1 and 2.2 regresses child's educational outcomes on mother's education without additional controls. These regressions confirm the relationships shown in *Figures 2.1* and *2.2,* that child literacy and numeracy increases strongly in line with mother's education. When we add controls for demographic characteristics in column (2) these attenuate the relationship between SES and outcomes by just under a third.

Column (3) of each table adds controls for the mothers' aspirational values. The coefficients on mother's education are virtually unchanged, which shows differences in parental aspirations play no role in explaining the positive relationship between SES and these child outcomes. Furthermore, none of the coefficients on aspirational values are statistically significant at the five percent level.

Adding controls for time demand factors in column (4) results in little attenuation of the relationship between SES and child educational outcomes, suggesting that our time demand controls do little to explain the relationship between SES and educational outcomes. Among these controls, we find that the number of children in the household is related to pre-literacy but not early numeracy skills, and that the mother having a partner in the 54-month wave is associated with higher child educational outcomes.

When we control for financial resources in column (5), we see another considerable drop in the coefficient on SES, consistent with higher family income being an important benefit of a more educated mother. The coefficient on mother's partnership status also decreases and becomes insignificant. This suggests mother's partnership status relates to child outcomes at least partly through access to more financial resources. Of the financial controls, income insufficiency is associated with lower educational outcomes, and household income with higher educational outcomes.

Finally in column (6) we add controls for parental involvement. This results in another sizeable drop in the coefficient on mother's education, suggesting one of the benefits of higher maternal education is that more educated mothers are more involved with their children's education. The decrease is smaller in our model of early numeracy skills than it is for pre-literacy skills, but is non-trivial in both cases.

The relationship between the number of children in the household and child's pre-literacy skills is attenuated heavily by the inclusion of parental involvement measures. This supports the idea that having multiple children diminishes literacy skills at least partly though parents' availability to engage with each child, conforming to the recurring finding documented by Guo et al., (2022).

The inclusion of parental involvement measures decreases the coefficient on income insufficiency in the regressions of child literacy and numeracy outcomes. This is consistent with the finding of Strazdins *et al.* (2006) that parents with poorer work prospects (or in this case, reporting higher income insufficiency) tend to work non-standard schedules, impeding parental involvement. However, the coefficient on household income does not decrease in the same way. One possibility is that income insufficiency is a better measure than absolute household income of how parents' financial situation affects their everyday lives and ability to engage with their child.

As for the individual controls for parental involvement and their relation to SES, mothers encouraging their child to learn has the strongest relationship across both outcomes. When compared to other standardised controls, the coefficients on learning encouragement are among the largest and most significant coefficients in our fully specified model. On the other hand, mothers reading to their child is associated with improvements only in pre-literacy skills. Childcare involvement is negatively associated with pre-literacy skills, but has no association with early numeracy skills.

Heterogeneity in results on educational outcomes

When we rerun the regressions in *Table 2.1* and *2.2* separately for each major ethnic grouping (see *Appendices 3.1, 3.2, 4.1, 4.2, 5.1, 5.2, 6.1, and 6.2)*, we find that coefficients are generally less significant, partly due to the smaller sample sizes. In terms of point estimates, the association between SES and educational outcomes is weaker for Māori and Asians than for Europeans and Pasifika. Furthermore, after controlling for all the mediating factors that we consider, SES remains significantly correlated with child outcomes at the five percent level for Europeans only.

Mothers' aspirations are not significantly correlated with their children's educational outcomes for any ethnic group in most cases. There are two exceptions. First, the aspiration 'to be ambitious' strongly positively

predicts pre-literacy skills for Pasifika children, and this relationship remains regardless of the additional controls included. However, the inclusion of this variable explains none of the correlation between SES and the outcome variable. Second, 'to have a concern for our world and environment' negatively predicts the early numeracy skills of European children. Again, this variable explains none of the correlation between SES and the outcome variable.

For all ethnic groups, mothers' financial resources and parental involvement variables tend to predict their children's educational outcomes.

Table 2.1: Relationship between SES and pre-literacy skills

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.160***	0.108***	0.108***	0.103***	0.085***	0.062***
	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Aspirational values						
To be ambitious			0.006	-0.000	0.001	0.005
			(0.026)	(0.026)	(0.025)	(0.024)
To take on challenges			0.037	0.036	0.037	0.023
			(0.024)	(0.024)	(0.024)	(0.023)
To have a concern for our world and environment			-0.007	-0.006	-0.002	0.006
			(0.027)	(0.027)	(0.027)	(0.026)
To respect others			0.008	0.010	0.012	0.011
			(0.030)	(0.030)	(0.029)	(0.028)
Time demand factors						
Mother has a partner				0.164***	0.092	0.070
				(0.057)	(0.059)	(0.057)
Hours worked per week				-0.001	-0.002	-0.001
				(0.001)	(0.001)	(0.001)
Not working				-0.490	-1.301	-0.884
				(1.302)	(1.322)	(1.282)
Number of children in household (Base – None):						
One other child in household				-0.107**	-0.116**	-0.081*
				(0.051)	(0.051)	(0.049)
Two or more other children in household				-0.256***	-0.263***	-0.165***
				(0.053)	(0.053)	(0.051)
Financial factors						
Income insufficiency					-0.050***	-0.033*
					(0.019)	(0.018)
Financial stress					0.016	0.018
					(0.018)	(0.017)
Household income					0.061***	0.059***
					(0.020)	(0.019)
Parental involvement						
Involvement with childcare						-0.034**
						(0.015)
Learning encouragement						0.245***
						(0.015)
Reading to child						0.095***
						(0.017)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	3,968	3,968	3,968	3,968	3,968	3,968
R-squared	0.028	0.092	0.093	0.102	0.108	0.184

The dependent variables of all regressions in *Table 2.1* are standardised measures for children's pre-literacy skills in the 54-month wave.
Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Table 2. 2: Relationship between SES & early numeracy skills

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.163***	0.114***	0.115***	0.106***	0.078***	0.066***
	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Aspirational values						
To be ambitious			-0.011	-0.014	-0.014	-0.013
			(0.026)	(0.026)	(0.025)	(0.025)
To take on challenges			-0.005	-0.004	-0.003	-0.012
			(0.024)	(0.024)	(0.024)	(0.024)
To have a concern for our world and environment			-0.052*	-0.049*	-0.045*	-0.036
			(0.027)	(0.027)	(0.027)	(0.027)
To respect others			-0.009	-0.004	0.000	0.001
			(0.030)	(0.030)	(0.030)	(0.029)
Time demand factors						
Mother has a partner				0.184***	0.077	0.061
				(0.057)	(0.059)	(0.058)
Hours worked per week				-0.000	-0.002	-0.001
				(0.001)	(0.001)	(0.001)
Not working				-0.141	-1.323	-1.001
				(1.309)	(1.325)	(1.321)
Number of children in household (Base – None):						
One other child in household				0.079	0.065	0.090*
				(0.051)	(0.051)	(0.050)
Two or more other children in household				0.011	-0.003	0.058
				(0.054)	(0.053)	(0.053)
Financial factors						
Income insufficiency					-0.041**	-0.031*
					(0.019)	(0.018)
Financial stress					-0.011	-0.009
					(0.018)	(0.017)
Household income					0.096***	0.097***
					(0.020)	(0.019)
Parental involvement						
Involvement with childcare						0.010
						(0.016)
Learning encouragement						0.175***
						(0.016)
Reading to child						0.029*
						(0.018)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	4,123	4,123	4,123	4,123	4,123	4,123
R-squared	0.029	0.049	0.051	0.057	0.069	0.102

The dependent variables of all regressions in *Table 2.2* are standardised measures for children's early numeracy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Results on children's socioemotional outcomes

Full sample

While the regressions of pre-literacy and early numeracy skills on SES and other controls yield similar results, the results of our regressions of socioemotional outcomes, reported in *Table 2.3*, have substantial differences. In the column (1) regression without additional controls, the coefficient on SES is sizeable and significant, as in our models of educational outcomes. However, this coefficient decreases by three-quarters and becomes insignificant when we add demographic controls in column (2).

When we control for aspirational values in column (3) there is no further attenuation of the coefficient on SES. While most aspirational values are insignificant predictors, 'to have a concern for our world and environment' is significantly and negatively associated with socioemotional outcomes. This conforms to a growing stream of literature that investigates anxiety arising from people's concern and perceived helplessness in the face of climate change (Clayton, 2020). Although most of the children are likely too young at four-and-a-half years to directly experience climate change anxiety, they may pick up this stress from their parents' behaviour.

It should be noted, however, that the number of mothers who list 'to have a concern for their world and environment' as one of their top three aspirations is small, consisting of only 6.0% of mothers for whom we have data on aspirations. Furthermore, for each of the parental aspirations 'to have a concern for their world and environment', 'to be ambitious', and 'to take on challenges', a far greater proportion of mothers list these aspirations as the three least important for their child's development. As such, it may be more accurate to interpret this coefficient as mothers who hold 'to have a concern for our world and environment' among their least important aspirations being associated with more positive socioemotional outcomes.

Including time demand factors in column (4) results in further attenuation of the coefficient of SES. Time demand factors are strong predictors of socioemotional outcomes. A mother having a partner in the 54-month wave is positively associated with socioemotional outcomes. Both the average number of hours a mother works per week, and dummy for the mother not working at all in the 54-month wave are positively associated with children's socioemotional outcomes. This means that, among children of mothers who work, working more hours tends to have beneficial association with socioemotional outcomes, but children tend to have more positive socioemotional outcomes if their mothers do not work at all than if they work only a small number of hours.

The inclusion of financial controls further reduces the coefficient of SES to effectively zero, telling us that the combination of demographic characteristics, time demand factors, and financial factors explain all of the difference in socioemotional outcomes we see by SES. Similar to educational outcomes, financial factors attenuate the coefficient on mother's partnership status, suggesting that partnership status relates to outcomes partly through access to financial resources. Although financial stress is not significantly associated with educational outcomes, it is the strongest predictor of socioemotional outcomes among financial factors. This is consistent with the stress that arises from a lack of financial resources driving the relationship between financial resources and socioemotional outcomes.

Parental involvement is a weaker predictor of socioemotional outcomes than of educational outcomes. The only parental involvement control that is significantly related to socioemotional outcomes is mothers reading to their children. This variable may be capturing the quality time a mother spends with her child, and this quality time could be driving the stronger socioemotional outcomes.

Heterogeneity in results on socioemotional outcomes

When we rerun our regressions in *Table 2.3* separately for each major ethnic grouping in *Appendices 3.3, 4.3, 5.3, and 6.3,* the most notable differences are the associations of socioemotional outcomes with parental aspirations. The aspirational value with the strongest[15] relationship with socioemotional outcomes is different for each ethnicity.

As mentioned above, 'to have a concern for our world and environment' is the only significant predictor of socioemotional outcomes in the full sample, and is negatively associated with socioemotional outcomes. 'To be ambitious' is the most influential aspirational value for Māori, for whom it is negatively correlated with outcomes, or conversely, Māori mothers who place 'to be ambitious' among the three least important

[15] In terms of size and significance of the coefficient on the aspirational value.

aspirations are more likely to have positive outcomes for their children. ‘To respect others’ is the most influential aspirational value for Pasifika, for whom it is negatively correlated with outcomes. ‘To take on challenges’ is the most influential value for Asians, for whom it is positively correlated with outcomes. None of the aspirational values are significantly correlated with outcomes for Europeans. In addition, Māori are the only ethnicity for whom aspirations explain more than a negligible proportion of the correlation between SES and socioemotional outcomes.

Aside from parental aspirations, coefficients of time demand, financial, and involvement factors generally follow the same patterns as the full sample in terms of direction and magnitude. However, these contributing factors are mostly insignificant, likely due to the smaller sample sizes of these ethnic subgroups.

Table 2.3: Relationship between SES & socioemotional outcomes

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level[+]	0.139***	0.036*	0.035*	0.024	-0.002	-0.013
	(0.019)	(0.020)	(0.020)	(0.020)	(0.020)	(0.021)
Aspirational values						
To be ambitious			-0.020	-0.020	-0.019	-0.015
			(0.025)	(0.025)	(0.025)	(0.025)
To take on challenges			0.021	0.020	0.020	0.017
			(0.024)	(0.023)	(0.023)	(0.023)
To have a concern for our world and environment			-0.059**	-0.055**	-0.053**	-0.060**
			(0.026)	(0.026)	(0.026)	(0.026)
To respect others			-0.047	-0.046	-0.040	-0.039
			(0.029)	(0.029)	(0.029)	(0.029)
Time demand factors						
Mother has a partner				0.218***	0.147***	0.135**
				(0.055)	(0.057)	(0.057)
Hours worked per week				0.003**	0.002*	0.003**
				(0.001)	(0.001)	(0.001)
Not working				2.765**	2.326*	2.985**
				(1.267)	(1.283)	(1.300)
Number of children in household (Base – None):						
One other child in household				0.044	0.030	0.031
				(0.049)	(0.049)	(0.049)
Two or more other children in household				0.076	0.059	0.067
				(0.052)	(0.051)	(0.052)
Financial factors						
Income insufficiency					-0.021	-0.020
					(0.018)	(0.018)
Financial stress					-0.069***	-0.066***
					(0.017)	(0.017)
Household income					0.051***	0.050***
					(0.019)	(0.019)
Parental involvement						
Involvement with childcare						0.026*
						(0.015)
Learning encouragement						-0.006
						(0.016)
Reading to child						0.042**
						(0.017)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	4,272	4,272	4,272	4,272	4,272	4,272
R-squared	0.013	0.079	0.081	0.088	0.099	0.101

The dependent variables of all regressions in *Table 2.3* are standardised measures of children's socioemotional outcomes in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.
[+] Education level is measured on a 3-point scale in these regressions, as the categories for Bachelors and higher education are combined.

Conclusions

Key findings

This study investigates the role of parental aspirations in the relationship between parents' socioeconomic background and their children's educational and socioemotional outcomes at pre-school age. We use data from the Growing Up in New Zealand (GUiNZ) longitudinal survey to analyse the extent to which mothers' aspirations for their children are associated with differences in this relationship, and consider parental involvement, financial resources, and other time commitments as other contributing factors for the link between SES and child outcomes.

Statistically significant but small differences in aspirations by SES

Our study finds that mother's socioeconomic background is associated with statistically significant differences in the aspirations for their children they consider important, although the magnitudes of the differences are small. Higher SES is associated with mothers being more likely to place a higher emphasis on taking on challenges and having a concern for the world and environment, or conversely, being less likely to place a low emphasis on these aspirations. In contrast, higher SES is associated with parents being less likely to value ambitiousness as important for their child's development, or more likely to rank it among the least important aspirations.

Few differences in outcomes by aspirations

Our analysis reveals that aspirations are generally not associated with differences in educational outcomes for children, and are rarely predictive of socioemotional outcomes. Furthermore, in instances where aspirations do predict differences in socioemotional outcomes, these are limited to at most one out of the four aspirations we include. These were selected from a total of ten on the basis of being the most likely to explain differences in child outcomes associated with differing socioeconomic status. The few differences we do find in these aspirational values do not attenuate the relationship between SES and child outcomes. This suggests intervening to change the aspirations of low SES parents is unlikely to be effective at reducing the socioeconomic gradient in child outcomes, absent other changes.

Considerable differences in outcomes by parental involvement

In contrast, we find that forms of parental involvement in their child's education are strong predictors of improvements in child outcomes. Parents encouraging their child to learn is strongly associated with improvements in children's pre-literacy and early numeracy skills. The associated increase in early numeracy skills from a one-standard-deviation increase in learning encouragement is nearly double that of a one-standard-deviation increase in household income. The associated increase in pre-literacy skills is approximately four times that of a one-standard-deviation increase in household income.

When we test for differences in this association by ethnicity, we find that this association is roughly the same across all ethnic subgroups. While the size of the coefficients on 'learning encouragement' and 'reading to child' vary, we find they are consistently among the strongest predictors of child pre-literacy skills and, for 'learning encouragement', early numeracy skills.

Limitations and suggested future directions

Our investigation is exploratory and has a number of limitations. Some arise from data availability, while some relate to the scope of our analysis. Here we discuss these limitations and some avenues for future research that they leave open.

Sample attrition is one issue that relates to data availability. Of the 6,896 mother-child pairs we observe in the antenatal wave, only 4,274 (61.98% of these) are available for our analysis. In addition to this, 222 mothers (5.19%) have no recorded aspirational values, 306 mother-child pairs (7.16%) have no associated pre-literacy scores, and 151 (3.53%) have no early numeracy scores. This attrition appears to be systematic, as the demographic characteristics of mothers lost to attrition differ from those retained. While methods exist to account for sample attrition in the GUiNZ sample (see: Monk, 2022), we were unable to implement these methods as we did not find an appropriate instrument.

While this attrition limits our ability to interpret the magnitudes of associations to a wider New Zealand context, we argue that the presence (absence) of statistically significant and large associations in our sample

indicates the likely presence (absence) of these association in a wider population. This provides valuable suggestive evidence of what factors matter for child outcomes.

We are also limited by the available data in two key ways: Firstly, aspirations asked of parents in the GUiNZ study are not specific about education-specific goals such as the level of education they hope their children will attain, or how important certain skills such as reading or writing are for their child's development. However, they do cover a wide range of values that might be expected to affect children's educational outcomes, such as ambition, taking on challenges, and being successful. Secondly, the formally-assessed educational outcomes available at the time of our analysis were conducted at the 54-month wave, and therefore do not incorporate any effect of primary school on the child. Further analysis would ideally consider later formally assessed educational outcomes if available.

While our consideration of socioemotional outcomes only considers the emotional symptoms scale of the 'strengths and difficulties' questionnaire, all four other scales are available in the GUiNZ data. These could be included in a future investigation of child outcomes.

In applying a wide lens to our analysis we employed several indicators which were composed of various other measures. Composite indicators used in our analysis include our main outcome variables of interest (pre-literacy skills, early numeracy skills, and socioemotional outcomes[16]) and our indicators for parental encouragement and involvement with childcare. We calculated Cronbach's alphas to test the appropriateness of these measures, and found many of these composite indicators had Cronbach's alphas less than 0.7. This could suggest some of our composite measures are capturing more than one underlying trait. Future investigations could delve in more detail into the individual components of our composite measures to better understand which components are driving the associations we observe.

In terms of scope, our analysis is intended as an exploratory investigation of a broad range of factors that may influence child outcomes. Our experimental design does not take advantage of any natural experiment or exogenous variation in our independent variables that would allow us to identify causal effects. Nor do we undertake formal mediation analysis. Studies incorporating these designs would be a logical next step in this line of research. Following from the suggestive evidence found here, further study may formally investigate moderating and mediating effects, or may leverage natural experiments or exogenous variation to establish causal links from the foundation of suggestive evidence this study provides.

[16] Interestingly, even this commonly used composite measure failed to exceed the 0.7 heuristic for Cronbach's alpha.

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Appendix tables

Appendix 1: Descriptive statistics of main variables of interest

Variable	Observations	Mean	Std. Dev.	Min	Max
Aspirational value: to be ambitious					
Ranked in bottom 3	4052	51.7%	0.5%		
Not ranked	4052	39.4%	0.5%		
Ranked in top 3.	4052	8.9%	0.3%		
Aspirational value: to take on challenges					
Ranked in bottom 3	4052	29.8%	0.5%		
Not ranked	4052	54.6%	0.5%		
Ranked in top 3	4052	15.5%	0.4%		
Aspirational value: to have a concern for our world and environment					
Ranked in bottom 3	4052	51.5%	0.5%		
Not ranked	4052	42.5%	0.5%		
Ranked in top 3.	4052	6.0%	0.2%		
Aspirational value: to respect others					
Ranked in bottom 3	4052	1.7%	0.1%		
Not ranked	4052	42.8%	0.5%		
Ranked in top 3.	4052	55.5%	0.5%		
Involvement with childcare (54-month)	4177	1.12	1.0	0	6
Learning encouragement (54-month)	4271	12.8	3.7	4	20
Reads to child (54-month)					
Seldom or never	4272	3.7%	0.2%		
Once a week	4272	8.3%	0.3%		
Several times a week	4272	23.1%	0.4%		
Once a day	4272	45.6%	0.5%		
Several times a day	4272	19.3%	0.4%		
Hours worked per week (54-month)	2979	29.2	14.5	0	70
not_working (54-month)	4274	30.0%	0.5%		
Has partner (54-month)					
No	4274	8.4%	0.3%		
Yes	4274	91.6%	0.3%		
Number of children (8-year)					
0	4224	12.1%	0.3%		
1	4224	46.7%	0.5%		
2+	4224	41.2%	0.5%		
Income insufficiency (2-year)					
More Than Enough	4269	22.7%	0.4%		
Enough	4269	37.6%	0.5%		
Just Enough	4269	31.3%	0.5%		
Not Enough	4269	8.4%	0.3%		
Financial stress (2-year)					
Not At All Stressful	4273	22.2%	0.4%		
Somewhat Stressful	4273	37.1%	0.5%		
Moderately Stressful	4273	25.2%	0.4%		
Highly Stressful	4273	15.6%	0.4%		
Household income (54-month)					
1. <=20K	3933	0.9%	0.1%		
2. >20K a..	3933	2.6%	0.2%		
3. >30K a..	3933	10.4%	0.3%		
4. >50K a..	3933	14.6%	0.4%		
5. >70K a..	3933	22.9%	0.4%		
6. >100K ..	3933	26.7%	0.4%		
7. >150K	3933	21.9%	0.4%		

Appendix 1 summarises the variables of interest used in our analysis. Observations correspond to non-missing values. Proportions reported are the proportions of non-missing values. 'Involvement with childcare' and 'learning encouragement' are aggregated measures, no individual categories are reported. Min/max values of binary indicators are omitted.

Appendix 2: Comparison of characteristics between antenatal mother sample and analysis sample

	Analysis sample			Antenatal cohort		
Variable	Observations	Proportion	Standard deviation	Observations	Proportion	Standard deviation
Mother's education level						
NCEA level 4 or less	4274	24.2%	0.4%	6896	31.1%	0.5%
Diploma/trade certificate / NCEA level 5-6	4274	29.6%	0.5%	6896	30.6%	0.5%
Bachelor's degree	4274	27.5%	0.4%	6896	22.7%	0.4%
Higher degree	4274	18.8%	0.4%	6896	15.6%	0.4%
Mother's self-prioritised ethnicity						
European	4267	68.6%	0.5%	6884	54.4%	0.5%
Māori	4267	10.3%	0.3%	6884	13.9%	0.3%
Pasifika	4267	7.8%	0.3%	6884	14.6%	0.4%
Asian	4267	11.6%	0.3%	6884	14.7%	0.4%
MELAA	4267	1.5%	0.1%	6884	2.1%	0.1%
Other	4267	0.2%	0.0%	6884	0.2%	0.0%
Mother's all-response ethnicity						
European	4274	75.1%	0.4%	6895	61.9%	0.5%
Māori	4274	14.6%	0.4%	6895	18.5%	0.4%
Pasifika	4274	9.8%	0.3%	6895	17.0%	0.4%
Asian	4274	12.7%	0.3%	6895	16.0%	0.4%
MELAA	4274	1.8%	0.1%	6895	2.5%	0.2%
Other	4274	0.5%	0.1%	6895	0.4%	0.1%
Age of mother at childbirth	4274	31.0	5.5	6896	30.1	5.8
Child gender						
Boy	4274	51.0%	0.5%	6441	51.7%	0.5%
Girl	4274	49.0%	0.5%	6441	48.3%	0.5%

Appendix 2 compares the antenatal characteristics of the analysis sample against the cohort of all mothers present in the antenatal wave. Observations correspond to non-missing values. Proportions reported are the proportions of non-missing values.

Appendix 3.1: Relationship between SES & pre-literacy skills – Māori

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.061*	0.029	0.023	0.016	0.003	-0.020
	(0.035)	(0.037)	(0.038)	(0.038)	(0.039)	(0.037)
Aspirational values						
To be ambitious			-0.023	-0.035	-0.030	0.000
			(0.056)	(0.056)	(0.056)	(0.053)
To take on challenges			0.020	0.006	-0.005	-0.037
			(0.052)	(0.052)	(0.052)	(0.049)
To have a concern for our world and environment			0.025	0.025	0.020	0.006
			(0.062)	(0.063)	(0.063)	(0.060)
To respect others			-0.024	-0.038	-0.035	-0.041
			(0.063)	(0.063)	(0.063)	(0.060)
Time demand factors						
Any partner (54-month)				0.172*	0.144	0.124
				(0.093)	(0.098)	(0.093)
Hours worked per week				-0.002	-0.001	-0.001
				(0.003)	(0.003)	(0.003)
Not working				-1.418	-1.084	-1.332
				(2.831)	(2.870)	(2.725)
Number of children in household (Base – 0. None):						
1. One other child in household				-0.117	-0.117	-0.137
				(0.109)	(0.109)	(0.103)
2. Two or more other children in household				-0.236**	-0.223**	-0.172*
				(0.109)	(0.109)	(0.103)
Financial factors						
Income insufficiency					-0.082**	-0.070*
					(0.040)	(0.038)
Financial stress					-0.005	0.019
					(0.037)	(0.035)
Household income (54-months)					-0.019	-0.033
					(0.042)	(0.039)
Parental involvement						
Involvement with childcare						-0.004
						(0.034)
Learning encouragement						0.200***
						(0.031)
Reading to child						0.099***
						(0.033)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	567	567	567	567	567	567
R-squared	0.005	0.041	0.043	0.063	0.072	0.183

The dependent variables of all regressions in *Appendix 3.1* are standardised measures for children's pre-literacy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 3.2: Relationship between SES & early numeracy skills – Māori

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.108**	0.089*	0.089*	0.071	0.057	0.054
	(0.046)	(0.049)	(0.049)	(0.050)	(0.051)	(0.051)
Aspirational values						
To be ambitious			-0.007	-0.006	-0.006	0.007
			(0.073)	(0.073)	(0.073)	(0.072)
To take on challenges			-0.031	-0.041	-0.052	-0.073
			(0.068)	(0.068)	(0.068)	(0.067)
To have a concern for our world and environment			-0.073	-0.057	-0.058	-0.063
			(0.081)	(0.081)	(0.082)	(0.080)
To respect others			0.016	0.033	0.038	0.036
			(0.083)	(0.084)	(0.084)	(0.082)
Time demand factors						
Any partner (54-month)				0.148	0.132	0.120
				(0.121)	(0.127)	(0.126)
Hours worked per week				0.004	0.004	0.004
				(0.004)	(0.004)	(0.004)
Not working				4.243	4.485	4.666
				(3.727)	(3.787)	(3.744)
Number of children in household (Base – 0. None):						
1. One other child in household				0.300**	0.297**	0.296**
				(0.143)	(0.143)	(0.140)
2. Two or more other children in household				0.178	0.192	0.226
				(0.142)	(0.142)	(0.141)
Financial factors						
Income insufficiency					-0.086	-0.081
					(0.053)	(0.052)
Financial stress					-0.012	0.002
					(0.048)	(0.048)
Household income (54-months)					-0.026	-0.029
					(0.055)	(0.054)
Parental involvement						
Involvement with childcare						0.098**
						(0.046)
Learning encouragement						0.194***
						(0.042)
Reading to child						-0.011
						(0.044)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	599	599	599	599	599	599
R-squared	0.009	0.016	0.023	0.038	0.046	0.091

The dependent variables of all regressions in *Appendix 3.2* are standardised measures for children's early numeracy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 3.3: Relationship between SES & socioemotional outcomes – Māori

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level[+]	0.196***	0.115**	0.107*	0.090	0.053	0.039
	(0.053)	(0.055)	(0.056)	(0.056)	(0.056)	(0.058)
Aspirational values						
To be ambitious			-0.147**	-0.148**	-0.141**	-0.131*
			(0.068)	(0.068)	(0.067)	(0.068)
To take on challenges			-0.017	-0.029	-0.032	-0.037
			(0.065)	(0.065)	(0.065)	(0.065)
To have a concern for our world and environment			-0.128*	-0.121	-0.105	-0.105
			(0.077)	(0.077)	(0.076)	(0.077)
To respect others			-0.022	-0.015	-0.016	-0.014
			(0.079)	(0.079)	(0.079)	(0.079)
Time demand factors						
Any partner (54-month)				0.365***	0.256**	0.242**
				(0.112)	(0.118)	(0.119)
Hours worked per week				0.001	0.001	0.001
				(0.004)	(0.004)	(0.004)
Not working				0.629	0.257	0.388
				(3.544)	(3.569)	(3.599)
Number of children in household (Base – 0. None):						
1. One other child in household				0.090	0.094	0.098
				(0.134)	(0.133)	(0.133)
2. Two or more other children in household				-0.006	-0.002	0.015
				(0.133)	(0.132)	(0.133)
Financial factors						
Income insufficiency					0.019	0.020
					(0.049)	(0.049)
Financial stress					-0.118***	-0.109**
					(0.045)	(0.046)
Household income (54-months)					0.119**	0.115**
					(0.052)	(0.052)
Parental involvement						
Involvement with childcare						0.001
						(0.044)
Learning encouragement						0.016
						(0.040)
Reading to child						0.051
						(0.041)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	626	626	626	626	626	626
R-squared	0.022	0.064	0.074	0.099	0.123	0.126

The dependent variables of all regressions in *Appendix 3.3* are standardised measures of children's socioemotional outcomes in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.
[+] Education level is measured on a 3-point scale in these regressions, as the categories for Bachelors and higher education are combined.

Appendix 4.1: Relationship between SES & pre-literacy skills – Pasifika

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.171***	0.167***	0.167***	0.157***	0.115**	0.102*
	(0.051)	(0.054)	(0.054)	(0.056)	(0.056)	(0.054)
Aspirational values						
To be ambitious			0.169**	0.160**	0.158**	0.171**
			(0.072)	(0.073)	(0.072)	(0.069)
To take on challenges			-0.041	-0.033	-0.015	-0.007
			(0.070)	(0.071)	(0.070)	(0.068)
To have a concern for our world and environment			-0.019	-0.013	-0.023	-0.017
			(0.085)	(0.086)	(0.084)	(0.082)
To respect others			0.012	0.035	0.080	0.096
			(0.087)	(0.087)	(0.087)	(0.084)
Time demand factors						
Any partner (54-month)				0.227*	0.099	0.089
				(0.136)	(0.136)	(0.131)
Hours worked per week				-0.000	-0.004	-0.002
				(0.005)	(0.004)	(0.004)
Not working				-0.342	-3.982	-2.415
				(4.580)	(4.568)	(4.423)
Number of children in household (Base – 0. None):						
1. One other child in household				0.124	0.168	0.150
				(0.160)	(0.157)	(0.151)
2. Two or more other children in household				-0.125	-0.070	0.006
				(0.159)	(0.156)	(0.151)
Financial factors						
Income insufficiency					-0.043	-0.019
					(0.051)	(0.049)
Financial stress					0.050	0.033
					(0.046)	(0.045)
Household income (54-months)					0.220***	0.212***
					(0.056)	(0.054)
Parental involvement						
Involvement with childcare						-0.048
						(0.047)
Learning encouragement						0.156***
						(0.047)
Reading to child						0.119**
						(0.047)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	369	369	369	369	369	369
R-squared	0.029	0.058	0.075	0.097	0.148	0.226

The dependent variables of all regressions in *Appendix 4.1* are standardised measures for children's pre-literacy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 4.2: Relationship between SES & early numeracy skills – Pasifika

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.166***	0.164**	0.152**	0.124*	0.053	0.046
	(0.060)	(0.063)	(0.064)	(0.066)	(0.065)	(0.064)
Aspirational values						
To be ambitious			0.001	0.008	-0.004	0.008
			(0.087)	(0.088)	(0.086)	(0.084)
To take on challenges			-0.126	-0.104	-0.085	-0.077
			(0.085)	(0.086)	(0.084)	(0.082)
To have a concern for our world and environment			-0.132	-0.101	-0.102	-0.088
			(0.100)	(0.100)	(0.098)	(0.096)
To respect others			-0.019	-0.015	0.025	0.043
			(0.103)	(0.104)	(0.102)	(0.099)
Time demand factors						
Any partner (54-month)				0.260	0.126	0.107
				(0.163)	(0.162)	(0.157)
Hours worked per week				0.007	0.002	0.004
				(0.005)	(0.005)	(0.005)
Not working				7.690	2.646	4.548
				(5.535)	(5.460)	(5.361)
Number of children in household (Base – 0. None):						
1. One other child in household				0.077	0.148	0.116
				(0.194)	(0.189)	(0.185)
2. Two or more other children in household				-0.111	-0.042	0.034
				(0.192)	(0.187)	(0.183)
Financial factors						
Income insufficiency					-0.008	0.010
					(0.060)	(0.059)
Financial stress					-0.014	-0.025
					(0.056)	(0.054)
Household income (54-months)					0.289***	0.283***
					(0.064)	(0.063)
Parental involvement						
Involvement with childcare						-0.002
						(0.057)
Learning encouragement						0.206***
						(0.056)
Reading to child						0.065
						(0.056)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	391	391	391	391	391	391
R-squared	0.019	0.031	0.043	0.069	0.136	0.193

The dependent variables of all regressions in *Appendix 4.2* are standardised measures for children's early numeracy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 4.3: Relationship between SES & socioemotional outcomes – Pasifika

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level[+]	0.327***	0.248***	0.247***	0.197**	0.154*	0.141
	(0.079)	(0.081)	(0.081)	(0.084)	(0.086)	(0.086)
Aspirational values						
To be ambitious			0.098	0.100	0.092	0.101
			(0.096)	(0.096)	(0.097)	(0.097)
To take on challenges			-0.037	-0.007	0.004	-0.012
			(0.093)	(0.093)	(0.093)	(0.094)
To have a concern for our world and environment			-0.074	-0.043	-0.049	-0.075
			(0.110)	(0.111)	(0.111)	(0.112)
To respect others			-0.293**	-0.290**	-0.261**	-0.269**
			(0.114)	(0.114)	(0.115)	(0.115)
Time demand factors						
Any partner (54-month)				0.253	0.207	0.210
				(0.173)	(0.177)	(0.177)
Hours worked per week				0.006	0.004	0.005
				(0.006)	(0.006)	(0.006)
Not working				7.073	4.346	5.472
				(6.099)	(6.195)	(6.262)
Number of children in household (Base – 0. None):						
1. One other child in household				-0.217	-0.197	-0.201
				(0.215)	(0.215)	(0.216)
2. Two or more other children in household				-0.255	-0.211	-0.214
				(0.211)	(0.211)	(0.212)
Financial factors						
Income insufficiency					0.017	0.024
					(0.068)	(0.068)
Financial stress					-0.106*	-0.111*
					(0.062)	(0.062)
Household income (54-months)					0.153**	0.143*
					(0.074)	(0.075)
Parental involvement						
Involvement with childcare						0.065
						(0.066)
Learning encouragement						-0.077
						(0.064)
Reading to child						0.071
						(0.064)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	418	418	418	418	418	418
R-squared	0.040	0.091	0.111	0.133	0.151	0.158

The dependent variables of all regressions in *Appendix 4.3* are standardised measures of children's socioemotional outcomes in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender. Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.
[+] Education level is measured on a 3-point scale in these regressions, as the categories for Bachelors and higher education are combined.

Appendix 5.1: Relationship between SES & pre-literacy skills – Asian

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.102*	0.086	0.074	0.054	0.024	0.025
	(0.055)	(0.057)	(0.057)	(0.059)	(0.061)	(0.059)
Aspirational values						
To be ambitious			-0.056	-0.065	-0.061	-0.080
			(0.089)	(0.089)	(0.089)	(0.084)
To take on challenges			0.122	0.122	0.124	0.089
			(0.086)	(0.087)	(0.087)	(0.083)
To have a concern for our world and environment			0.166*	0.170*	0.172*	0.143
			(0.098)	(0.099)	(0.099)	(0.095)
To respect others			-0.046	-0.039	-0.055	-0.057
			(0.105)	(0.106)	(0.106)	(0.101)
Time demand factors						
Any partner (54-month)				0.269	0.120	0.263
				(0.262)	(0.270)	(0.260)
Hours worked per week				-0.001	-0.001	0.000
				(0.006)	(0.006)	(0.006)
Not working				-	-	-
				-	-	-
Number of children in household (Base – 0. None):						
1. One other child in household				-0.063	-0.062	-0.047
				(0.155)	(0.154)	(0.147)
2. Two or more other children in household				-0.250	-0.258	-0.206
				(0.184)	(0.184)	(0.177)
Financial factors						
Income insufficiency					-0.173**	-0.131*
					(0.071)	(0.068)
Financial stress					0.020	0.053
					(0.066)	(0.063)
Household income (54-months)					0.034	0.041
					(0.076)	(0.072)
Parental involvement						
Involvement with childcare						-0.226***
						(0.067)
Learning encouragement						0.283***
						(0.059)
Reading to child						0.161***
						(0.059)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	484	484	484	484	484	484
R-squared	0.007	0.045	0.057	0.071	0.086	0.180

The dependent variables of all regressions in *Appendix 5.1* are standardised measures for children's pre-literacy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
'Not working' is omitted because of collinearity.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 5.2: Relationship between SES & early numeracy skills – Asian

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.097**	0.077	0.069	0.043	-0.008	-0.018
	(0.045)	(0.047)	(0.048)	(0.048)	(0.050)	(0.050)
Aspirational values						
To be ambitious			-0.073	-0.081	-0.085	-0.090
			(0.073)	(0.073)	(0.072)	(0.071)
To take on challenges			0.044	0.044	0.055	0.038
			(0.071)	(0.071)	(0.071)	(0.070)
To have a concern for our world and environment			0.026	0.037	0.035	0.025
			(0.081)	(0.082)	(0.081)	(0.081)
To respect others			-0.065	-0.047	-0.067	-0.063
			(0.086)	(0.087)	(0.086)	(0.085)
Time demand factors						
Any partner (54-month)				0.141	-0.079	-0.027
				(0.210)	(0.215)	(0.215)
Hours worked per week				-0.001	-0.003	-0.001
				(0.005)	(0.005)	(0.005)
Not working				-1.077	-2.842	-1.365
				(4.898)	(4.893)	(4.882)
Number of children in household (Base – 0. None):						
1. One other child in household				-0.082	-0.076	-0.056
				(0.128)	(0.127)	(0.125)
2. Two or more other children in household				-0.324**	-0.351**	-0.310**
				(0.152)	(0.150)	(0.150)
Financial factors						
Income insufficiency					-0.137**	-0.123**
					(0.057)	(0.057)
Financial stress					-0.008	0.007
					(0.054)	(0.053)
Household income (54-months)					0.121*	0.119*
					(0.062)	(0.061)
Parental involvement						
Involvement with childcare						-0.048
						(0.056)
Learning encouragement						0.166***
						(0.049)
Reading to child						0.054
						(0.050)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	512	512	512	512	512	512
R-squared	0.009	0.021	0.026	0.053	0.083	0.114

The dependent variables of all regressions in *Appendix 5.2* are standardised measures for children's early numeracy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 5.3: Relationship between SES & socioemotional outcomes – Asian

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level[+]	0.067	0.025	0.022	0.003	-0.058	-0.058
	(0.054)	(0.056)	(0.056)	(0.057)	(0.059)	(0.059)
Aspirational values						
To be ambitious			-0.103	-0.089	-0.095	-0.092
			(0.066)	(0.067)	(0.066)	(0.065)
To take on challenges			0.154**	0.160**	0.170***	0.178***
			(0.064)	(0.064)	(0.064)	(0.063)
To have a concern for our world and environment			-0.066	-0.036	-0.032	-0.031
			(0.073)	(0.074)	(0.073)	(0.073)
To respect others			0.072	0.068	0.063	0.076
			(0.078)	(0.079)	(0.078)	(0.078)
Time demand factors						
Any partner (54-month)				0.253	0.132	0.184
				(0.192)	(0.196)	(0.196)
Hours worked per week				0.007	0.007	0.007
				(0.004)	(0.004)	(0.004)
Not working				8.459*	8.160*	8.662*
				(4.480)	(4.454)	(4.474)
Number of children in household (Base – 0. None):						
1. One other child in household				0.141	0.141	0.115
				(0.116)	(0.114)	(0.114)
2. Two or more other children in household				0.072	0.076	0.115
				(0.136)	(0.135)	(0.134)
Financial factors						
Income insufficiency					-0.086*	-0.061
					(0.052)	(0.052)
Financial stress					0.035	0.036
					(0.048)	(0.048)
Household income (54-months)					0.078	0.087
					(0.056)	(0.055)
Parental involvement						
Involvement with childcare						-0.087*
						(0.051)
Learning encouragement						-0.002
						(0.044)
Reading to child						0.077*
						(0.045)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	542	542	542	542	542	542
R-squared	0.003	0.055	0.076	0.096	0.130	0.152

The dependent variables of all regressions in *Appendix 5.3* are standardised measures of children's socioemotional outcomes in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.
[+] Education level is measured on a 3-point scale in these regressions, as the categories for Bachelors and higher education are combined.

Appendix 6.1: Relationship between SES & pre-literacy skills – European

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.136***	0.110***	0.111***	0.110***	0.095***	0.072***
	(0.016)	(0.017)	(0.017)	(0.017)	(0.018)	(0.017)
Aspirational values						
To be ambitious			0.015	0.009	0.008	0.018
			(0.029)	(0.029)	(0.029)	(0.028)
To take on challenges			0.028	0.025	0.024	0.008
			(0.027)	(0.027)	(0.027)	(0.026)
To have a concern for our world and environment			-0.030	-0.028	-0.025	-0.007
			(0.030)	(0.030)	(0.030)	(0.029)
To respect others			0.004	0.005	0.009	0.005
			(0.033)	(0.033)	(0.033)	(0.032)
Time demand factors						
Any partner (54-month)				0.188***	0.118*	0.079
				(0.065)	(0.067)	(0.065)
Hours worked per week				-0.001	-0.001	-0.001
				(0.001)	(0.001)	(0.001)
Not working				-0.401	-1.125	-0.888
				(1.395)	(1.419)	(1.381)
Number of children in household (Base – 0. None):						
1. One other child in household				-0.157***	-0.171***	-0.130**
				(0.059)	(0.059)	(0.056)
2. Two or more other children in household				-0.302***	-0.317***	-0.216***
				(0.061)	(0.061)	(0.059)
Financial factors						
Income insufficiency					-0.038*	-0.024
					(0.021)	(0.020)
Financial stress					0.008	0.006
					(0.020)	(0.020)
Household income (54-months)					0.055**	0.054**
					(0.022)	(0.021)
Parental involvement						
Involvement with childcare						-0.021
						(0.016)
Learning encouragement						0.241***
						(0.017)
Reading to child						0.079***
						(0.020)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	3,031	3,031	3,031	3,031	3,031	3,031
R-squared	0.023	0.045	0.046	0.058	0.063	0.139

The dependent variables of all regressions in *Appendix 6.1* are standardised measures for children's pre-literacy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 6.2: Relationship between SES & early numeracy skills – European

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.152***	0.116***	0.118***	0.111***	0.090***	0.079***
	(0.016)	(0.017)	(0.018)	(0.018)	(0.018)	(0.018)
Aspirational values						
To be ambitious			-0.013	-0.016	-0.017	-0.013
			(0.029)	(0.029)	(0.029)	(0.029)
To take on challenges			-0.017	-0.016	-0.018	-0.029
			(0.028)	(0.028)	(0.028)	(0.027)
To have a concern for our world and environment			-0.068**	-0.067**	-0.063**	-0.047
			(0.030)	(0.030)	(0.030)	(0.030)
To respect others			-0.017	-0.014	-0.009	-0.010
			(0.034)	(0.034)	(0.034)	(0.033)
Time demand factors						
Any partner (54-month)				0.204***	0.106	0.082
				(0.066)	(0.068)	(0.067)
Hours worked per week				-0.001	-0.002	-0.002
				(0.001)	(0.001)	(0.001)
Not working				-0.533	-1.503	-1.468
				(1.418)	(1.439)	(1.435)
Number of children in household (Base – 0. None):						
1. One other child in household				0.075	0.055	0.085
				(0.060)	(0.060)	(0.059)
2. Two or more other children in household				0.031	0.012	0.077
				(0.062)	(0.062)	(0.061)
Financial factors						
Income insufficiency					-0.020	-0.011
					(0.021)	(0.021)
Financial stress					-0.019	-0.022
					(0.021)	(0.020)
Household income (54-months)					0.085***	0.086***
					(0.022)	(0.022)
Parental involvement						
Involvement with childcare						0.005
						(0.017)
Learning encouragement						0.181***
						(0.018)
Reading to child						0.020
						(0.021)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	3,118	3,118	3,118	3,118	3,118	3,118
R-squared	0.027	0.042	0.045	0.052	0.061	0.096

The dependent variables of all regressions in *Appendix 6.2* are standardised measures for children's early numeracy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 6.3: Relationship between SES & socioemotional outcomes – European

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level[+]	0.076***	0.013	0.011	0.004	-0.022	-0.032
	(0.021)	(0.022)	(0.022)	(0.022)	(0.023)	(0.023)
Aspirational values						
To be ambitious			-0.013	-0.013	-0.012	-0.009
			(0.028)	(0.028)	(0.028)	(0.028)
To take on challenges			0.023	0.024	0.021	0.019
			(0.026)	(0.026)	(0.026)	(0.026)
To have a concern for our world and environment			-0.029	-0.028	-0.025	-0.031
			(0.029)	(0.029)	(0.029)	(0.029)
To respect others			-0.028	-0.028	-0.024	-0.023
			(0.032)	(0.032)	(0.032)	(0.032)
Time demand factors						
Any partner (54-month)				0.166***	0.089	0.073
				(0.063)	(0.065)	(0.065)
Hours worked per week				0.002*	0.002	0.003*
				(0.001)	(0.001)	(0.001)
Not working				2.012	1.744	2.441*
				(1.358)	(1.377)	(1.397)
Number of children in household (Base – 0. None):						
1. One other child in household				0.086	0.069	0.072
				(0.057)	(0.057)	(0.057)
2. Two or more other children in household				0.142**	0.125**	0.133**
				(0.059)	(0.059)	(0.059)
Financial factors						
Income insufficiency					-0.022	-0.022
					(0.020)	(0.020)
Financial stress					-0.073***	-0.071***
					(0.020)	(0.020)
Household income (54-months)					0.045**	0.046**
					(0.021)	(0.021)
Parental involvement						
Involvement with childcare						0.038**
						(0.016)
Learning encouragement						0.008
						(0.017)
Reading to child						0.030
						(0.020)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	3,206	3,206	3,206	3,206	3,206	3,206
R-squared	0.004	0.031	0.032	0.038	0.049	0.052

The dependent variables of all regressions in *Appendix 6.3* are standardised measures of children's socioemotional outcomes in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender. Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.
[+] Education level is measured on a 3-point scale in these regressions, as the categories for Bachelors and higher education are combined.

Appendix 7.1 Relationship between SES & pre-literacy skills – rerun with probability weights

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.160***	0.112***	0.111***	0.104***	0.084***	0.061***
	(0.015)	(0.017)	(0.017)	(0.017)	(0.018)	(0.017)
Aspirational values						
To be ambitious			0.005	-0.001	0.001	0.004
			(0.026)	(0.026)	(0.026)	(0.025)
To take on challenges			0.033	0.033	0.033	0.022
			(0.026)	(0.026)	(0.026)	(0.025)
To have a concern for our world and environment			-0.003	-0.002	0.001	0.005
			(0.029)	(0.028)	(0.028)	(0.028)
To respect others			0.014	0.016	0.017	0.017
			(0.030)	(0.030)	(0.030)	(0.028)
Time demand factors						
Mother has a partner				0.158***	0.085	0.072
				(0.055)	(0.057)	(0.056)
Hours worked per week				-0.000	-0.001	-0.001
				(0.001)	(0.001)	(0.001)
Not working				-0.183	-1.107	-0.610
				(1.304)	(1.312)	(1.253)
Number of children in household (Base – None):						
One other child in household				-0.077	-0.086	-0.062
				(0.057)	(0.057)	(0.054)
Two or more other children in household				-0.215***	-0.220***	-0.132**
				(0.059)	(0.059)	(0.056)
Financial factors						
Income insufficiency					-0.055***	-0.034*
					(0.020)	(0.019)
Financial stress					0.021	0.026
					(0.018)	(0.017)
Household income					0.069***	0.067***
					(0.020)	(0.019)
Parental involvement						
Involvement with childcare						-0.039**
						(0.015)
Learning encouragement						0.237***
						(0.016)
Reading to child						0.100***
						(0.017)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Probability Weights	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,968	3,968	3,968	3,968	3,968	3,968
R-squared	0.028	0.121	0.121	0.129	0.136	0.212

The dependent variables of all regressions in *Appendix 7.1* are standardised measures for child pre-literacy skills in the 54-month wave.
Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Probability weights are derived from demographic variables in the antenatal cohort.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 7.2 Relationship between SES & early numeracy skills – rerun with probability weights

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.163***	0.115***	0.116***	0.105***	0.074***	0.062***
	(0.015)	(0.017)	(0.017)	(0.017)	(0.018)	(0.017)
Aspirational values						
To be ambitious			0.001	-0.001	-0.000	0.000
			(0.028)	(0.028)	(0.028)	(0.027)
To take on challenges			-0.003	-0.002	-0.002	-0.009
			(0.027)	(0.027)	(0.027)	(0.026)
To have a concern for our world and environment			-0.045	-0.040	-0.037	-0.032
			(0.029)	(0.029)	(0.029)	(0.029)
To respect others			0.008	0.013	0.016	0.018
			(0.032)	(0.032)	(0.032)	(0.031)
Time demand factors						
Mother has a partner				0.183***	0.081	0.066
				(0.062)	(0.064)	(0.063)
Hours worked per week				-0.000	-0.001	-0.001
				(0.001)	(0.001)	(0.001)
Not working				0.206	-1.078	-0.606
				(1.358)	(1.385)	(1.377)
Number of children in household (Base – None):						
One other child in household				0.089	0.075	0.094*
				(0.059)	(0.058)	(0.056)
Two or more other children in household				0.014	0.002	0.058
				(0.063)	(0.062)	(0.061)
Financial factors						
Income insufficiency					-0.054***	-0.043**
					(0.020)	(0.020)
Financial stress					-0.001	0.002
					(0.020)	(0.019)
Household income					0.102***	0.104***
					(0.023)	(0.022)
Parental involvement						
Involvement with childcare						0.019
						(0.017)
Learning encouragement						0.174***
						(0.017)
Reading to child						0.027
						(0.020)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Probability Weights	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,123	4,123	4,123	4,123	4,123	4,123
R-squared	0.029	0.058	0.059	0.066	0.080	0.112

The dependent variables of all regressions in *Appendix 7.2.* are standardised measures for child early numeracy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Probability weights are derived from demographic variables in the antenatal cohort.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 7.3 Relationship between SES & socioemotional outcomes – rerun with probability weights

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.139***	0.054**	0.054**	0.041*	0.012	0.002
	(0.019)	(0.022)	(0.023)	(0.023)	(0.023)	(0.023)
Aspirational values						
To be ambitious			-0.016	-0.018	-0.015	-0.011
			(0.030)	(0.030)	(0.030)	(0.030)
To take on challenges			0.009	0.010	0.009	0.007
			(0.029)	(0.029)	(0.029)	(0.029)
To have a concern for our world and environment			-0.066**	-0.060*	-0.059*	-0.066**
			(0.033)	(0.033)	(0.032)	(0.032)
To respect others			-0.069**	-0.068**	-0.061*	-0.060*
			(0.034)	(0.034)	(0.034)	(0.034)
Time demand factors						
Mother has a partner				0.239***	0.173**	0.163**
				(0.074)	(0.076)	(0.077)
Hours worked per week				0.003**	0.003*	0.003**
				(0.001)	(0.001)	(0.001)
Not working				3.165**	2.612*	3.285**
				(1.373)	(1.378)	(1.384)
Number of children in household (Base – None):						
One other child in household				-0.006	-0.019	-0.019
				(0.055)	(0.055)	(0.055)
Two or more other children in household				0.014	0.000	0.005
				(0.058)	(0.058)	(0.058)
Financial factors						
Income insufficiency					-0.020	-0.018
					(0.021)	(0.021)
Financial stress					-0.068***	-0.066***
					(0.021)	(0.021)
Household income					0.061***	0.060***
					(0.022)	(0.022)
Parental involvement						
Involvement with childcare						0.026
						(0.018)
Learning encouragement						-0.016
						(0.019)
Reading to child						0.043**
						(0.021)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Probability Weights	Yes	Yes	Yes	Yes	Yes	Yes
Observations						
R-squared						

The dependent variables of all regressions in *Appendix 7.3* are standardised measures for child socioemotional outcomes in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Probability weights are derived from demographic variables in the antenatal cohort.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 8.1 Relationship between SES & pre-literacy skills – using income as main SES proxy

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.089***	0.077***	0.077***	0.069***	0.040***	0.029**
	(0.012)	(0.013)	(0.013)	(0.013)	(0.015)	(0.014)
Aspirational values						
To be ambitious			-0.003	-0.009	-0.007	0.000
			(0.026)	(0.026)	(0.025)	(0.024)
To take on challenges			0.046*	0.044*	0.043*	0.027
			(0.024)	(0.024)	(0.024)	(0.023)
To have a concern for our world and environment			0.007	0.007	0.008	0.013
			(0.027)	(0.027)	(0.027)	(0.026)
To respect others			0.008	0.009	0.010	0.009
			(0.030)	(0.030)	(0.030)	(0.028)
Time demand factors						
Mother has a partner				0.144**	0.089	0.064
				(0.057)	(0.059)	(0.057)
Hours worked per week				-0.001	-0.002	-0.001
				(0.001)	(0.001)	(0.001)
Not working				-0.789	-1.351	-0.849
				(1.307)	(1.326)	(1.284)
Number of children in household (Base – None):						
One other child in household				-0.103**	-0.112**	-0.078
				(0.051)	(0.051)	(0.049)
Two or more other children in household				-0.245***	-0.256***	-0.159***
				(0.054)	(0.054)	(0.052)
Financial factors						
Income insufficiency					-0.050***	-0.032*
					(0.019)	(0.018)
Financial stress					0.014	0.017
					(0.018)	(0.017)
Household income					0.054**	0.054***
					(0.022)	(0.021)
Parental involvement						
Involvement with childcare						-0.032**
						(0.015)
Learning encouragement						0.244***
						(0.016)
Reading to child						0.103***
						(0.017)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	3,968	3,968	3,968	3,968	3,968	3,968
R-squared	0.015	0.091	0.091	0.099	0.104	0.182

The dependent variables of all regressions in *Appendix 8.1* are standardised measures for child pre-literacy skills in the 54-month wave.
Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 8.2 Relationship between SES & early numeracy skills – using income as main SES proxy

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.119***	0.093***	0.092***	0.084***	0.043***	0.037**
	(0.012)	(0.013)	(0.013)	(0.013)	(0.015)	(0.015)
Aspirational values						
To be ambitious			-0.023	-0.024	-0.023	-0.019
			(0.026)	(0.026)	(0.025)	(0.025)
To take on challenges			0.003	0.003	0.002	-0.008
			(0.024)	(0.024)	(0.024)	(0.024)
To have a concern for our world and environment			-0.036	-0.034	-0.034	-0.028
			(0.027)	(0.027)	(0.027)	(0.027)
To respect others			-0.008	-0.004	-0.001	0.000
			(0.030)	(0.030)	(0.030)	(0.029)
Time demand factors						
Mother has a partner				0.152***	0.071	0.052
				(0.057)	(0.059)	(0.058)
Hours worked per week				-0.001	-0.002	-0.001
				(0.001)	(0.001)	(0.001)
Not working				-0.577	-1.393	-0.988
				(1.311)	(1.327)	(1.322)
Number of children in household (Base – None):						
One other child in household				0.082	0.068	0.093*
				(0.051)	(0.051)	(0.050)
Two or more other children in household				0.022	0.003	0.064
				(0.054)	(0.054)	(0.053)
Financial factors						
Income insufficiency					-0.040**	-0.030
					(0.019)	(0.019)
Financial stress					-0.012	-0.010
					(0.018)	(0.018)
Household income					0.086***	0.087***
					(0.021)	(0.021)
Parental involvement						
Involvement with childcare						0.011
						(0.016)
Learning encouragement						0.175***
						(0.016)
Reading to child						0.037**
						(0.017)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	4,123	4,123	4,123	4,123	4,123	4,123
R-squared	0.030	0.052	0.053	0.059	0.067	0.101

The dependent variables of all regressions in *Appendix 8.2* are standardised measures for child early numeracy skills in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.

Appendix 8.3 Relationship between SES & socioemotional outcomes – using income as main SES proxy

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Education level	0.102***	0.039***	0.038***	0.028**	-0.006	-0.008
	(0.012)	(0.012)	(0.012)	(0.012)	(0.014)	(0.014)
Aspirational values						
To be ambitious			-0.022	-0.022	-0.019	-0.015
			(0.025)	(0.025)	(0.025)	(0.025)
To take on challenges			0.022	0.021	0.019	0.016
			(0.023)	(0.023)	(0.023)	(0.023)
To have a concern for our world and environment			-0.055**	-0.052**	-0.053**	-0.060**
			(0.026)	(0.026)	(0.026)	(0.026)
To respect others			-0.045	-0.045	-0.040	-0.039
			(0.029)	(0.029)	(0.029)	(0.029)
Time demand factors						
Mother has a partner				0.202***	0.142**	0.132**
				(0.055)	(0.057)	(0.057)
Hours worked per week				0.003**	0.002*	0.003**
				(0.001)	(0.001)	(0.001)
Not working				2.557**	2.293*	2.935**
				(1.270)	(1.283)	(1.301)
Number of children in household (Base – None):						
One other child in household				0.043	0.029	0.030
				(0.049)	(0.049)	(0.049)
Two or more other children in household				0.078	0.057	0.064
				(0.052)	(0.052)	(0.052)
Financial factors						
Income insufficiency					-0.021	-0.020
					(0.018)	(0.018)
Financial stress					-0.069***	-0.066***
					(0.017)	(0.017)
Household income					0.053**	0.051**
					(0.020)	(0.020)
Parental involvement						
Involvement with childcare						0.025
						(0.015)
Learning encouragement						-0.006
						(0.016)
Reading to child						0.041**
						(0.017)
Demographic controls	No	Yes	Yes	Yes	Yes	Yes
Observations	4,272	4,272	4,272	4,272	4,272	4,272
R-squared	0.023	0.081	0.083	0.089	0.099	0.101

The dependent variables of all regressions in *Appendix 8.3* are standardised measures for child socioemotional outcomes in the 54-month wave. Demographic controls include mother's self-prioritised ethnicity, mother's age at antenatal survey, and child's gender.
Standard errors are indicated in parentheses.
Significance levels are indicated with asterisks: *** p<0.01, ** p<0.05, * p<0.10.