

## **Understanding Adult Literacy Skills Over Time: A Cohort and Period Perspective**

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### **Introduction**

When assessing the state of human capital across countries, researchers have historically mainly focused on quantitative measures of education (e.g. years of schooling, enrolment rates, etc.). However, a growing number of research suggests that it is not only formal education that plays a crucial role in a country's development, but also the quality of education, i.e. relevant cognitive skills, that has an important impact on socio-economic outcomes – whether it is about earnings (Mateos Romero, Murillo Huertas, & Salinas Jiménez, 2017) or health (Kakarmath, 2018) on the individual level, or about economic growth (Hanushek & Woessmann, 2012) and employment rates (Li, von Davier, Hancock, & Kirsch, 2016) on a macro-economic level. Understanding how skills evolve over time and what drives their evolution is therefore essential when seeking to tackle contemporary socio-economic challenges through the development of human capital.

In this paper, we want to investigate the level, distribution, and life-course development of literacy skills over time and across countries using data from three international large-scale assessment surveys. More specifically, we want to answer the following research questions:

1. *How do adult literacy skills change over the life course and over time, both from a cohort and a period perspective?*
2. *How does this differ between countries, gender and for different educational attainment groups?*

Traditionally, ageing has been identified as one of the key drivers of skills change over the life course (e.g. Desjardins & Warnke, 2012), but little is known about how cohort effects, i.e. being born in a different time period and thus being exposed to different circumstances (e.g. the nature and quality of schooling), may influence the development of skills over time. Until recently, the availability of relevant data has hindered the possibility to perform age-period-cohort analysis. Surveys measuring adult skills have been traditionally cross-sectional, hence only reflecting combinations of age and cohort effects. Only recently, internationally comparable large-scale assessments at different points of time representing the same population became available, allowing for a separation of these effects and a better understanding of skill development across generations.

First attempts at disentangling age and birth cohort effects in changes of literacy skills over time using both cross-sectional and longitudinal data have been recently initiated by Flisi et al. (2018), Barrett & Riddell (2016), and Green & Riddell (2012). However, these studies either only focus on a particular set of countries, do not include all literacy surveys available, or do not conduct analyses separately for different educational attainment groups. By additionally disaggregating the population by levels of education, we not only aim at estimating the impact of formal education on skill development over the life course, but also at taking account of compositional effects over time (e.g. changing educational attainment distribution in each country). We therefore hope to contribute to the literature by conducting a comprehensive

analysis on skill development across generations and over the life course, differentiating between countries and socio-demographic characteristics.

## **Data & Methodology**

For the purpose of this paper, we rely on data from three international, large-scale assessments: (1) the 1994-1998 International Adult Literacy Survey (IALS), (2) the 2003-2008 Adult Literacy and Lifeskills Survey (ALL), and (3) the 2012-2014 Programme for the International Assessment of Adult Competencies (PIAAC).

IALS was the world's first large-scale, internationally comparative assessment aimed at measuring the level and distribution of literacy skills in the adult population in 22 countries around the world. Literacy skills in IALS were defined as the ability to use "printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential." (Statistics Canada, 2003, p. 15). Similarly, and building on the foundation of IALS, the subsequent ALL survey also measured adults' skills, more precisely the literacy and numeracy skills of 16- to 65-year olds in eleven countries, partly coinciding with IALS countries (National Center for Education Statistics, 2018). Finally, PIAAC was developed by the OECD as a cyclical, large-scale study with the goal of assessing and comparing the basic skills and competencies of adults, focusing on four broad domains: literacy, numeracy, problem-solving in technology-rich environments, and reading components. Trend items from IALS and ALL were included in PIAAC, allowing data from previous surveys to be linked to trend data from participating countries in PIAAC (National Center for Education Statistics, 2019). All three surveys have been designed to be representative of the civilian, non-institutionalized population aged 16-65 in each country.

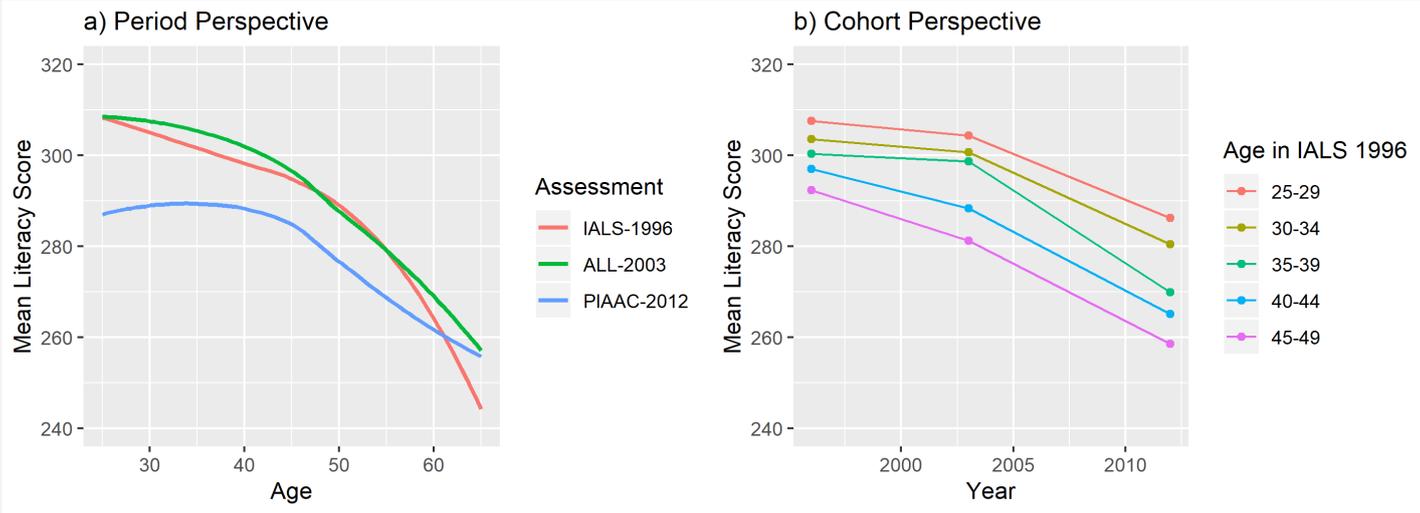
In this paper, we focus exclusively on literacy skills, as this is the only domain assessed across all three surveys. Countries for which adult literacy data are available for at least two points in time include Australia, Belgium, Canada, Chile, Czech Republic, Denmark, Finland, Germany, Ireland, Italy, Netherlands, New Zealand, Norway, Poland, Slovenia, Sweden, United Kingdom, and the United States. Six of these countries (Australia, Italy, Netherlands, New Zealand, Norway, and the United States) participated in all three surveys.

Empirical analyses are based on a pooled dataset of IALS, ALL and PIAAC, from which we build synthetic cohorts to investigate the skill development of different age groups over a time period of roughly 20 years. Ideally and if available we use single year age groups which are then aggregated to 5-year age groups depending on the year the surveys took place and the time lag between the different surveys in each country. For example, in the United States surveys took place in 1994 (IALS), 2003 (ALL), and 2012 (PIAAC); hence, our analysis follows a synthetic cohort, which was e.g. 25-29 years old in IALS, 34-38 years old in ALL, and 43-48 years old in PIAAC. Since our analyses are restricted to synthetic cohorts and data availability does not allow us to follow real individuals over their life course, we narrow our sample to the population over the age of 25, where we assume that the vast majority of people has already completed formal education.

Preliminary results suggest that deterioration in the level of skills is not only happening because of ageing, but also across generations, with more recent birth cohorts having lower levels of literacy and individuals from a given birth cohort losing literacy skills at a different rate than indicated by cross-sectional estimates. Figure 1 shows the example of Norway, depicting mean literacy scores by age from all three surveys a) from a period perspective and

b) from a cohort perspective. These results, however, require further in-depth interpretation and validation. We will present results for all countries with some longitudinal data available, particularly focusing on differences by gender and educational attainment. This additional disaggregation of the population should take account of compositional effects over time (e.g. changing educational attainment distribution in each country) and thus add further validity and explanatory power to our results.

Figure 1. Mean literacy scores by age, Norway, 1996, 2003, and 2012



Sources: Statistics Canada (2013) & OECD (2019)

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