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Inequality during the Early Years: Child Outcomes and Readiness to Learn in Australia, Canada, United Kingdom, and United States

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1. Introduction

The importance of the early years is now a mainstay of public policy discourse. Early investments are often claimed to frame the chances children will successfully navigate the series of transitions they must make in becoming successful and self-reliant adults. As such they have a direct bearing on the conduct of social policy in many OECD countries.

This perspective reflects a large and growing literature from a number of different disciplines on the importance of the early years. Knudsen *et al.* (2006) offer a particularly clear and succinct summary, but just as importantly they sketch out the logic of an argument stressing the relevance for public policy. How and why early experiences have long-lasting consequences has important implications, in their view, for the future productivity of society, and raises a need for public policy to invest in the development of young children from disadvantaged backgrounds. This question also relates to an important shared value: equality of opportunity, the idea that all children regardless of socio-economic background should have the opportunity to develop their capacities to become all that they can be.

As such the focus in this chapter is on the emergence of inequality during the early years. We offer a comparative analysis of children who, at the age of about five years, are at the onset of formal schooling, and therefore put the focus on the environment and on public policies other than the education system. We study a series of child outcomes related to readiness to learn— focusing on vocabulary development and externalizing behavior—in a comparative way across four countries: Australia, Canada, the United Kingdom, and the United States. While family is the principle influence on child outcomes during these early years, the time and skills parents bring to bear in investing in their children is also influenced by public policies addressed to families and their interaction with labor markets. Our analysis describes the extent to which inequalities in outcomes emerge by the age of five according to parental education and income. While our estimates are not intended to be causal, our descriptive results may point toward possible policy remedies. In particular, the implications for

public policy may well be different if inequality of outcomes is due solely to relatively well-advantaged families capitalizing on their resources to improve the lives of their children, than if it is due to the relatively disadvantaged raising children that fall far below the mainstream. We therefore pay particular attention to charting the gaps that emerge at both the top and the bottom of the education and income hierarchy.

Our major findings are three in number. First, significant inequalities in child capacities emerge even in these early years in all four countries but the disparities are notably greater in the United States and the United Kingdom than in Australia, and particularly in Canada. Second, although large differences in outcomes exist in all countries between children from disadvantaged backgrounds and the mainstream, the differences across countries largely reflect variation in the degree to which the most advantaged children out-perform those in the middle. Third, to some significant degree cross-country differences in cognitive development reflect different outcomes for minority racial, ethnic, and immigrant groups, while differences in socio-emotional outcomes are more linked to family composition.

2. Background

By focusing on early cognitive and socio-emotional development we are speaking to a literature that has highlighted the importance of both cognitive skills (such as reading and math knowledge) and other types of skills (such as social and emotional development) for adult earnings, employment, and other outcomes. . As suggested this literature also argues that early experiences are important, and that interventions in early childhood can be particularly effective at reducing longer-term inequalities (Almond and Currie, 2010; Carneiro and Heckman, 2003; Cunha, Heckman, Lochner, and Masterov, 2005; Currie and Stabile, 2006; Heckman and Lochner, 2000; Magnuson and Duncan, 2009; and Smith, 2009).

Our analysis is also predicated upon the idea that there is value in a cross-country comparative analysis. We focus on these four particular countries because they are often thought of as having similar types of welfare states and labor markets (Esping-Anderson 1990), and indeed they

often look to each other for policy models and reforms. Yet at the same time there are important and interesting differences in both outcomes and inputs.

As shown in Table 1, each of these countries is characterized by levels of income inequality that for the most part are above the OECD average — with Gini coefficients ranging from about 0.31 and 0.32 in Australia and Canada to 0.35 and 0.37 in the United Kingdom and the United States. They also differ in their levels of social mobility in adult earnings across generations. The United States and United Kingdom are identified as among the least mobile countries; Australia andCanada are among the most mobile (Corak, 2006). The countries also differ in the levels of child poverty. Child poverty rates based upon a relative income threshold (50% of median equivalised income) are as high as 212 percent in the United States, but significantly lower at 17 percent in Canada, and 14 percent in both the United Kingdom and Australia (data for 2004 from the Luxembourg Income Study)

Further, there are substantial differences in expenditures and policy frameworks for families with young children, with the United States standing out as having the least generous provisions. Per capita social expenditure on children younger than six years of age is significantly higher in Australia, Canada, and the United Kingdom than in the United States (Table 1). Moreover, across the four major domains of public policy that affect families with young children – parental leave, child care, income supports, and health insurance – the US has the weakest provisions, and if anything the gap between the US and the other countries has widened in recent years as the other countries' policies to support families with young children have evolved and expanded.

In Australia, one of the few countries to not offer paid parental leave (although it does offer 12 months of unpaid parental leave), plans are now underway to move to a system of 14 weeks of paid leave. Child care policies are evolving as well. Child care in Australia is provided by a combination of state, non-governmental organization, and private providers. Historically there has been a split between 'long day care' (which is subsidised by the Federal government by providing child care rebates of up to 50% of the fees) and 'pre-school' (which is provided by the states as part of the education system). Payment for preschool and availability differs from state to state, as does the school starting age. There is currently a policy program initiated by the Council of Australian Governments (the Commonwealth and the States acting together) to develop a unified early years

framework which will bring together the Commonwealth and State provisions and iron out the anomalies. Overall Australia is one of the lowest spenders in the OECD on childhood services but in contrast provides relatively generous cash transfers to parents of young children including a generous baby bonus, various family tax benefits and other in kind provisions. The benefit system is also relatively progressive, with many of the cash transfers being targeted at the most disadvantaged. With regard to health care, Australia has a universal free health care system for young children, with all children receiving at least one nurse home visit after birth.

There were important expansions in family policy in Canada during the 1990s, with the cohort studied here among the first to be exposed to some of these provisions. This includes the introduction of a National Child Benefit and Early Childhood Development Agreements. These involved increased financial transfers provided through the tax system targeted according to family income and the number of children, and including supplements based on the number of children under seven years of age. This change significantly increased the financial support to lower income families. At the same time there was an increase of in-kind support through the development of early childhood learning and day care facilities.These innovations also included an increase in paid parental leave through the unemployment insurance program, so that beginning in 2001 up to one year of benefits are provided for a parent of a newborn or adopted child. This includes 15 weeks of maternity benefits to the biological mother, and a further 35 weeks of parental benefits that could be shared between the mother and the father. With regard to health care, in Canada all children and their families are covered by a universal health care system. This has been a longstanding program that permits families of all socio-economic backgrounds access to publicly provided health care. In other domains there is also considerable variation in policies across the ten provinces with, for example, Quebec offering essentially free child care for working mothers, and Ontario currently implementing a program of full day kindergarten beginning at age four.

The past decade in the United Kingdom has witnessed dramatic expansions in programs and supports for preschool age children (Waldfogel, 2010). Parents of the cohort studied here had the right to take up to three months of unpaid parental leave, and mothers had the right to up to 29 weeks of job-protected maternity leave, with 18 weeks paid (this has since been extended to a year of job-

protected maternity leave, with 9 months paid). In addition, low-income families with young children have benefited from sizable increases in means-tested benefits as well as in the universal child allowance program. Those living in the lowest-income communities have also benefited from home visiting and child care services provided to children under age three by the Sure Start program. And this cohort of children was entitled to free universal preschool at age three and four. As in Australia and Canada, all children and their families benefit from universal health care, which is provided free at the point of service by the National Health Service.

In contrast, the United States remains one of the few advanced industrialized countries without a national policy providing a period of paid maternity leave. Under the Family and Medical Leave Act, qualifying employees may take up to 12 weeks of leave following a birth, but only about half of new parents are covered and eligible, the period of leave is quite short by international standards, and it is unpaid. The United States also differs from other advanced industrialized countries in having a system of early childhood care and education that relies heavily on the private market. Subsidies are provided to low-income working families, but there are not enough dollars to support all eligible families. The federal Head Start program provides preschool to disadvantaged three and four year olds, but, in spite of recent expansions, does not serve all eligible children. Public prekindergarten programs serve only a small share (roughly one sixth) of the country's four year olds. Thus, children's experience of preschool remains very strongly correlated with their parents' resources, with the most advantaged children the most likely to participate. Moreover, the US still does not provide universal health insurance coverage for children and their families, even after the recent expansions in Medicaid and the Children's Health Insurance Program, and the passage of health care reform in early 2010.

Whether these inputs have bearing on these outcomes is hard to tell without first documenting at what point in the life cycle significant socio-economic gradients begin to emerge. A comparative analysis may be helpful in appreciating the role of differences in public policy choices, but is obviously a challenge because of the need for comparable data. Our analysis therefore takes advantage of rich data on specific cohorts from each of the four countries to investigate variations in the connection between parental resources and inequality in early child outcomes. Part of our

contribution to the literature is, therefore, methodological. We focus attention on measures and indicators that are relatively similar across the very detailed surveys conducted in these countries, highlighting areas where future research and data development in other countries might be directed.

The most important antecedent for our work is Waldfogel and Washbrook (2009, 2010) who study income-related gaps in school readiness in the United States and the United Kingdom. Some of this ground is covered by Corak, Curtis, and Phipps (2010) who study differences between Canada and the United States, and by Bradbury and others on disparities in Australia (Bradbury, 2007; Katz and Redmond, 2009; Redmond and Zhu, 2009).

While this work indicates that substantial gaps in school readiness exist in all four countries, only two explicit cross-country comparisons have been carried, and these focused on different countries, age groups, and outcomes. Comparing income-related gaps in cognitive and behavioral aspects of school readiness for preschool age children in the United States and the United Kingdom, Waldfogel and Washbrook (2009, 2010) found that overall the results were quite similar. Large gaps were evident in both countries between children in the bottom and middle income quintiles, and between children in the top and middle income quintiles. Another point of agreement was that differences in parenting behaviour accounted for a substantial portion of the gaps in both countries. But some of the findings in Corak *et al.* (2010) would suggest that these similarities are not likely to hold in general. Their analysis of a range of cognitive, behavioral, and health outcomes for preschool and school age children in Canada and the United States found that income-related gaps differed across the two countries. In general, gaps in outcomes between low-income children and their more advantaged peers tended to be larger in the US than they are in Canada, suggesting the presence of less mobility even in childhood.

3. The nature of the data and the measurement of outcomes and socio-economic background

Our analysis is based upon: (1) the Longitudinal Study of Australian Children (LSAC), for Australia; (2) the National Longitudinal Survey of Children and Youth (NLSCY), for Canada; (3) the Millennium Cohort Study (MCS), for the UK; and (4) the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), for the US. The UK and US studies each survey a single birth cohort, and we

utilize both in their entirety. The Australian and Canadian studies contain multiple birth cohorts from which we select the sub-sets most comparable in time with the available UK and US data. Some details of the full scope of the Australian and Canadian studies are given in the online appendix[2]; for the rest of the chapter we describe only those cohorts used in the analysis.

These data are vast in both the breadth and depth of information they contain on children in all stages of their lives. Indeed, some of these surveys could more accurately be described as containing multiple surveys, involving separate questionnaires for parents, schools, and children. Our use of this information is very selective, and driven by the objectives of our analysis and the need for cross-country comparability. Table 2 provides an overview of some of the key features of each survey, with further detail provided in the appendix. While the four datasets share many similarities the task of developing comparable measures of outcomes and background is not simple.

We use information on more than 40,000 children across the four countries born in the first four years of the 21st century. All these children were age 4 to 5 when their outcomes were assessed. The samples were designed to be broadly representative of all children born in the country in the relevant time window, and who remained resident until the dates of the follow-ups. Survey weights are used in all analyses to adjust for over-sampling of certain groups, geographical clustering and non-random attrition. The study-specific details on survey design are discussed in the appendix.

Each of the datasets contains three waves: Wave 1 when the children were age 0 or 1; Wave 2 when they were age 2 or 3; and Wave 3 when they were age 4 or 5. Each wave contains a Parent Interview in which the most knowledgeable parent or care-giver—the child's biological mother in the overwhelming majority of cases—responded to detailed questions on the family's socio-economic circumstances and the early care environment of the child. The Wave 3 modules also include direct assessments of the child's cognitive ability based on several well-known psychometric instruments, parent reports of the frequency the child exhibited certain behaviors, and anthropomorphic measurements.[3] Hence comparable measures of both parental socio-economic status ("P") and

[2] Web address of appendix.
[3] In some cases assessments at Wave 2 are also available. We make only limited use of these measures for comparability reasons, and make it clear when we do so that the outcome in question is not taken from the default Wave 3 survey.

cognitive, socio-emotional and health outcomes in early childhood ("C1") can be constructed for all four countries.

The differences in child development and health at age 4 or 5 are related to two indicators of parental resources. Following the literature on the importance of parental education on child outcomes, the first indicator we use is the highest educational qualification attained by the primary care-giver or partner who is co-resident with the child at the time of the Wave 3 survey. We recode the information to UNESCO's International Standard Classification of Education (ISCED), a scale explicitly designed to enable cross-national comparisons. In this way it is possible to distinguish four common levels: lower secondary or less (Level 2); upper secondary and post-secondary non-tertiary (Levels 3 and 4); first stage tertiary practical/technical/occupationally-specific programs (Level 5B); and first stage tertiary theoretically-based/research preparatory/highly skilled professional programs and second stage tertiary advanced research qualifications (Levels 5A and 6).

Table A1 in the appendix provides details of common national qualifications that fall into each category, and distributions of parental education for the full Wave 3 samples analyzed in this chapter. Inspection of this table alerts us to the fact that the imposition of ISCED definitions results in apparently very different education distributions across the countries. Although the proportion of families in the lowest (Level 2) and highest (Levels 5A/6) categories are roughly similar in three of the four countries, the Canadian distribution is heavily skewed toward the more highly educated. In addition, the proportions of families falling into the middle two categories is complicated by the fact that Level 5B qualifications are relatively more common in Canada and the United States, while Level 3/4 qualifications are the norm among the 'middle-educated' in Australia and the UK. We judge it likely that this discrepancy is more a function of the rigidities of the ISCED classification system than evidence of higher average levels of educational attainment in North America, and for this reason we group Levels 3, 4 and 5B together in a single middle education category that covers around 50% of the population in three of the four countries (and 40% in Canada). Our analysis uses this middle group as the reference category and documents the difference in average outcomes between children in this group and those in the lowest and highest ISCED categories.

The second indicator of parental socio-economic status is average gross household income, divided for the most part into quintile groups. We derive a measure of gross nominal household income at each of the three waves, deflate to 2006 values using national price indices, and convert the amounts to US dollars using OECD purchasing power parity indices. The square root of household size is used as the equivalence scale. These three observations of real gross equivalized household income for each family are then averaged and the survey weights are used to define nationally-representative quintile boundaries.[4] The intent of the averaging is to minimize the influence of transitory fluctuations in income due to employment patterns after child birth, reporting or other factors that may introduce measurement error into the analysis. Measurement error will have a tendency to lead to an understatement of the true relationship between child outcomes and parental resources.

In addition it should be noted that the precision of the income questions posed in the parental interviews differs across the countries. The least detailed measure comes from the US survey, in which parents are asked to give their total gross annual household income in one of thirteen bands. We calculate the percentage of US families in each band (separately for single-parent and couple families, and separately for each wave), and use these percentiles to derive a comparable measure from the more continuous income data in other countries. All families are then classified into one of 26 income/family structure groups at each wave. A representative dollar value for gross household income is assigned to each group and it is this 'lumpy' nominal measure that is used in the rest of the income variable derivation (see the appendix for further details of how these values are assigned).

We organize our analyses by two broad outcome domains: cognitive and socio-emotional. For each domain, we focus primarily on a single outcome measure that is the most comparable across the full set of four countries. We then go on to explore other outcomes that are measured consistently in fewer than four countries or that measure a more narrow sub-set of skills, but which provide some evidence on the robustness of our core findings (see the online appendix for details of these additional outcomes). Our focal cognitive outcomes are picture vocabulary test scores. Children's receptive vocabulary is measured in the Australian, Canadian and American datasets with items from the

[4] We use measures from one or two waves if information on all three waves is not available.

Peabody Picture Vocabulary Test (PPVT). In this assessment the child is shown pictures on an easel and is asked to identify the picture that best represents the meaning of the word read out by the interviewer.[5] The UK picture vocabulary assessment—the British Ability Scales Naming Vocabulary (BAS-NV) test—differs slightly from the PPVT by requiring the child to name out loud the object shown in a single picture. Although this assesses expressive rather than receptive vocabulary, both the BAS-NV and the PPVT are well-known assessments designed to capture verbal ability and tap very similar, if not identical, abilities. For all picture vocabulary tests the sequence of items administered is routed according to the child's responses, and Item Response Theory (IRT) techniques are used to score the final pattern of responses on a single "difficulty scale". The availability of the BAS-NV for the UK children at age 3 as well as age 5 allows some analysis of the sensitivity of vocabulary gradients to age at measurement.

Our core measure of socio-emotional development captures two types of childhood behavior problems: hyperactivity/inattention, and conduct problems. For all countries we derive a total externalizing behavior score that is the sum of ten items (five per type of behavior), each of which is scored 0, 1 or 2 by the parent respondent. Example items ask about the frequency the child: "Fights or bullies other children" (Conduct problems) and is "Restless, overactive, cannot stay still for long" (Hyperactivity/inattention). The instruments used in the Australian and UK studies are identical: the combined Hyperactivity and Conduct problems sub-scales from the parent-report Strengths and Difficulties Questionnaire (SDQ; Goodman 1997). The Canadian and US studies also include sets of parent-report behaviour items that, although not drawn from any single well-recognized behavioral scale, are very similar to the SDQ items selected. The item details are described in the appendix. Given evidence that hyperactivity/inattention and conduct problems differ in the degree to which they are consequential for later outcomes (Duncan and Magnuson, 2009), we also explore gradients in the two measures separately in supplemental analyses.

Descriptive statistics for the two key outcome variables, as they appear in the raw data, are shown in Table 3. It is clear that the vocabulary variables are measured in units that are not

[5] It should be noted, however, that different items and versions of the PPVT were used in different countries. These details are available in the appendix.

comparable across countries, and moreover that have no natural interpretation. The externalizing behaviour variables differ from the vocabulary variables in that they are nominally measured in the same units across countries, although it should be noted that only the Australian and UK behavior scores are measured using an identical instrument.

One way to get some sense of the comparability of the measures is to examine the average increment in the test score associated with an additional one month of age. Such calculations are only approximate, as they are dependent on the range of children's ages at the time of the assessment (see Table 2), and assume linear growth in test scores over that period. Nevertheless, when we express the monthly increment in the vocabulary test score (the regression coefficient on age in months) as a fraction of the overall standard deviation of the variable, we see that the average score increases by a very similar amount per month – between 5% and 7% of a standard deviation – in all four countries. This implies that one standard deviation of a vocabulary score is equivalent to somewhere between 14 to 20 months of development at this age. It is noticeable that there is less systematic variation with child age in the behaviour scores than in the vocabulary scores. In three of the four countries behaviour problems appear to decrease slightly with age, but only at the rate of 1 to 2% of a standard deviation per month, so age equivalents seem a less useful way to think about the magnitude of group differences in this context.[6]

To ease of interpretation of our results across countries and across domains, all outcomes analysed in the remainder of the paper are standardized with mean zero and standard deviation one using the survey weights. Raw outcome variables are adjusted for age (by taking the residuals from a regression of the outcome score on a polynomial of age) before standardization. In addition, although all the raw behavior measures are constructed such that higher scores indicate more behavior problems, we reverse the signs of the standardized variables in our analysis for consistency with the cognitive outcomes. Thus, henceforth in our analysis, higher scores refer to better socio-emotional functioning.

[6] The pattern of decreasing behavior problems with age is supported by a comparison of the UK scores at Wave 2 (age 3) and Wave 3 (age 5) as the mean falls from 6.46 to 4.64 over this period.

4. Descriptive statistics

The composition of the population across the four countries differs substantially. Table 4 shows the average demographic characteristics of all families with 4 to 5 year olds by country. Table 5 provides sample characteristics by education group for each country; Table 6 provides similar information by income group.

Not only are there mean differences in population characteristics across countries, there are also significant differences within education and income groups. Differences in racial/ethnic group membership and immigrant status are particularly notable. For example, while the US displays the most racial/ethnic diversity among the native-born population, Australia and Canada have the highest share of immigrant parents (with roughly a third of children having at least one foreign-born parent). However, children with immigrant parents are much more concentrated in the low education group in the US than in other countries. Half of the low education group in the US is foreign born, in contrast to roughly 30% in Australia and Canada and 17% in the UK (Table 5). These differences are intrinsic features of the countries in question, and it is not clear how to interpret results that 'adjust' them away. Nevertheless, it is of interest to see how the SES gradients in various outcomes are affected by allowing intercept differences for different groups. Hence for some outcomes, we estimate SES gradients conditional on whether the child has a foreign-born parent and the country-specific set of indicators for racial/ethnic group shown in Tables 4 to 6[7].

There are also notable differences across countries in family composition and structure. The US (followed by the UK) has the highest share of single parents and young mothers (mothers under age 20 at the time they gave birth), and the lowest share of older mothers (over age 30). Australia has the highest share of older mothers, while Canada has the lowest number of children in the household. These differences are particularly pronounced in the low and middle SES groups. To the extent that children with more parents in the home, more mature parents, and fewer competing siblings tend to receive more or higher-quality parental inputs, and to the extent these attributes are differentially distributed within SES groups across countries, these differences may help explain variation in the

[7] Note that the Australian survey does not record the child's racial/ethnic background as such, so we are able only to distinguish between Indigenous children and the rest. Definitions from the Canadian survey relate to the race/ethnicity of the main carer rather than the child.

gaps across countries. As with the race/ethnic/immigrant differences, these family characteristics are an intrinsic feature of the countries and it is not clear that our estimates should adjust for them. Nevertheless, in a descriptive sense, it is useful to know to what extent the SES gradients change if these factors are held constant. Thus, for some outcomes we estimate supplemental models where we add controls for these factors in addition to the race/ethnicity and immigrant variables described above.

These summary statistics also confirm the presence of greater income inequality in the United States and United Kingdom than in Australia and Canada. While mean incomes are roughly similar across the four countries, income gaps between education groups are larger in the US and UK (although as noted the distribution of the population across education groups also varies by country, so these groups are not completely comparable). In the United States, for example, the low education group has an average income of $9,680 compared to $19,699 for the middle group and $49,613 for the top group. In contrast, for Australia the comparable figures are $16,090, $21,416, and $33,362.

5. Methods

The relationship between parental SES and a child outcome can be summarized in a single statistic by the correlation between the log of household income and the outcome variable. This correlation coefficient has the advantage that it makes use of the full distributions of both continuous variables. However, to gain a more nuanced picture that allows for non-linearities and comparison of results using household income and parental education as the stratifying variables, we generate estimates from the following least squares regression (estimated separately for each country):

$$y_{ic} = \beta_{0c} + \beta_{Lc}(1 \mid SES_{ic} = Low) + \beta_{Hc}(1 \mid SES_{ic} = High) + \varepsilon_{ic}$$

Where y_{ic} is the standardized outcome measure of child i in country c; $(1 \mid SES_{ic} = Low)$ and $(1 \mid SES_{ic} = High)$ are binary indicators equal to 1 if child i in country c is respectively in the Low or the High SES group; and ε_{ic} is an uncorrelated error term. When SES_{ic} is measured by parental education *Low* denotes ISCED 2 and *High* denotes ISCED 5A/6; when it is measured by parental income *Low* denotes the lowest quintile of average gross household income and *High* denotes the highest quintile.

Gradients are thus measured relative to the mean outcome of children in the middle SES reference group: ISCED 3/5B in the case of education, the middle three quintile groups in the case of income. We refer to β_{Lc} as the bottom-middle gap and β_{Hc} as the top-middle gap. A single summary measure of the inequality in child outcomes is given by (β_{Lc} - β_{Hc}), the difference in mean outcomes between those in the high and low SES groups. All outcome variables are standardized to have unit variance, and so these coefficients represent the number of standard deviations difference between the different SES groups. The appropriate survey weights are used in the calculation of all estimates and sample design features are accounted for in the calculation of confidence intervals.[8]

All four of these countries are characterized by diversity in terms of ethnic and racial identity and immigrant status. For this reason we augment the above equation with controls for race, ethnicity, and immigrant status to examine the extent to which SES gradients are associated with demographic heterogeneity.[9] It is often suggested in the literature that race plays a particularly important role in distinguishing child outcomes in the United States from other countries. But we should also note that these countries have very different policies with respect to immigration selection rules. The variables used to define race and ethnicity are, of necessity, different in each country (see Tables 4 to 6), but we believe that we have been able to capture the most salient features of the within-country heterogeneity.

As discussed, a second way in which families differ across countries, and that might matter in explaining differential SES gaps, is their structure and composition. Accordingly, we estimate an additional model in which we further add controls for single parenthood, age of mother, and number of children in the household.

6. Results

Figure 1 displays the correlations between log gross household income and our two focal outcomes, with 95% confidence intervals shown by the range plots. On the basis of this simple statistic, the four

[8] The exception to this is that the confidence intervals for the correlation coefficient in Australia do not take account of sample design. Also, in all countries, our confidence intervals do not account for the sampling variance associated with the standardization of the dependent variables, and so are slightly too narrow.
[9] An alternative approach would be to re-estimate our models on a sub-sample consisting only of children with non-minority native-born parents. We estimated such models as a robustness check, as discussed below.

countries appear to divide into two groups of two – Australia and Canada show similar relationships between family income and child outcomes that are markedly weaker than the correlations for the United Kingdom and the United States. In both cases the Canadian correlation is the lowest of the four, closely followed by Australia. Among the high correlations, the US income-vocabulary relationship is slightly stronger than that in the UK, while the reverse is true for the income-externalizing behaviour relationship.

However, while these correlations tell us about the overall strength of the association between parental SES and child outcomes, they do not tell us where in the distribution this occurs. For this reason, we turn next to models that explicitly compare outcomes for the top group and the middle, and for the bottom group and the middle.

Figure 2 explores the associations of SES and vocabulary outcomes in more detail. Panel A refers to the overall country results with no controls for demographic characteristics, Panel B shows the results of adding controls on racial/ethnic/immigrant composition, and Panel C adds further controls for family composition and mother's age at birth. The lighter bars in these figures show β_{Hc} , the mean outcome score for the 'top' group minus the mean score for the 'middle' group. The darker bars similarly show β_{Lc}, the bottom-middle gap, with the combined bar lengths (β_{Lc} - β_{Hc}), the gap between the top and bottom, summarized in parentheses alongside the relevant bars. The outcomes are all standardised measures, so that a difference of 0.50 represents a half standard deviation difference in outcomes. The figures also show approximate 95 per cent confidence intervals. Details of all estimates, along with pairwise t-tests of country differences, are provided in the online appendix.[10]

Focusing first on the unconditional estimates in Panel A, we see that the overall differences in vocabulary scores between the top and bottom SES groups mimic the pattern of correlations shown in Figure 2, regardless of whether parental income or education is used as the SES indicator. The US shows the greatest disparities, followed by the UK and Australia, with the smallest average differences found in Canada. Pairwise t-tests of cross-country differences confirm that the top-bottom US gradient is significantly larger than those of each of the other three countries, and also that this

[10] As a rule-of-thumb, when two countries have similar length error bars, the difference between them will be significant at the 5% level if the error bars shown in the figure are reduced by 30% and then do not overlap.

gradient is significantly smaller in Canada than the UK. However, we cannot reject the hypotheses of no significant differences between Australia and either Canada or the UK.

Comparison of the top-middle and bottom-middle gaps reveals that these country differences are almost entirely driven by variation at the upper part of the SES distribution. In no case is the bottom-middle income-related gap significantly different between any pair of countries, although children from the lowest educated families in Canada (6.2% of the cohort) do perform significantly better in a relative sense than their counterparts in either the UK or the US.

Differences at the top end of the distribution are much more marked. American children in the highest education households score 0.60 of a standard deviation higher than children from the middle education group, compared to 0.43 for the UK and 0.33 to 0.35 for the other two countries. A similar pattern is seen for income, with American children in the highest income households scoring 0.62 of a standard deviation higher than children from the middle income group. This gap ranges from to 0.25 (Canada) to 0.33 (Australia) to 0.43 (UK) in the other countries. Again, we cannot reject the hypothesis that the top-middle gaps are equal in Australia and Canada on either measure, nor that the top-middle income gap is the same in Australia and the UK. Other than this, all country differences in the top-middle gaps, and in particular the differences between the US and all other countries, are significant.

Panel B displays a similar set of results, but based upon models that include controls for racial/ethnic diversity and immigrant status.[11] The contrast between these results and those in Panel A highlights the extent to which SES gradients are associated with this heterogeneity, and in particular the extent to which the greater divergence in vocabulary scores in the United States is associated with the racial and ethnic heterogeneity in that country.

As expected, the overall lengths of the bars are generally either smaller or the same length as those in Panel A (this can also be seen in appendix Table A3). The portion of the SES gradients explained by these controls is particularly large for the US. For example, after controlling for

[11] An alternative approach would be to estimate a model only for the non-minority and native-born sub-group in each country. We did estimate such models as a robustness check (shown in appendix table A3) and found the results were broadly comparable to those obtained in the full sample model with controls for minority status and foreign-born. We also estimated more detailed models including controls for language spoken in the home (although the variables regarding language are not fully comparable across countries) and results were similar.

race/ethnicity and immigration status, the gap in vocabulary scores between children of middle-income and high-income parents falls by 36% in the US as compared to 9% in Australia and 24% in the UK. After controlling for race/ethnicity and immigration status the top-middle differences between the US and both Canada and Australia are reduced, but not eliminated. No significant differences in the any of the vocabulary gradients between the US and the UK, however, remain in Panel B. It appears that some, but not all, of the greater variation in vocabulary outcomes in the US is associated with the divergent outcomes of children in different racial/ethnic and nativity groups within that country, but that significant differences between the US and other countries remain.

Panel C shows the estimates from a further set of models adding, in addition to the above controls, a set of controls for single parent, age of mother (binary indicators for below 20 or above 30 at the time of the birth), and number of children in the home. The results show that the correlation between family composition and SES contributes to the vocabulary gradients in all four countries, but does little to explain the country differences, which remain largely unchanged from Panel B. Again, no differences between the US and the UK remain, but high SES children in the US continue to exhibit an advantage in vocabulary that is relatively greater than for their counterparts in either Australia or Canada.

While the vocabulary measures presented in Figure 2 are the most comparable measures of child cognitive development across the four countries, the surveys also include a number of other cognitive scores. Figure 3 offers a brief look at the two cognitive domains where we have comparable data for three countries (estimates of the unconditional gradients in all supplementary outcomes are available in the online appendix). It is unfortunate that the instruments used to measure math skills differ considerably across the three countries in which they were included, and are only available for the UK at the earlier Wave 2 (age 3). The copying instrument was identical in the Australian and Canadian surveys, but again differs in the US case. Hence we cannot draw strong conclusions from the correlations shown in Figure 3, but it is noticeable that the ranking of the countries under both additional measures is the same as for the vocabulary measure – the US shows the greatest disparities in both outcomes, followed by the UK and Australia, with the lowest correlations found in the Canadian measures. Analysis of the top-middle and bottom-middle gaps (not shown here) shows that

as before higher US gradients are generally driven by greater disparities at the top of the SES distribution, although some differences in the relative position of the lowest SES groups are also discernable.

Figure 4 depicts in more detail the socio-economic gradients in our most comparable measure of socio-emotional functioning, externalizing behaviours. As suggested by the correlations in Figure 1, SES-related disparities in behavioral outcomes are smaller than in cognitive outcomes in all countries. The unconditional results in Panel A highlight Canada as a clear outlier in this domain, and t-tests provided in the appendix confirm that all top-bottom and top-middle gradients – whether by income or education – are significantly smaller in Canada than all the other three countries. Assessment of the relative position of low SES children in Canada varies depending on whether income or education is the stratifying variable – the bottom-middle income gap is not significantly different in Canada to that in any of the other countries, but children of the low-educated show smaller disparities in externalizing behaviour than elsewhere.

In contrast to the results for vocabulary outcomes, the greatest disparities in behavioral outcomes are found not in the US but in the UK. Differences between high- and middle-SES children are virtually identical in the two countries, and it solely the relatively greater behavioral problems of low SES children in the UK that are responsible for this finding.

The addition of racial/ethnic/nativity controls in Panel B makes very little difference to the estimated gradients in any country, but the demographic controls added in Panel C have a stronger explanatory role, suggesting that somewhat different mechanisms underlie the gradients in cognitive and socio-emotional outcomes. The smaller behavioral gradients in Canada are not accounted for by any of the controls, but differences between the UK and both the US and Australia becomes insignificant when family composition and maternal age are held constant. Additional analyses provided in the appendix find little systematic variation across countries in the gradients of the sub-domains of hyperactivity/inattention and conduct problems. Low SES children in the UK have the greatest disparities in both sub-domains of all the four countries, and overall gradients are the lowest in Canada on both measures.

6. Some implications

While it is very difficult to ascribe the variation in outcomes to particular policies or institutions, our results do complement other indicators of social inequality and mobility, and offer a starting point to reflect upon the particular accomplishments and challenges in each country. In particular, our results indicate that, in spite of the broad similarities, young children grow up in very different contexts in these four countries.

The descriptive statistics in Tables 4, 5, and 6 highlight the fact that the resources—both monetary and non-monetary—families are able to bring to bear differ in an absolute sense across these countries. While overall average income, at about $26,000 to $29,000, is about the same it is distributed differently, with parents having low levels of education having substantially less income in the United Kingdom, and particularly in the United States. But this reflects a number of other demographic factors that also determine the amount of time and other non-monetary resources parents have to invest in their young children. Children raised in the bottom of the income distribution are more likely to have parents with low levels of education, mothers who tend to be younger at the child's birth, and more likely to be in a single parent household.

In addition, our analysis has emphasized the importance of racial/ethnic and cultural diversity and the fact that this seems to play out across socio-economic groups in a different way in the four countries. The proportion of children in our samples living with foreign born parents does not differ significantly according to parental income in Australia, Canada, and the United Kingdom. About 30% of the low educated parents of four and five year old children are foreign born in Australia and Canada, while about the same fraction (and indeed an even higher fraction) of the high educated parents are also foreign born. In the United Kingdom these figures are lower in level, but they also do not vary significantly according to parental education levels. But in the United States close to one of every two children with low educated parents are being raised by foreign born parents, but just less than one-in-five when the parent has high education.

The issue of race and in particular the place of the black population in American society aside, these results reflect very different immigration selection rules. The most extreme contrast is between the United States, on the one hand, and Canada and Australia on the other. Reliance on low

skilled immigrants with often a tenuous legal footing in the United States contrasts with a focus on high skilled migration in Australia and until recently Canada. Further a higher proportion of low skilled immigrants arriving in these latter countries tend to come from countries which place a high value on education and labor market success. The experience of the children of south-east Asian parents is an often cited example. This is in contrast with a relatively high proportion of immigrants to the United States from Hispanic countries, in particular, Mexico. The intergenerational consequences of immigration rules is increasingly becoming clear, with immigrant and second generation children faring much more favorably in a host of teen and adult outcomes in some countries than others (Corak 2008, OECD 2006).

While immigration policies may have long-term, and often unintended, consequences for social outcomes in the next generation, it would be a mistake to place the entire emphasis on them or for that matter on the characteristics of families. There are a host of broader issues associated with the support that families in challenging circumstances can rely upon. As we emphasized earlier, children experience very different policy contexts across the four countries in four policy domains that determine the amount of time parents have for non-market activities associated with family life, as well as other material resources important for the development of children: parental leave, child care, income supports for families with young children, and health insurance. Exploring the role of these policy contexts in early inequalities is an important challenge for future research.

8. Conclusion

This chapter is intended to shed light on the origins of inequality and social immobility by examining the gaps that exist in cognitive and socio-emotional development in early childhood in four countries that share a good deal in common, but that also display important differences. We emphasize three basic findings and also offer some thoughts about the use of cross-country comparative data.

First, our analysis of four and five year olds in Australia, Canada, the United Kingdom, and the United States finds that while gaps in readiness to learn between the children of relatively advantaged and relatively disadvantaged families are clearly evident in each country, there is also variation across them. In general, differences in cognitive development seem to be more strongly

linked to disparities in parental resources in the United States than in the other countries. There is also a suggestion in the data that behavioral problem gaps tend to be larger in the United Kingdom. In this sense we highlight a couple of particular challenges faced by children in these two countries.

Second, we find SES gaps not only at the bottom but also at the top of the distribution. Thus, any explanation must account both for why children at the bottom do not do as well as children in the mainstream, but also why children at the top out-perform children in the middle, particularly in the US. One hypothesis, which might be tested in future research, is that families in the middle receive less support in the US due to the highly targeted nature of its social welfare system, and thus lag further behind those at the top. Another factor may be the greater disparity of incomes in the US, with particularly high incomes for those at the top.

Third, the extent of these disparities and the differences across these countries is somewhat muted when account is taken of the diversity in demographic composition of the population. The outcomes look more similar when account is made of these differences, particularly between the US and UK where no significant differences remain. This reflects the fact that populations vary by race/ethnicity, immigrant status and family composition in different ways across countries, and also that the links between these characteristics and the outcomes we consider are not uniform across countries. Like many other countries in the OECD these countries will increasingly face the need to cope with racial and ethnic diversity and other demographic shifts, and to integrate and foster the development of new citizens. How they address these challenges will in turn affect the degree to which the transmission of inequality across the generations is rooted in the early years.

In addition to these substantive conclusions, we also offer a call for more attention to comparable data across a larger number of OECD countries. Our analysis is descriptive, but good description is often the first step to informed policy discussion and hypotheses about causal relationships. While the data we rely upon are extremely rich, they are designed to inform public policy by offering a longitudinal perspective on child development in a particular national context. This no doubt is central to an appreciation of the causal mechanisms determining outcomes, but without attention to the comparability of measures across countries, an opportunity is missed to illustrate the role of different public policies and social situations. We draw an analogy to the

important role that the Programme of International Student Assessment has had on discussions of schooling outcomes for 15 year olds across the entire OECD. Now that public policy has come to fully appreciate that this variation is also routed in disparities of outcomes during the early years, the development of a similar instrument offering comparable cross-sectional indicators over many more countries than we are able to examine here would inform the quality of future research and public discourse directed to the well being of children.

In this paper we find clear evidence of differences in the correlation between socio-economic status and child cognitive outcomes. This is strongest in the US and weakest in Australia and Canada, with the UK in-between. Although our four countries share a common heritage, their economic and social policy environments do differ in many ways. Although our results cannot be used to point unambiguously to any particular causal determinant, they do suggest the importance of future research on the role that specific policies might play.

Our findings are also relevant to some of the larger questions about intergenerational mobility addressed in this volume. Previous research has shown a noticeable (though admittedly not large) positive correlation between high parental inequality and high levels of parent-child immobility of adult income levels (Bjorklund and Jantti, 2008). Indeed the US experience of high inequality and high intergenerational immobility is a key data point for this cross-national correlation. It is certainly not inevitable that high inequality should imply low mobility, indeed the rhetoric advanced in unequal societies is often just the opposite. The results found here can be seen as contributing to an explanation of this relationship. The distribution of resources available to families with young children does seem to matter for their developmental outcomes – and this in turn is one part of the explanation for the broader patterns of intergenerational mobility.

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Table 1. Indicators of economic and policy inputs into child well-being inequality

	Australia	Canada	United Kingdom	USA
Inequality (Gini, 2003-2004)	0.31	0.32	0.35	0.37
Child poverty (relative, 2005)	11.8	15.1	10.1	20.6
Per capita social expenditure on children aged < 6 as proportion of median working-age income				
Cash and tax breaks	9.9	na	8.9	4.3
Child care, education and other	8.8	na	12.7	6.4
Public expenditure as share of total health expenditure (2005)	66.9	70.3	81.9	44.4

Source: LIS (2010), OECD (2009a), OECD (2009b)

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Table 2. Overview of datasets

	Australia	Canada	UK	US
Survey name	Longitudinal Study of Australian Children Birth Cohort (LSAC)	National Longitudinal Study of Children and Youth (NLSCY)	Millennium Cohort Study (MCS)	Early Childhood Longitudinal Study Birth Cohort (ECLS-B)
Year of birth (range)	March 2003 to February 2004	Jan 2000 to Dec 2002	Sept 2000 to Jan 2002	Jan 2001 to Dec 2001
Exclusions from eligible birth cohort	Non-permanent residents; children with the same name as deceased children; only one child per household	Children living on reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces, and residents of some remote regions.	Families ineligible for Child Benefit	Children born to mothers less than 15 years old; children adopted before 9 months old.
Sampling frame	Medicare Australia database, clustered by postal area.	Labour Force Survey using the 1994 and 2004 design	Child benefit records, clustered by electoral ward. Oversamples: 3 smaller countries in UK; areas >30% Black/Asian; areas with Child Poverty Index >75th percentile.	Registered births in the vital statistics system. Oversamples: twins; low and very low birth weight babies; American Indians; Chinese; Other Asian/Pacific Islanders.
# children ever participated	5,107	8,522	19,517	10,700*
Wave 1 response rate	57% (33% refusal, 11% non-contact)	74.9%	76.7%	71.6%
# children in Wave 3	4,386	7,147	15,460	8,950*
% ever participated in Wave 3	85.9%	83.9%	79.2%	83.7%
Mean age in months at Wave 3	57.7	58.6	62.1	53.0
SD age in months at Wave 3	2.9	6.7	3.0	4.2

* ECLS-B frequencies rounded to the nearest 50 in accordance with NCES reporting rules.

Table 3. Descriptive statistics for key raw outcome variables

	Vocabulary				Externalizing behavior			
	AU	CN	UK	US	AU	CN	UK	US
Observations	4266	6234	15168	8450*	3823	6758	13474	8900*
Mean	64.61	57.94	108.40	8.50	6.64	3.93	4.64	5.62
Standard deviation (SD)	6.38	20.00	15.88	1.99	3.33	3.14	3.36	3.86
Minimum	34.19	na	10	4.62	0	0	0	0
Maximum	84.78	na	170	13.63	20	20	20	20
Mean monthly increment	0.39	1.35	0.85	0.09	0.03	-0.03	-0.05	-0.02
Monthly increment / SD	0.06	0.07	0.05	0.05	0.01	-0.01	-0.02	-0.01

* ECLS-B frequencies rounded to the nearest 50 in accordance with NCES reporting rules.

Notes: Higher vocabulary scores denote more favourable outcomes here and throughout our analysis. Higher externalizing behaviour scores denote more adverse outcomes in Table 3 only – the sign of the standardized behaviour measures are reversed in all following tables for consistency with the cognitive measures. The minimum and maximum of the Canadian vocabulary are not released by Statistics Canada. The mean monthly increment the linear regression slope of the outcome against age in months at assessment. All statistics calculated using survey weights.

Table 4. Average characteristics of families with 4 to 5 year old children, by country

	AU (N = 4,386)	CN (N = 6812)	UK (N = 15,460)	US (N = 8,500)*
Low education (ISCED 2)	8.2%	6.2%	12.2%	10.4%
Middle education (ISCED 3/5B)	53.5%	39.6%	52.9%	56.6%
High education (ISCED 5A/6)	38.4%	54.2%	34.1%	33.0%
Mean household income (SD)	25,569 (15,375)	29,539 (17,983)	27,195 (19,447)	28,534 (27,604)
Single parent household at W3	15.0%	14.4%	19.7%	21.8%
Mother <20 at birth	4.0%	3.4%	7.6%	11.0%
Mother >30 at birth	50.0%	42.6%	40.8%	31.7%
Under 18s in household at W3	2.51 (1.05)	2.25 (0.98)	2.40 (1.05)	2.44 (1.14)
Foreign-born parent	33.0%	31.5%	13.0%	23.4%
White (non-Hispanic for US)	-	81.0%	86.7%	54.0%
Black (non-Hispanic for US)	-	3.3%	2.8%	13.8%
Hispanic	-	-	-	25.1%
Asian	-	-	-	2.6%
South Asian	-	4.9%	-	-
Pakistani/Bangladeshi	-	-	4.2%	-
Indian	-	-	1.8%	-
Chinese	-	2.4%	-	-
Indigenous (AU)/ Aboriginals (CN)	4.9%	1.9%	-	-
Mixed	-	-	3.3%	-
Race/ethnicity NOC	-	6.6%	1.2%	4.5%

* ECLS-B frequencies rounded to the nearest 50 in accordance with NCES reporting rules.

Table 5. Average characteristics of families with 4 to 5 year old children, by parental education and country

	AU (N = 4265)	CN (N = 6812)	UK (N = 15,460)	US (N = 8,500)*
A. LOW EDUCATION GROUP				
Mean household income (SD)	16,090 (12,248)	14,712 (7,641)	11,412 (7,034)	9,680 (6,524)
Single parent household at W3	48.0%	36.9%	47.7%	43.8%
Mother <20 at birth	15.0%	12.4%	21.1%	24.6%
Mother >30 at birth	43.0%	30.5%	25.5%	17.1%
Under 18s in household at W3	2.76 (1.41)	2.57 (1.48)	2.80 (1.38)	2.80 (1.40)
Foreign-born parent	29.0%	29.8%	17.0%	49.3%
White (non-Hispanic for US)	-	76.3%	77.0%	17.8%
Black (non-Hispanic for US)	-	5.0%	4.6%	18.5%
Hispanic	-	-	-	58.1%
Asian	-	-	-	2.0%
South Asian	-	1.8%	-	-
Pakistani/Bangladeshi	-	-	10.2%	-
Indian	-	-	1.9%	-
Chinese	-	1.7%	-	-
Indigenous (AU)/ Aboriginals (CN)	15.5%	8.2%	-	-
Mixed	-	-	4.4%	-
Race/ethnicity NEC	-	7.1%	1.9%	3.6%
B. MIDDLE EDUCATION GROUP				
Mean household income (SD)	21,416 (10,703)	23,738 (12,586)	21,902 (13,980)	19,699 (15,187)
Single parent household at W3	17.0%	19.5%	21.7%	26.7%
Mother <20 at birth	5.0%	5.3%	8.7%	14.5%
Mother >30 at birth	43.0%	31.7%	33.7%	21.5%
Under 18s in household at W3	2.55 (1.11)	2.34 (1.02)	2.37 (1.05)	2.44 (1.17)
Foreign-born parent	29.0%	30.3%	10.2%	20.7%
White (non-Hispanic for US)	-	81.0%	88.3%	49.0%
Black (non-Hispanic for US)	-	4.2%	2.4%	17.5%
Hispanic	-	-	-	27.1%
Asian	-	-	-	1.3%
South Asian	-	4.5%	-	-
Pakistani/Bangladeshi	-	-	3.9%	-
Indian	-	-	1.5%	-
Chinese	-	1.4%	-	-
Indigenous (AU)/ Aboriginals (CN)	6.1%	2.2%	-	-
Mixed	-	-	2.9%	-
Race/ethnicity NEC	-	6.7%	1.0%	5.1%

	AU (N = 4265)	CN (N = 6812)	UK (N = 15,460)	US (N = 8,500)*
C. HIGH EDUCATION GROUP				
Mean household income (SD)	33,362 (17,908)	36,002 (19,610)	41,149 (21,197)	49,613 (34,779)
Single parent household at W3	5.0%	8.1%	6.3%	6.5%
Mother <20 at birth	1.0%	1.1%	1.0%	0.8%
Mother >30 at birth	63.0%	50.9%	57.2%	53.7%
Under 18s in household at W3	2.41 (0.86)	2.23 (0.87)	2.29 (0.85)	2.33 (0.98)
Foreign-born parent	39.0%	32.1%	15.9%	19.8%
White (non-Hispanic for US)	-	81.4%	88.1%	74.0%
Black (non-Hispanic for US)	-	2.5%	2.7%	6.1%
Hispanic	-	-	-	11.3%
Asian	-	-	-	4.9%
South Asian	-	5.5%	-	-
Pakistani/Bangladeshi	-	-	2.1%	-
Indian	-	-	2.3%	-
Chinese	-	3.1%	-	-
Indigenous (AU)/ Aboriginals (CN)	1.1%	0.8%	-	-
Mixed	-	-	3.4%	-
Race/ethnicity NEC	-	6.6%	1.3%	3.8%

* ECLS-B frequencies rounded to the nearest 50 in accordance with NCES reporting rules.

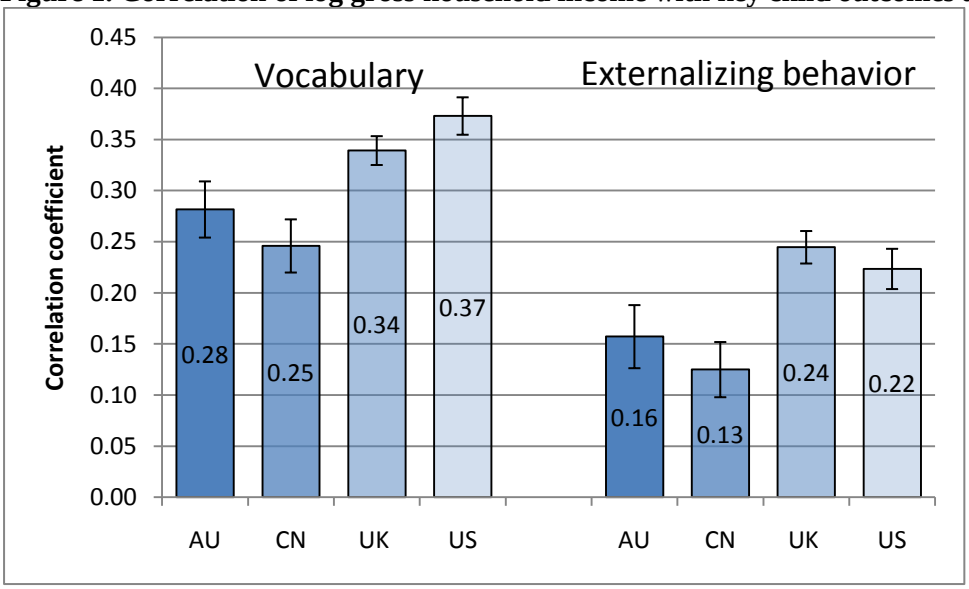
Table 6. Average characteristics of families with 4 to 5 year old children, by parental income group and country

	AU (N = 4239)	CN (N = 6848)	UK (N = 15,460)	US (N = 8,500)*
A. LOW INCOME GROUP				
Low education (ISCED 2)	21.7%	19.9%	35.9%	28.9%
Middle education (ISCED 3/5B)	63.3%	53.1%	56.4%	68.0%
High education (ISCED 5A/6)	15.0%	27.0%	6.0%	3.2%
Mean household income (SD)	9,784 (2,839)	11,026 (2,954)	7,648 (1,678)	6,003 (2,536)
Single parent household at W3	41.0%	38.5%	55.7%	47.0%
Mother <20 at birth	10.0%	10.6%	22.6%	22.3%
Mother >30 at birth	40.0%	30.0%	21.1%	17.6%
Under 18s in household at W3	2.87 (1.44)	2.53 (1.25)	2.61 (1.29)	2.84 (1.39)
Foreign-born parent	37.0%	46.7%	16.2%	29.7%
White (non-Hispanic for US)	-	68.5%	74.2%	26.6%
Black (non-Hispanic for US)	-	6.6%	5.9%	31.3%
Hispanic	-	-	-	35.8%
Asian	-	-	-	1.2%
South Asian	-	8.8%	-	-
Pakistani/Bangladeshi	-	-	10.6%	-
Indian	-	-	1.7%	-
Chinese	-	2.6%	-	-
Indigenous (AU)/ Aboriginals (CN)	12.6%	4.8%	-	-
Mixed	-	-	6.0%	-
Race/ethnicity NEC	-	8.7%	1.6%	5.1%
B. MIDDLE INCOME GROUP				
Low education (ISCED 2)	5.8%	3.7%	7.8%	7.5%
Middle education (ISCED 3/5B)	59.2%	42.4%	61.2%	65.1%
High education (ISCED 5A/6)	35.0%	53.9%	30.5%	27.4%
Mean household income (SD)	23,029 (5,633)	26,835 (7,202)	23,257 (8,447)	22,367 (9,218)
Single parent household at W3	11.0%	9.7%	13.2%	18.4%
Mother <20 at birth	3.0%	2.1%	5.3%	10.5%
Mother >30 at birth	48.0%	39.3%	38.5%	26.7%
Under 18s in household at W3	2.50 (0.94)	2.23 (0.91)	2.40 (1.02)	2.39 (1.09)
Foreign-born parent	29.0%	28.2%	10.8%	23.2%
White (non-Hispanic for US)	-	83.1%	89.8%	54.9%
Black (non-Hispanic for US)	-	2.8%	2.1%	11.2%
Hispanic	-	-	-	26.9%
Asian	-	-	-	2.4%
South Asian	-	4.5%	-	-

	AU (N = 4239)	CN (N = 6848)	UK (N = 15,460)	US (N = 8,500)*
Pakistani/Bangladeshi	-	-	2.9%	-
Indian	-	-	1.8%	-
Chinese	-	1.9%	-	-
Indigenous (AU)/ Aboriginals (CN)	3.8%	1.4%	-	-
Mixed	-	-	2.4%	-
Race/ethnicity NEC	-	6.3%	1.1%	4.6%
C. HIGH INCOME GROUP				
Low education (ISCED 2)	1.7%	0.5%	0.6%	0.3%
Middle education (ISCED 3/5B)	26.0%	16.9%	23.4%	19.0%
High education (ISCED 5A/6)	72.3%	82.6%	75.5%	80.6%
Mean household income (SD)	49,081 (16,130)	57,889 (18,,239)	59,395 (15,383)	70,489 (34,766)
Single parent household at W3	3.0%	4.7%	2.9%	6.1%
Mother <20 at birth	0.0%	0.2%	0.3%	0.4%
Mother >30 at birth	67.0%	61.3%	66.3%	61.4%
Under 18s in household at W3	2.21 (0.79)	2.04 (0.79)	2.16 (0.77)	2.19 (0.88)
Foreign-born parent	40.0%	29.0%	13.5%	16.8%
White (non-Hispanic for US)	-	87.1%	92.4%	79.8%
Black (non-Hispanic for US)	-	1.7%	1.4%	3.7%
Hispanic	-	-	-	8.2%
Asian	-	-	-	4.4%
South Asian	-	1.9%	-	-
Pakistani/Bangladeshi	-	-	0.6%	-
Indian	-	-	1.6%	-
Chinese	-	3.4%	-	-
Indigenous (AU)/ Aboriginals (CN)	0.9%	0.4%	-	-
Mixed	-	-	3.1%	-
Race/ethnicity NEC	-	5.5%	0.7%	3.9%

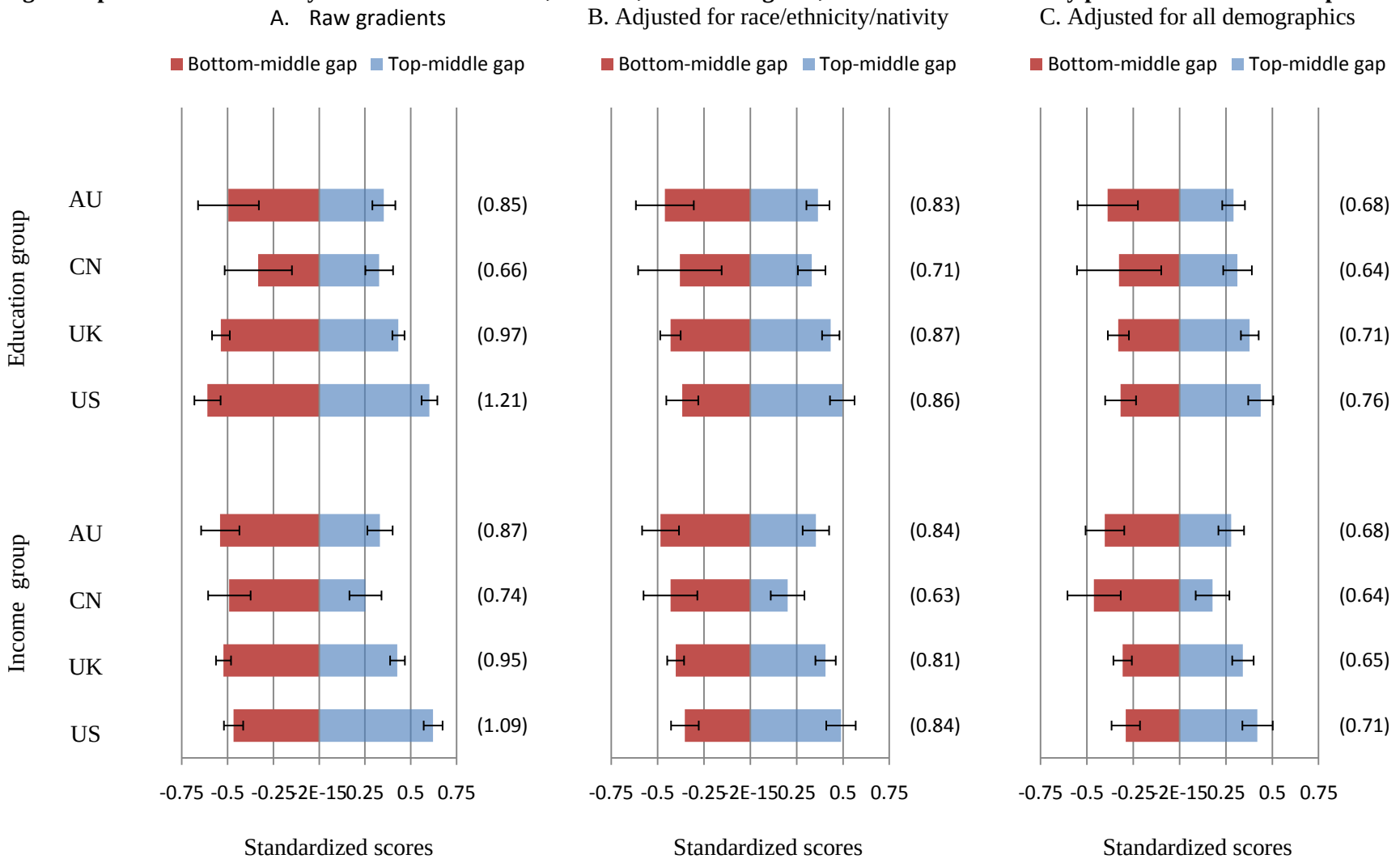
* ECLS-B frequencies rounded to the nearest 50 in accordance with NCES reporting rules.

Figure 1. Correlation of log gross household income with key child outcomes at age 4 to 5



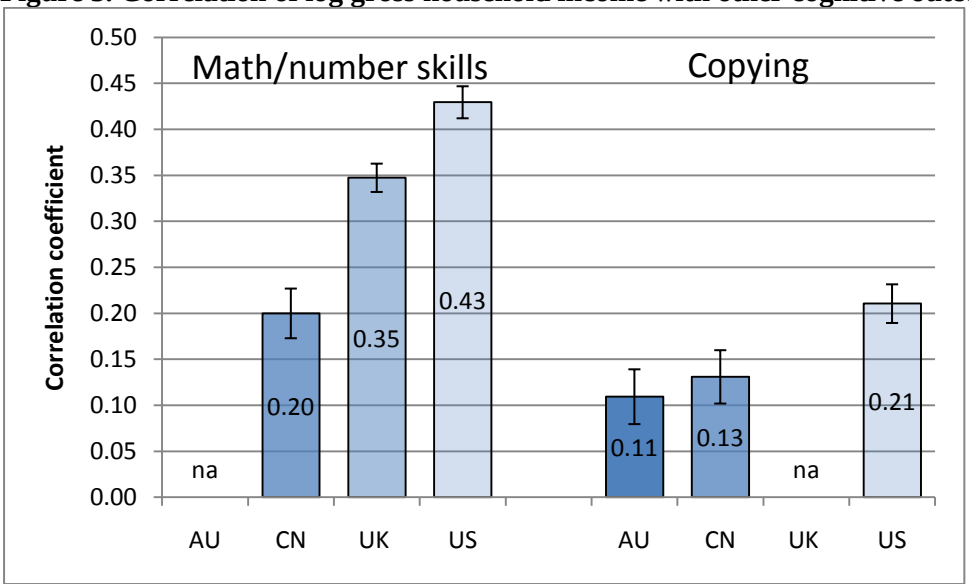
Range plots show 95% confident intervals.

Fig 2. Disparities in vocabulary outcomes in Australia, Canada, United Kingdom, and the United States by parental education and parental income



Numbers in parentheses are the total gap between the top and bottom groups (the sum of the darker and lighter bars). Range plots show 95% confidence intervals. The control variables introduced in Panels B and C are listed in Table 4.

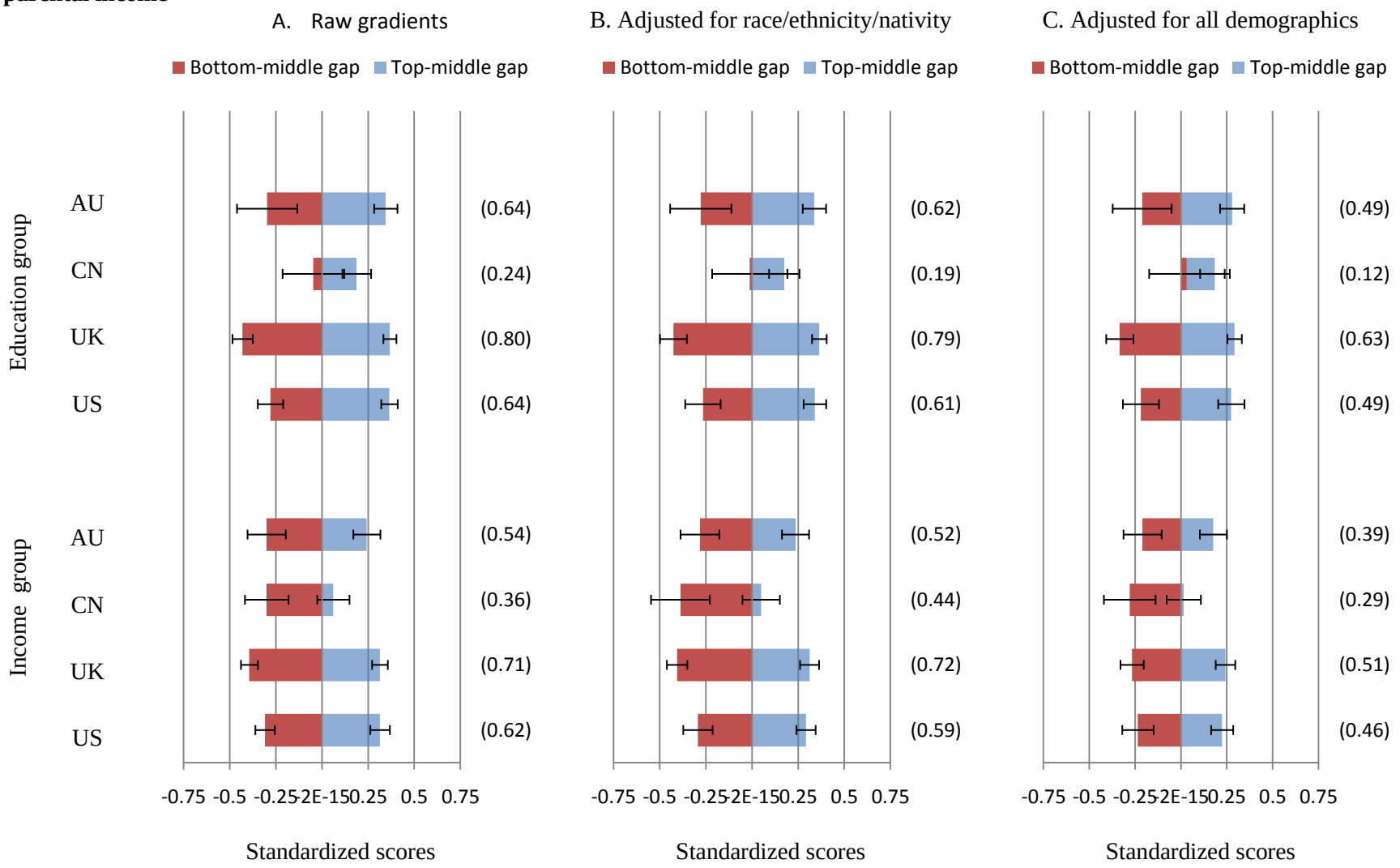
Figure 3. Correlation of log gross household income with other cognitive outcomes at age 4 to 5



Range plots show 95% confident intervals. na indicates the measure is not available for that country.

Math/number skills were assessed using the Number Knowledge assessment in Canada, and the ECLS-B Math assessment in the US. The UK measure is the sum of four of the six Bracken School Readiness Assessment (BRSA) sub-scales - Numbers; Sizes; Shapes and Comparisons – which were administered in Wave 2 only when the MCS children were age 3. Copying was assessed via the Copying sub-scale of the Who Am I assessment in Canada and Australia, and via the ECLS-B copying forms task in the US. See the online appendix for further details.

Figure 4. Disparities in externalizing behaviour problems in Australia, Canada, United Kingdom, and the United States by parental education and parental income



Numbers in parentheses are the total gap between the top and bottom groups (the sum of the darker and lighter bars).