INEQUALITY IN CHILD DEVELOPMENT ACROSS THE EARLY SCHOOL YEARS IN AUSTRALIA, CANADA, THE UNITED KINGDOM, AND THE UNITED STATES

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One of the most disturbing aspects of social inequality is the transmission of inequality across generations. Children from lower-socioeconomic status (SES) families enter school with lower levels of school readiness than their more affluent peers, and evidence from the US suggests that these SES gradients in school readiness if anything widen during the school years, such that children leave school with vastly unequal attainment and skills.

This paper uses data on contemporary cohorts from Australia, Canada, UK, and US to examine how these US patterns of SES gradients compare with those in similar countries and what these other countries do to mitigate inequality. The countries selected for the analysis share some common features (including comparable data) but also present distinct policy contexts and thus offer contrasting cases to the US. The paper examines three key questions:

1) whether SES gradients widen or diminish as children move through the school years,
2) how these patterns vary across the four countries and whether that variation is associated with cross-country differences in policies, resources, and/or institutions, and
3) how these patterns with gender and the position of the child in the ability distribution.

Background

Inequality related to socioeconomic status – what we term the SES gradient – is well-documented in the US, as is inequality associated with race/ethnicity (see e.g. Duncan and Brooks-Gunn, 1997; Fryer and Levitt, 2004; Jencks and Phillips, 1998; Lee and Burkam, 2002; Magnuson and Waldfogel, 2005, 2008; Murnane et al., 2006). Moreover, previous research suggests that the SES gradient in school readiness is larger in the US than in other countries. (Bradbury et al., 2012, Waldfogel and Washbrook, 2011a and b; Washbrook et al., 2012, Magnuson et al., 2012),

However, we know less about whether and how the subsequent evolution of the SES gradient in school achievement as children move through school, differs across countries and if so, why. This question is important because the implication of initial SES gradients in children's development depends on how consequential those are in the long-run. Early gaps might be closed or reduced as children move through school, or early inequality might persist or widen, leading to higher levels of social inequality for future generations (Heckman and Lochner, 2000).

There is some limited evidence on these questions for the US and UK. Early research in the US reported that inequality between SES groups narrows during the first few years of school (Stipek and Ryan, 1997), but more recent large-scale studies in the US have found that SES-related gaps widen (Carneiro and Heckman, 2003; Rathbun et al., 2004). Recent UK studies also find inequality widens after school entry (DCSF, 2009; Feinstein, 2003, 2004; Goodman and Gregg, 2010; Goodman et al., 2009). In our previous research analyzing SES gaps from school entry to age 14 in the US and in one region in the UK, we found that patterns differ across the two countries (Magnuson et al., 2012). In the US, SES-related gaps diminish somewhat in the first few years of school but then widen (although patterns vary depending on whether

standardized or raw scores are used). In the UK, in contrast, gaps are relatively constant through primary school but then widen in secondary school. This latter finding is confirmed by Ermisch and Del Bono (2012).

Firm conclusions about differences across a larger set of countries, however, have been hampered by a lack of cross-nationally comparable panel data. Ermisch and Del Bono (2012) examine inequality for adolescents in six countries and report that gaps are largest in the US, second largest in the UK (and three other European countries), and smallest in Australia and Canada, but with only cross-sectional data they are not able explore the evolution of the gaps. Jerrim and Micklewright (2012) provide suggestive evidence: using data on pseudo cohorts from PIRLS and PISA, they find that SES gradients widen less between age 10 and 15 in some countries (including Canada) than they do in the US and UK. However, their results are sensitive to the measure of SES and they lack data on children's skills at school entry.

All the studies described above estimate a single SES gradient that is assumed to apply to all groups of children. The question of whether SES matters differentially for boys, for example, or for high-achievers, has received little attention in a cross-national context, but is potentially important for understanding which groups benefit most (or least) from particular policy environments.

Data

Our analyses will make use of four large nationally representative longitudinal datasets (see Table 1). Each follows children from school entry when they were age 4 (or 5) through to at least age 11 (and sometimes beyond). We will use these datasets to carry out parallel analyses of the evolution of SES gradients in development and health as children move through school across the four countries. Our primary focus will be on school achievement, as measured by tests of reading and math, but we will also examine emotional and behavioral development and selected health outcomes.

Table 1: Key datasets

	Australia	Canada	UK	US
Survey name	Longitudinal Study of Australian Children Kindergarten Cohort (LSAC)	National Longitudinal Study of Children and Youth (NLSCY)	Millennium Cohort Study (MCS)	Early Childhood Longitudinal Study Kindergarten Cohort (ECLS-K)
Year of birth	Mar 1999 to Feb 2000	1991 to 1997	Sept 2000 to Jan 2002	~1993
Sample size	4,983	~6000	19,517	21,400
Age at outcome assessments	4/5, 6/7, 8/9, 10/11, 12/13 years	4/5, 6/7, 8/9, 10/11, 12/13 years	5, 7, 11 years	Fall & Spring K, 1st,5th & 8th grade
Cognitive outcomes	Peabody Picture Vocabulary Test (PPVT); Who Am I? Test (WAI); Matrix reasoning Teacher-rated math and language skills	PPVT; WAI; Number Knowledge; Canadian Achievement Tests in Math and Reading	BAS: Naming Vocabulary; Picture Similarities; Pattern Construction & Number Skills; Word Reading. Progress in Mathematics. NFER test of reading & math, Douglas test of verbal & nonverbal ability	Reading and Math ECLS-K IRT scores
Socio-emotional outcomes	SDQ behavior scale (parent report)	Behavior checklist (parent report)	SDQ behavior scale (parent report)	Behavior checklist (teacher report)
Health	BMI, parent-rated general	BMI, parent-rated	BMI, parent-rated general	BMI, parent-rated

outcomes	health	general health	health	general health
Child investment measures	Parental employment, fee-paying primary school, private tuition, doctor visits, specialist visits, parenting	Parental employment, fee-paying primary school, private tuition, doctor visits, specialist visits, parenting	Parental employment, fee-paying primary school, private tuition, doctor visits, specialist visits, parenting	Parental employment, fee-paying primary school, private tuition, doctor visits, specialist visits, parenting

A key part of our approach is to assess the robustness of findings using the multiple outcome measures at a given age available in our uniquely rich data. In addition, we will compare the similarity of age- and gender-related gradients in standardized scores of ability taken from different tests and by comparing with other (US) datasets.

We will be able to take advantage of some measures that are highly comparable between at least two of the countries. Identical assessments include the Who Am I in Australia and Canada, and the Strengths and Difficulties Questionnaire in the UK and Australia. Versions of the PPVT are used in Canada and Australia (and in datasets other than the ECLS-K in the US). The existence of these scores helps check the validity of our broader results. In addition, in many instances even when the tests are not identical, the underlying abilities being assessed, such as reading or math, are arguably the same. Our main analyses will report results using standardized scores, but we will also report supplemental results using raw scores.

Our primary measures of SES will be parental education (measured as the highest education of either parent in the home, although we will also test for differences by maternal and paternal education) and parental income quintiles (groups defined on PPP-adjusted US income quintile boundaries will also be examined).

Analyses

In characterizing the evolution of SES gradients across countries, we will test for patterns of 'fanning out' or 'fanning in' of SES gradients. We will also carry out analyses where the SES gradient is allowed to vary with gender (by means of interaction terms) and by position in the ability distribution (by means of quantile regression). The latter set of analyses, for example, allow us to compare whether the outcomes of economically disadvantaged children with high potential are maximized in the US in the same way as in other countries.

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