Trajectories of health inequalities in LifeCycle: draft analysis plan

Tim Cadman

18th February 2019

Contents

1 Test

See Figure 1 for a test figure.

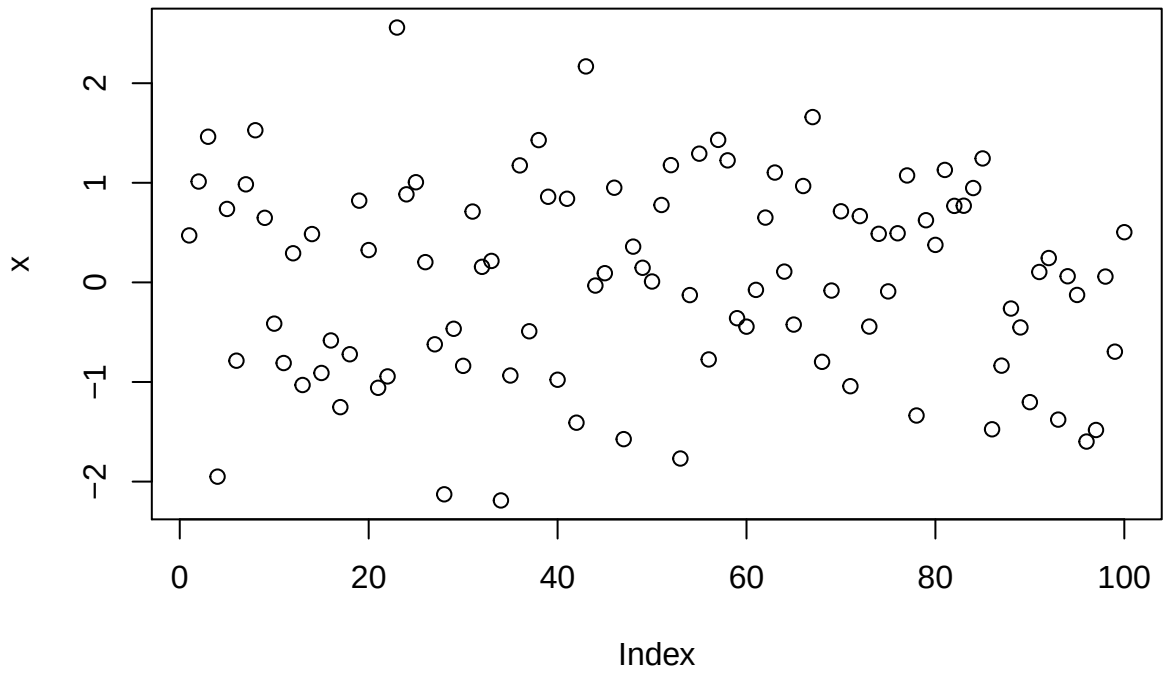

Figure 1: Here is a test figure

2 Background

Whilst it is well-established that children from low socio-economic position (SEP) have worse mental and physical health outcomes, the majority of this research is from cross-sectional studies. In the past decade there have been an increasing focus on describing how health inequalities develop and change over childhood, in particular whether they persist, narrow or widen. This is important from a policy perspective as it could highlight key time points to interview. However to date findings have not always been consistent, and for some outcomes very few longitudinal studies have been conducted.

Findings are most consistent for the impact of SEP on body-mass index (BMI). In high-income countries low SEP has been found to correlate with higher BMI from as early as 9 months [3], with most studies finding the gap increasing over time [5, 17, 19, 1]. Some studies have reported different findings, e.g. Howe, Lawlor, and Propper [10] reported stable inequalities in fat mass from ages 9 to 15, whilst Apouey and Geoffard [2] reported a quadratic trajectory of inequality. For low or middle-income countries the opposite effect has been observed, with higher SEP associated with higher BMI and greater BMI increases [18, 6]

Relatively consistent findings have also been reported for birth length and height: higher SEP is associated with longer birth length across countries [9, 15, 3]. These differences generally appear to increase [14, 15], though Howe et al. [9] reported that the majority of differences at age 10 are accounted for by differences in birth-length.

However for other outcomes, especially mental health and neurocognitive development longitudinal research is more sparse and findings more varied. Whilst a number of studies have reported higher levels of behavioural/externalising problems in lower SEP children as young as three [12, 13], to the best of our knowledge only one study has explicity modelled how this changes over time, finding differences remained stable Howe, Lawlor, and Propper [10]. Socioeconomic differences in internalising symptoms are of smaller magnitude Noonan, Burns, and Violato [16], but there is limited research on how these differences develop over time [elov2012; howe2013].

In terms of cognitive and language development discrepent findings have been reported. Whilst higher SEP is associated with superior reading and language development, some studies have reported these differences remain largely constant [4, 8], some to decrease [10], or to show a non-linear pattern of first narrowing and then increasing [11]. These discrepencies may in part be due to the specific cognitive outcome or relate to the education system of the country in which they were conducted.

Significant interactions by sex and ethnicity have also been reported. Greater BMI inequalities have generally been observed for women [3, 1], whilst Howe, Lawlor, and Propper [10] only found inequalities in fat mass for women (though cf Bradved who found interaction on BMI inequality by sex) [5]. Hargrove [7] also reported interactions between sex and ethinicity: for example black women had the highest BMI and experienced a steeper increase in BMI (compared to white women of same SEP).

[Still to review literature: (i) Motor skills, (ii) Expiratory volume, (iii) blood pressure]

3 Aims and hypotheses

The aims of the current study are to replicate and extend previous research by describing trajectories of inequalities for key physical and mental health outcomes within the LifeCycle consortium. The chosen outcomes are:

1. Height
2. Weight
3. Blood pressure
4. Expiratory volume
5. Motor skills
6. Language development

7. Internalising
8. Externalising

[Complete hypotheses after finishing literature review]

4 Inventory of variables

I have reviewed the available data in LifeCycle cohorts. My inclusion criterion was that the cohort needed to use the same measure at at least two time points.

4.1 Height and weight:

- Waiting for Sido to get back to me about this - he was going to print off a report.

4.2 Expiratory volume

Four cohorts had FEV-1 data at at least two time points (Table 1)

Table 1: Available respiratory data

Cohort	Available time points
ALSPAC	8-9 14-16
GEN-R	9-10 12-14
RHEA	4-5 6-7
RAINE	5-6 8-9 12-14 20-25
INMA	4-5 7-8 10-12 14-16

4.3 Language development

This was more tricky as there were a number of different measures broadly classified as measuring language development. Expressive language is a high-priority WP6 variable to harmonise, so presumably cohorts will make their own decisions which is the best measure of this.

Cohort	Measure	Available time points
		0-1 1-2

ALSPAC	Denver	2-3 4-5 5-6 6-7
	MacArthur	0-1 1-2 3-4 6-7
	Non-word	5-6 8-9
	Reynell	1-2 2-3 5-6
ELFE	MacArthur	1-2 2-3
INMA	SVF	7-8 8-9
MoBa	Språk20	5-6 8-9
	CCC-2	5-6 8-9
	ELVS	5-6 8-9
NFBC1966	Unnamed	0-1 1-2 2-3 3-4 4-5 5-6
	Australian Developmental Record	0-1 1-2
	Bayley scales of infant development	0-1 1-2
	STYCAR	0-1 1-2
	Denver	0-1 1-2 2-3
	ELM	0-1 1-2 2-3
	Gessell	0-1 1-2
	Griffiths	0-1 1-2

	HELP	0-1 1-2
	Peabody	5-6 9-10
	Woodside	0-1 1-2

4.3.0.1 Table 2: Available data on language development

4.4 Motor skills

Again there are a range of measures used, and within the WP6 harmonisation process cohorts should decide the most appropriate for gross and fine motor development.

Cohort	Measure	Available time points
ALSPAC	Denver	0-1 1-2 2-3 4-5 5-6 6-7
EDEN	Ages & stages questionnaire	3-4 4-5
	Brunet-Lezine psychometric scale	1-2 2-3
ELFE	Child Development Inventory	1-2 3-4 5-6
GEN-R	Touwen	0-1 1-2
INMA	Finger tapping	7-8 9-10 10-12
MoBa	Ages & stages questionnaire	0-1 1-2 3-4 5-6
NFBC1966		0-1 1-2 2-3 3-4 4-5
		1-2

	Unnamed	
NFBC1986		7-8 14-16
RAINE	Ages & stages questionnaire	0-1 1-2 3-4
	Bayley scales of infant development	0-1 1-2
	STYCAR	0-1 1-2
	Denver	0-1 1-2 2-3
	Gessell	0-1 1-2
	Griffiths	0-1 1-2
	Woodside	0-1 1-2

4.4.0.1 Table 3: Available data on motor skills

5 Moderation

There is evidence in the literature that both sex and ethnicity could be moderators. However as you mentioned last time we met ethnicity is recorded quite differently in different cohorts (e.g. asking ethnic background vs asking parent's country of origin). It also isn't well documented - I've struggled to find information on this for many of the cohorts (BiB & ALSPAC are exceptions).

One option would be to use the "Ethnicity - best guess" variable from the core variables. However we would still need to think about how each of these had been derived to interpret any findings.

6 Questions for Debbie

1. Decisions about selection of measures. Will this be determined by cohorts harmonsation decisions?
2. How/whether to focus on ethnicity/intersectionality
3. Whether to restrict the range of outcomes (or write two papers?)
4. Which measure of SEP to use. Education would be simplest? Poverty vs SEP
5. Worth looking at variables which explain between-cohort differences (e.g. healthcare provision, inequality)
6. Filling out the project proposal form - which cohorts to include
7. Practicalities of running the analysis. Via datashield? Via data-sharing agreements? In collaboration?

References

[1] B. H. Apouey. “Child physical development in the UK: the imprint of time and socioeconomic status”. In: Public Health 141 (2016), pp. 255–263. ISSN: 0033-3506. URL: %3CGo%20to%20ISI%3E://WOS:000390639900042.

[2] B. H. Apouey and P. Y. Geoffard. “Parents’ education and child body weight in France: The trajectory of the gradient in the early years”. In: Economics & Human Biology 20 (2016), pp. 70–89. ISSN: 1570-677X. URL: %3CGo%20to%20ISI%3E://WOS:000369195900006.

[3] M. Ballon et al. “Socioeconomic inequalities in weight, height and body mass index from birth to 5 years”. In: International Journal of Obesity 42.9 (2018), pp. 1671–1679. URL: %3CGo%20to%20ISI%3E://WOS:000445750700015.

[4] B. Belfi et al. “Inequality in language achievement growth? An investigation into the impact of pupil socio-ethnic background and school socio-ethnic composition”. In: British Educational Research Journal 40.5 (2014), pp. 820–846. ISSN: 01411926. URL: %3CGo%20to%20ISI%3E://WOS:000344350900004.

[5] R. Bramsved et al. “Parental education and family income affect birthweight, early longitudinal growth and body mass index development differently”. In: Acta Paediatrica 107.11 (2018), pp. 1946–1952. ISSN: 0803-5253. URL: %3CGo%20to%20ISI%3E://WOS:000446822800018.

[6] Q. Fu and L. K. George. “Sex, Socioeconomic and Regional Disparities in Age Trajectories of Childhood BMI, Underweight and Overweight in China”. In: Asian Population Studies 11.2 (2015), pp. 134–148. ISSN: 17441730. URL: %3CGo%20to%20ISI%3E://WOS:000360307700003.

[7] T. W. Hargrove. “Intersecting Social Inequalities and Body Mass Index Trajectories from Adolescence to Early Adulthood”. In: Journal of Health and Social Behavior 59.1 (2018), pp. 56–73. ISSN: 0022-1465. URL: %3CGo%20to%20ISI%3E://WOS:000429871900004.

[8] Paul T. von Hippel, Joseph Workman, and Douglas B. Downey. “Inequality in Reading and Math Skills Forms Mainly before Kindergarten: A Replication, and Partial Correction, of “Are Schools the Great Equalizer?”” In: SOCIOLOGY OF EDUCATION (2018), 323–357. ISSN: 0038-0407.

[9] L. D. Howe et al. “Socioeconomic differences in childhood growth trajectories: at what age do height inequalities emerge?” In: Journal of Epidemiology and Community Health 66.2 (2012), pp. 143–148. ISSN: 0143-005X. URL: %3CGo%20to%20ISI%3E://WOS:000298395300008.

[10] Laura D. Howe, Debbie A. Lawlor, and Carol Propper. “Trajectories of socioeconomic inequalities in health, behaviours and academic achievement across childhood and adolescence”. In: JOURNAL OF EPIDEMIOLOGY AND COMMUNITY HEALTH 67.4 (Apr. 2013), pp. 358–364. ISSN: 0143-005X. DOI: 10.1136/jech-2012-201892.

[11] Michael J. Kieffer. “Before and after third grade: Longitudinal evidence for the shifting role of socioeconomic status in reading growth”. In: READING AND WRITING (2011), 1725–1746. ISSN: 0922-4777.

[12] Kathleen E. Kiernan and M. Carmen Huerta. “Economic deprivation, maternal depression, parenting and children’s cognitive and emotional development in early childhood1”. In: The British Journal of Sociology 59.4 (2008), pp. 783–806. DOI: 10.1111/j.1468-4446.2008.00219.x. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1468-4446.2008.00219.x. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-4446.2008.00219.x.

[13] Kathleen E. Kiernan and Fiona K. Mensah. “Poverty, Maternal Depression, Family Status and Children’s Cognitive and Behavioural Development in Early Childhood: A Longitudinal Study”. In: Journal of Social Policy 38.4 (2009), pp. 569–588. DOI: 10.1017/S0047279409003250.

[14] A. Matijasevich et al. “Maternal education inequalities in height growth rates in early childhood: 2004 Pelotas birth cohort study”. In: Paediatric and Perinatal Epidemiology 26.3 (2014), pp. 236–249. ISSN: 0269-5022. URL: %3CGo%20to%20ISI%3E://WOS:000302471200008.

[15] C. McCrory et al. “Socioeconomic differences in children’s growth trajectories from infancy to early adulthood: evidence from four European countries”. In: Journal of Epidemiology and Community Health 71.10 (2017), pp. 981–989. ISSN: 0143-005X. URL: %3CGo%20to%20ISI%3E://WOS:000411146100007.

[16] Katharine Noonan, Richeal Burns, and Mara Violato. “Family income, maternal psychological distress and child socio-emotional behaviour: Longitudinal findings from the UK Millennium Cohort Study”. In: SSM - Population Health 4 (Mar. 2018). DOI: 10.1016/j.ssmph.2018.03.002.

[17] A. Parkes et al. “Does parenting help to explain socioeconomic inequalities in children’s body mass index trajectories? Longitudinal analysis using the Growing Up in Scotland study”. In: Journal of Epidemiology and Community Health 70.9 (2015), pp. 868–873. ISSN: 0143-005X. URL: %3CGo%20to%20ISI%3E://WOS:000383291100005.

[18] R. Patel et al. “Socioeconomic differences in childhood BMI trajectories in Belarus”. In: International Journal of Obesity 42.9 (2018), pp. 1651–1660. URL: %3CGo%20to%20ISI%3E://WOS:000445750700013.

[19] Lpmm Wijlaars et al. “Socioeconomic status and weight gain in early infancy”. In: International Journal of Obesity 35.7 (2011), pp. 963–970. URL: %3CGo%20to%20ISI%3E://WOS:000292641300010.