Survey of Adult Skills 2023 (PIAAC): National Report for England

Research report

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About PIAAC

The Survey of Adult Skills is a product of the Programme for the International Assessment of Adult Competencies (PIAAC) led by the Organisation for Economic Cooperation and Development (OECD). The Survey of Adult Skills aims to measure the skills needed by adults to participate in society and for economies to prosper. The 2023 survey assessed skills in literacy, numeracy and adaptive problem solving, and further information was collected through a background questionnaire.

The latest Survey of Adult Skills was carried out in 31 countries during 2022 and 2023. In England, it was carried out on behalf of the Government by a consortium led by Verian in partnership with the National Centre for Social Research (NatCen) and the National Foundation for Educational Research (NFER).

The survey was carried out with adults aged 16 to 65 in their homes. Covid-19 reduced response rates in England and other participating countries compared with the previous cycle of the survey, and response rates varied between 27% and 73%. In England, 4,941 adults participated in the survey between September 2022 and June 2023. The response rate was 38%.

The 2023 Survey of Adult Skills offers crucial insights into how adult skills have changed over the last decade. England participated in the first cycle in 2012 which identified that the youngest adults in England performed less well than older adults (contrary to the international pattern) and performed poorly compared with their international peers. There has been considerable policy focus on raising standards in these key skills in school education, such as compulsory education to 18 and making mathematics and English a requirement of post-16 courses for those who did not attain National Qualifications Framework (NQF) Level 2 in English and Maths at 16. England's disappointing performance in the 2012 survey in adult numeracy as well as the gap between the lowest and highest performing adults in literacy and numeracy has also been reflected in adult skills policy. For example, recent reforms include the Lifetime Skills Guarantee, which provides funding for adults without an existing full Level 3 (A Level equivalent) qualification to study for free (Prime Minister's Office, 10 Downing Street and Johnson, 2020). In addition, the 'It all starts with skills' campaign encourages adults to gain the skills and qualifications they need to progress including improving their 'essential skills' (in English, mathematics and digital skills) (Department for Education, 2023a).

Literacy in England

England's literacy score has been stable since 2012 (Cycle 1). Adults in England scored, on average, 272 points in literacy, significantly above the OECD average of 260 points. Japan was the only G7 country to outperform England.

In England, 18% of adults were defined as having low proficiency in literacy, compared with 26% across the OECD, on average. Adults with low proficiency were those whose scores placed them at PIAAC Level 1 or below. Adults achieving Level 1 or below struggle to complete tasks involving longer texts with distracting information. The gap between England's highest and lowest achievers has increased since Cycle 1, but changes to the measurement of low literacy proficiency meant that the gap increased significantly in all but 3 countries.

Higher literacy skills were associated with higher educational attainment, being employed or a student, not having a health problem or disability which limited day-to-day activities, being born in the UK and learning English as a child. Men and women had similar scores, on average.

Numeracy skills in England

England's numeracy score has increased significantly since 2012 (Cycle 1). Adults in England scored, on average, 268 points in numeracy, significantly above the OECD average of 263 points. Japan and Germany were the only G7 countries to outperform England.

In England, 21% of adults achieved at PIAAC Level 1 or below, compared with 25% across the OECD, on average. Adults achieving Level 1 or below struggle to complete mathematical tasks with distracting information or carry out multi-step mathematical processes.

The gap between England's highest and lowest achievers has increased since Cycle 1. This was driven by an increase in the scores of top performers, whilst the lowest achievers' skill level has remained unchanged.

The patterns for educational attainment, employment status, country of birth / language first learned as a child were similar to those for literacy. In England, men scored 16 points higher than women, on average, which was a significant difference. A similar pattern was found internationally, with men scoring 10 points higher than women across the OECD, on average.

Adaptive problem solving skills in England

Adults in England scored, on average, 259 points in adaptive problem solving, significantly above the OECD average of 251. Consistent with literacy and numeracy, Japan was the only G7 country to outperform England.

In England, 21% of adults achieved at PIAAC Level 1 or below, compared with 30% across the OECD, on average. Adults achieving Level 1 or below struggle with problems with several steps in well-structured environments with few easily accessible elements related to a single problem. Of the 8 countries which outperformed England, only 4 did so whilst achieving better equity between highest and lowest achievers.

In England, men scored 5 points higher than women, on average, which was a significant difference. A similar pattern was found internationally, with men scoring 2 points higher than women across the OECD, on average.

Adaptive problem solving in Cycle 2 was not comparable to the problem solving assessment in Cycle 1. Therefore, we cannot report on changes over time.

Distribution of adult skills by age

Young people (16-24 year olds) in England had significantly improved literacy and numeracy scores compared with young people in 2012. The distribution of skills in England by age was no longer an international outlier, as the pattern of performance by age broadly matched the pattern across the OECD, on average. In England and across the OECD, there was a pattern of increasing literacy and numeracy skills with age, and then a decline, with youngest adults scoring more highly than the oldest adults, on average. The age-related decline in skills was also visible for adaptive problem solving.

Adult skills and work in England

Adults who worked in industry sectors including professional, scientific and technical activities had the highest average scores for literacy, numeracy and adaptive problem solving. The scores for literacy and adaptive problem solving were significantly higher than scores for adults working in the same professions across the OECD, on average.

On average, adults in England working in professional occupations (including science and engineering professionals, health professionals and teaching professionals amongst others) had the highest literacy, numeracy and adaptive problem solving skills, and these scores were significantly above the OECD average.

For the highest earners in England, there was a clear relationship between salary and skills for adults, but this relationship did not extend to adults in the lowest deciles of

salary. A similar pattern was found across the OECD and it is likely that findings are impacted by the uneven distribution of full-time and part-time workers across the deciles.

More frequent use of certain skills in the workplace (for example, reading or writing at work, use of ICT skills at work or problem solving at work, amongst others) was associated with higher average scores in literacy, numeracy and adaptive problem solving compared with adults using these skills infrequently at work.

Adult skills in everyday life

Adults in England and internationally that read and write frequently in their everyday life tended to achieve higher standards of literacy, numeracy and adaptive problem solving. This is a finding consistent with 2012. Adults in England generally read more often outside of work compared with the OECD average, although 21% of adults in England reported never reading books. The most common form of writing in everyday life in England was writing letters, memos or emails, with a quarter of adults reportedly doing so on a daily basis.

Literacy practices outside of work are important. The most frequent readers and writers in England achieved high literacy and problem solving scores (which were significantly above the OECD average), and the least frequent readers and writers had disproportionally lower literacy, numeracy and problem solving scores compared with the OECD average.

A very high proportion of adults in England reported using a computer or digital device for accessing information and online banking or e-commerce at least once a week or even daily, greatly exceeding OECD averages.

Adult socio-emotional skills and wider non-economic outcomes

Adults' levels of socio-emotional skills (agreeableness, conscientiousness, emotional stability, extraversion and open mindedness) in England were comparable to skills levels reported in other OECD countries. Some typical variation by age or gender was found, for example, older adults scored higher in each of the 5 socio-emotional skills. Life satisfaction in England was also largely comparable with the OECD average. In line with recent literature, self-reported health declined between 2012 and 2023 in England.

Findings highlighted an association between education levels for non-economic outcomes. In England, adults with higher education levels had more positive non-economic outcomes, such as higher socio-emotional skills, greater life satisfaction, better

perceived health status as well as increased levels of social trust and political efficacy. Please note that causality cannot be implied.

Characteristics of adults with low proficiency

The findings from the Survey of Adult Skills provide an estimate of 8.5 million working-age adults in England with low basic skills in 2023 (that is low proficiency in literacy, low proficiency in numeracy, or both). Adults were defined as having low proficiency in literacy, numeracy or adaptive problem solving if they achieved Level 1 or below.

There were 6 characteristics which had significant associations with low proficiency common to all 3 domains:

- having a low level of education

- belonging to particular ethnic groups

- being born outside the UK

- having parents who have low levels of education

- not having computer experience in everyday life

- working in certain occupations.

The characteristics that were most strongly associated with increased likelihood of low proficiency across the 3 domains were: having less than secondary school education, being Black or Asian, being born outside the UK, and having no computer experience. The characteristics most strongly associated with decreased likelihood of low proficiency across all domains was having a professional occupation, and for numeracy, also being educated above secondary school level. The characteristics associated with low proficiency were generally very consistent between Cycles 1 and 2.

1 Background and overview

1.1 Introduction

The Survey of Adult Skills is an international large-scale household survey of adults aged 16 to 65. It is part of the OECD Programme for the International Assessment of Adult Competencies (PIAAC). In England, the 2022/23 survey was carried out on behalf of the Government by consortium led by Verian in partnership with the National Centre for Social Research (NatCen) and the National Foundation for Educational Research (NFER).

The Survey of Adult Skills aims to measure key cognitive and workplace skills needed for adults to participate in society and for economies to prosper. The first cycle of the survey collected data in 39 countries over 3 rounds between 2011 and 2018. England participated in Round 1 of the first cycle of the study, for which national data were collected in 2011 and 2012.

The second cycle of the survey was carried out in 31 countries during 2022 and 2023. Data collection was delayed by 1 year due to the Covid-19 pandemic.

Each participating country followed strict technical standards and guidelines (OECD, forthcoming d) to deliver the survey. This enables governments to benchmark adult skills over time, to make evidence-based decisions and to learn from policies and practices in other countries.

In this report, we present England's findings, analyse changes over time, and compare outcomes with other participating countries. Chapter 1 provides more information about the background to the survey, how it was administered in England, the sample and it outlines the structure of the report.

1.2 The Survey of Adult Skills in the context of England

The second cycle of the Survey of Adult Skills offers crucial insights into the adult literacy, numeracy and problem-solving capabilities of the nation following a turbulent decade. These are ever more important for national prosperity and individual life chances in the competitive global economy and fast-changing, technology-driven world. The first study cycle in 2012 identified that the youngest adults in England performed less well than older adults (contrary to the international pattern) and performed poorly compared with their international peers. Since then, there has been considerable policy focus on raising standards of these key skills in school education. The need to address England's disappointing performance in adult numeracy in 2012, as well as the nation's gap between the lowest and highest performing adults in literacy and numeracy has been reflected in adult skills policy, as outlined in the sections below.

1.2.1 Raising standards of literacy and numeracy of younger adults

In the last 10 years, extensive policy reforms have aimed to improve the English and mathematics attainment of young people in secondary and further education (FE). Alongside raising the participation age to 18, the introduction of a more rigorous National Curriculum and reformed English and mathematics GCSEs, condition of funding require students on 16-19 study programmes who have not attained a Level 2 qualification (for example, GCSE grade 4, previously grade C) to continue studying these subjects. From academic year 2025/26, maths and English condition of funding will require providers to offer these students 100 hours each of English and mathematics teaching during the academic year and to continue their best efforts to deliver 35 hours of extra teaching time for mathematics (Education and Skills Funding Agency, 2024c).

Alongside GCSEs, reformed Functional Skills qualifications in mathematics and English are available as an alternative route to gaining the knowledge and skills employers need, such as being able to solve mathematics problems with and without a calculator (Department of Education, 2018). Further, between 2018 and 2023 the Centres for Excellence in Maths programme provided funding to improve mathematics teaching for students aged 16 to 19 studying for GCSE or Functional Skills qualifications in the FE sector through new teaching approaches, upskilling teachers and sharing best practice (Department for Education and Education and Skills Funding Agency, 2022).

In the latest available statistics – the academic year 2022/23 – Level 2 attainment of English and mathematics by age 19 is the highest on record in 2022/23 at 78%. However, over a fifth are still not obtaining this important benchmark (Department for Education, 2024b).

Encouraging take-up of advanced mathematics at Level 3 amongst 16- to 19-year-olds has been supported in recent years through the advanced maths premium which provides funding to schools and colleges for additional students enrolling for advanced qualifications (Education and Skills Funding Agency, 2024a). In addition to A level mathematics, the core maths qualifications introduced from 2014 provide an alternative Level 3 pathway focused on developing mathematical understanding and the application of mathematics valuable for further study and employment across a range of areas (Department for Education, 2013). Take-up of core maths is also supported through additional funding (Education and Skills Funding Agency, 2024b).

The incoming Government (elected in July 2024) has committed to an independent review of the curriculum from key stages 1 to 5 with a focus on excellent foundations in reading, writing and mathematics alongside greater emphasis on the creative, digital and speaking and listening skills required for work (Department for Education, 2024a). It has also pledged renewed attention on raising standards of mathematics teaching in early years and primary schools (The Labour Party, 2024).

1.2.2 Improving literacy and numeracy levels of working-age adults

In the decade since the first cycle of the Survey of Adults Skills, there have been significant policy reforms focused on 'skills for jobs' stemming from the 2021 White Paper (Department for Education, 2021c) and the subsequent Skills and Post-16 Education Act 2022. The Lifelong Learning Entitlement is now available to adults and young people offering tuition-fee-loan entitlement to the equivalent of 4 years of post-18 education to use up to the age of 60 (Lewis and Bolton, 2024). Skills bootcamps have also been introduced to give adults the opportunity to build up sector-specific skills including digital skills, and meet the skills needs of their areas (Department for Education, 2021b). The incoming Government has committed to a comprehensive post-16 skills strategy and the creation of 'Skills England' bringing together central and local government, businesses, training providers and unions to meet skills needs and provide strategic oversight (Department for Education, 2024c). This sits alongside devolving adult education budgets to combined authorities giving them powers to address local needs (ibid).

Aside of these reforms, there continues to be extensive concern about literacy and numeracy levels amongst the working-age population with an estimated 6 million adults not qualified to Level 2 (equivalent to GCSE level) and an overall decline in adult education participation (Centre for Social Justice, 2020). Recent reforms include the Lifetime Skills Guarantee, which provides funding for adults without an existing full Level 3 (A level equivalent) qualification to study for free (Prime Minister's Office, 10 Downing Street, 2020). This is in addition to the entitlement for individuals aged 19 and over who have not previously achieved a Level 2 qualification or are assessed as being below level 2 in English and mathematics to study for free to obtain them (Education and Skills Funding Agency, 2024d). The government continues to promote 'Skills for Life' through the 'It all starts with skills' campaign to encourage adults to gain the skills and qualifications they need to progress, including improving their 'essential skills' (English, mathematics and digital skills) (Department for Education, 2023b). This includes the Multiply programme to help adults who do not have a Level 2 mathematics qualification build confidence with numbers and improve their numeracy skills (Department for Education, 2021a) and the statutory digital entitlement introduced in August 2020 for adults with low digital skills to gain an essential digital skills qualification.

1.3   Description of the survey and changes since Cycle 1

The Survey of Adult Skills was carried out with adults aged 16 to 65, in their homes and comprised 2 elements – a computer-assisted personal interview (CAPI) which collected information about participants' backgrounds, and a tablet-based direct assessment of key information-processing skills.

The background questionnaire collected information about:

- factors which influence the development and maintenance of skills: education, adult training, socio-economic background, engagement with literacy, numeracy and technology, linguistic background.

- outcomes which may relate to skills: economic outcomes such as employment status and earning, and non-economic outcomes such as health, participation in volunteering, social trust.

- non-economic outcomes, including wellbeing, and a self-assessment of social and emotional skills.

The skills direct assessments were of literacy, numeracy and adaptive problem solving.

There have been some changes to the survey data collected via the direct assessments and background questionnaire since Cycle 1. These are:

- updated literacy and numeracy frameworks to better reflect the skills required in digital environments, whilst preserving trends over time.

- a new framework to assess adaptive problem solving – solving problems and adapting plans when conditions change. The adaptive problem solving outcomes are not comparable to those from problem solving in technology-rich environments in Cycle 1.

- there is greater precision in the estimation of low skills in Cycle 2 with the inclusion of performance on the reading components assessment integrated into the literacy proficiency scale. In Cycle 1, reading components were an independent measure. There is a new numeracy components measure for Cycle 2 which provides greater information about basic numeracy skills.

- updates to the background questionnaire. Many items have been preserved between cycles. The main changes are to include measures of social and emotional skills, greater detail about education experience and home learning environment during childhood, and updates to questions about skills use in everyday life and work.

There have also been 2 key methodological changes. These are that the Cycle 2 survey was fully tablet-based. In Cycle 1, the survey was administered using a laptop with a paper-based option for the direct assessments. In Cycle 2, additional data was also collected using a doorstep interview, designed to capture information about sampled adults who were unable or reluctant to complete the survey, for instance, due to lack of familiarity with the language of the assessment.

Data collection for Cycle 2 of the Survey of Adult Skills took place during 2022 and 2023 in 31 countries (or sub-national regions). The participating countries comprised 27 OECD countries and 2 OECD subnational entities, and 2 non-OECD partner countries. See

Table 1 for an overview of participating countries in Cycle 2, and their year of participation in Cycle 1.

Table 1 Participating countries in Cycle 2 and their year of participation in Cycle 1

Countries which participated in Cycle 2, 2023	Cycle 1 year of participation
Austria	2012
Canada	2012
Chile	2014
Croatia	n/a
Czechia	2012
Denmark	2012
England	2012
Estonia	2012
Finland	2012
Flemish Region (Belgium)	2012
France	2012
Germany	2012
Hungary	2017
Ireland	2012
Israel	2014
Italy	2012
Japan	2012
Korea	2012
Latvia	n/a
Lithuania	2014
Netherlands	2012
New Zealand	2014
Norway	2012
Poland	2012
Portugal	n/a
Singapore	2014
Slovak Republic	2012
Spain	2012
Sweden	2012
Switzerland	n/a
United States	2012/14, 2017

There were some unusual response patterns identified in the data for Poland in Cycle 2. Therefore, caution is required in interpreting Poland's results. See the Note for Poland in the Reader's Guide (OECD, forthcomingb).

1.4   The development of the survey

Educational Testing Service (ETS) led the international consortium[1] that designed and implemented the survey on behalf of the OECD, building on the experiences of the previous surveys (Survey of Adult Skills (PIAAC) Cycle 1, International Adult Literacy Survey (IALS) and Adult Literacy and Lifeskills Survey (ALL)). The design and implementation were guided by the PIAAC technical standards and guidelines (OECD, 2022) that were developed to ensure that the survey yielded high-quality and internationally comparable data. The technical standards and guidelines were supplemented by additional manuals, training materials, testing plans and toolkits as well as training sessions at appropriate points in the process.

The consortium was responsible for developing the background questionnaire, assessment instruments and the tablet-based-delivery platform as well as supporting survey operations, quality control and scaling, preparing the database and providing support for analysis. Expert review panels developed the frameworks for the skills domains and also guided the development and selection of assessment items and the interpretation of results.

Participating countries implemented the assessment in their own countries, including sampling, adaptation and translation of materials, data collection and database production. The Board of Participating Countries (BPC), comprising representatives from participating countries, oversaw the development and implementation of the survey, with additional responsibility for major decisions about budgets, reporting and monitoring progress.

A field trial was carried out in all participating countries in 2021 and 2022; in 3 countries this was a simulated field trial due to the Covid-19 pandemic. The outcomes of the field trial were used to finalise the contents and format of the survey delivery, the background questionnaire and the assessments for the main survey in 2022-2023.

1.5   What the Survey of Adult Skills measures

The Survey of Adult Skills directly measures skills in the 3 domains of literacy, numeracy and adaptive problem solving. Taken together, literacy and numeracy provide a foundation for the development of higher order cognitive skills which are essential for

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[1] Other members of the international consortium were Westat in the USA, cApStAn in Belgium, the Research Centre for Education and the Labour Market (ROA) at the University of Maastricht, the Leibniz Institute for the Social Sciences (GESIS), the International Association for the Evaluation of Educational Achievement (IEA).

gaining access to and understanding specific domains of knowledge whether related to education, work or home life. The third domain – adaptive problem solving – the ability to identify and solve problems in situations where the solution is not immediately available is a feature of most education, workplace and domestic environments. This section gives a brief description of each domain. Further details can be found in the Survey of Adult Skills Cycle 2 assessment frameworks (OECD, 2021).

1.5.1 Literacy

The literacy framework for Cycle 2 of the Survey of Adult Skills is largely unchanged since Cycle 1 but has evolved to give greater emphasis to the importance of reading in digital environments and of being able to interact with multiple texts, for instance, online. In Cycle 2, literacy is defined as 'accessing, understanding, evaluating and reflecting on written texts in order to achieve one's goals, to develop one's knowledge and potential and to participate in society.' It does not involve the production of written texts. The assessment tasks used texts with varied content and contexts and there were different cognitive demands, dependent on the task. Specific contexts for literacy texts and tasks were work and occupation, personal, community, and education and training. In terms of content, texts were characterised by their type, format, organisation and source:

- Type: texts were categorised according to the predominant characteristics of the text as description (e.g. of a particular place in a diary or item in a catalogue), narration (e.g. a novel or newspaper report of an event), exposition (e.g. communicating the concept of how sugar is broken down by the body), argumentation (e.g. a poster or film review which presents factual or interpretive claims), instruction (e.g. a recipe), or transaction (e.g. to request or confirm arrangements in an email).

- Format: continuous (sentences organised into paragraphs to create descriptions, narratives, instructions, arguments, etc); non-continuous (texts organised in matrix format, e.g. lists, or around graphic features, e.g. graphs, maps, forms); mixed texts (using a combination of continuous and non-continuous elements such as a newspaper article incorporating text and a graph).

- Organisation: layout, content representation and access devices.

- Source: single (originating from a single source, for example an author or a publication) or multiple (having multiple authors or published through different channels, for example a web forum where different people post messages at different times).

Participants were expected to use 3 different cognitive strategies when responding to written texts: accessing text, understanding, and evaluating. In terms of accessing text, the skills demanded can range from selecting clearly identified information, to navigating multiple pieces of information to locate specific pieces of information, to using

background knowledge and inferential reasoning. Understanding skills range from literal comprehension to understanding relationships between different parts of a text or multiple texts in order to construct meaning and draw inferences. The final strategy – evaluating – requires readers to relate information in the text to other information, knowledge and experience to, for example, assess the relevance or credibility of a text. This requires the reader to be able to evaluate the accuracy, the soundness and the task-relevance of text, and also to reflect on the author's intent or purpose for writing.

Adults with low levels of proficiency were directed to an assessment of reading components which assessed comprehension of simple sentences and of short passages. Adults were identified as having a low level of proficiency if they failed to correctly answer sufficient questions in the low difficulty 'locator test' (8 numeracy and 8 literacy items which acted as a screener) and were then routed directly to the reading components assessment.

1.5.2 Numeracy

The numeracy framework for Cycle 2 of the Survey of Adult Skills has been updated more significantly than literacy since Cycle 1. The updates reflect the increase in importance of numerical digital information in everyday life, enabling assessment of skill in managing numerical information from infographics and dynamic, or interactive, applications. There is increased emphasis in recognising how and when to use mathematical processes, understanding and application of mathematical procedures, and reasoning and reflective skills. In Cycle 2, numeracy is defined as 'accessing, using and reasoning critically with mathematical content, information and ideas represented in multiple ways in order to engage in and manage the mathematical demands of a range of situations in adult life.'

There are 4 areas of mathematical content, information and ideas: quantity and number; space and shape; change and relationships; data and chance. The topics can be presented in 5 ways – texts or symbols, images of physical objects, structured information such as tables and graphs, and dynamic applications.

- Quantity and number: understanding ordering, counts, place value, magnitudes, indicators, relative size and numerical trends.

- Space and shape: understanding and using measurement systems and formulas, dimensions and units, location and direction, geometric shapes and patterns, angle properties, symmetry, transformations, and 2D and 3D representations and perspectives.

- Change and relationship: understanding ways to describe, model and interpret mathematical relationships, quantitative patterns, and change. This involves understanding, using and applying proportional reasoning and rates of change,

including the use and application of ratios, and recognising, describing and/or using a relationship between different variables.

- Data and chance: this content area includes topics such as data collection, data displays, charts and graphs, measures of central tendency and variance, and understanding and knowing about chance and probability.

The contexts for numeracy tasks were personal, work, and societal and community. Three cognitive strategies are associated with numeracy. The first, to access and assess situations mathematically, this requires an adult to assess if the problem is a mathematical one, how it can be solved and how the real-world situation can be simplified into a mathematical representation. The second strategy is to act on and use mathematics, this includes ordering, counting, estimating, computing, measuring, graphing and drawing. The final strategy – evaluate, critically reflect, and make judgements – requires the solution to be evaluated against the original problem to assess the reasonableness of the solution.

Similarly to literacy, adults with low levels of proficiency were directed to an assessment of numeracy components which assessed number sense – understanding of quantities and how numbers represent quantities. Adults were identified as having a low level of proficiency if they failed to answer correctly sufficient questions in the low difficulty 'locator test' (8 numeracy and 8 literacy items which acted as a screener) and were then routed directly to the numeracy components assessment.

1.5.3 Adaptive problem solving skills

Adaptive problem solving is defined as the ability to 'achieve one's goals in a dynamic situation, in which a method for solution is not immediately available. It requires engaging in cognitive and metacognitive processes to define the problem, search for information, and apply a solution in a variety of information environments and contexts.' The problem solving tasks in Cycle 2 were embedded in technology-rich and dynamic environments, and the focus of the problem solving assessment was adults' ability to adapt when conditions change, rather than adults' ability to solve problems in technology-rich environments. The problem solving assessment in Cycle 1 was of adults' information processing skills in technology-rich environments and is not comparable to the Cycle 2 assessment.

As was the case for numeracy, the contexts of the problems were personal, work, and societal and community. The contents of the tasks were in problem configuration, dynamics of the situation, features of the environment and the information environment. Three overarching cognitive processes were assessed, each with sub-cognitive processes and metacognitive processes:

- Definition: this involves 3 cognitive subprocesses of selecting, organising and integrating problem information into a mental model; retrieving relevant

background information; and the ability to externalise the problem's main features (for instance, in a drawing or table). Metacognitive processes are goal setting and monitoring problem comprehension.

- Searching: this involves 2 cognitive subprocesses of searching for operators in the (mind and) environment (that is locating information about available actions that might solve the problem) and evaluating how well operators satisfy the problem constraints (which also involves metacognitive processes).

- Application: this is when the problem solver applies plans to solve a problem and executes the specified operators. Metacognitive processes involve monitoring progress, taking action if the problem changes or progress has stalled, and reflection.

1.5.4 Assessment design

There were a number of pathways that participants could take through the Survey of Adult Skills, determined by answers to questions in the background questionnaire and performance in the locator assessment. These are outlined in Appendix Figure 29.

1.6 Proficiency scales and levels

The Survey of Adult Skills uses proficiency scales and levels to present the results of the assessments. Each scale ranges from 0 to 500 and these have been grouped into levels: below level 1 and levels 1 to 5 for literacy and numeracy, and below level 1 and levels 1 to 4 for adaptive problem solving. The literacy and numeracy proficiency levels in the Survey of Adult Skills are not equivalent to England's National Qualification Framework (NQF) levels in literacy and numeracy. A comparison between PIAAC levels in Cycle 1 and NQF levels was carried out in the Cycle 1 national report (Wheater *et al.*, 2013) and a calibration is available in Appendix G, Table G1 of that report. As discussed in section 1.5, the frameworks for literacy and, particularly, numeracy have changed since Cycle 1 and therefore there are additional caveats relating to the calibration.

1.6.1 Proficiency scales

The proficiency scales relate to both test takers and test items: test takers are located in terms of their proficiency and test items are located in terms of their difficulty. Therefore, each scale point represents a point on the scale at which an individual has a 67% chance of successfully completing items located at that point on the scale and also at which an item will probably be answered correctly by 67% of respondents with that scale score. If an individual has a particular proficiency score, he or she would probably answer items of lesser difficulty with greater success and would possibly be able to complete items of greater difficulty, but with less chance of success.

1.6.2 Proficiency levels

Items on the proficiency scale in each domain are located at different points according to their difficulty, as described above. In order to aid the interpretation of results, the scales have been divided into 'proficiency levels' which are defined by score-point ranges. Each level implies an ability to cope with a particular type of task and is based on the shifts in the skills needed to successfully complete items at different points along the scale. These descriptions are presented in full in Appendix A (Tables 98 to 100; section A9). The tables describe the features of the tasks, with difficulty values within these ranges, providing a summary of what adults with particular proficiency scores in a particular skills domain can do.

1.7 Interpreting differences between countries

A major objective of the Survey of Adult Skills was to examine the determinants of literacy, numeracy and adaptive problem solving across a number of countries, languages and cultures. It is important to know what can reasonably be concluded from the data and which interpretations would be going beyond what can be reliably supported by the results. This section outlines some points that need to be borne in mind while reading this report.

1.7.1 International standards

Data from all countries were checked and adjudicated to ensure that the same processes and quality controls were adhered to throughout the survey, in line with the Technical Standards and Guidelines (OECD, 2022), in order to make the data internationally comparable. Adjudication reports were produced for each country, based on sampling, coverage and non-response bias, data collection and instrumentation. The data for England was considered to be of a suitable quality for inclusion in the international report. Data was weighted to correct known biases and it is this data that is reported. Full details of the weighting process are included in the Cycle 2 Technical Report of the Survey of Adult Skills.

1.7.2 Sources of uncertainty

There are 2 sources of uncertainty which have to be taken into account in the statistical analysis and interpretation of any test results. These are described as sampling error and measurement error.

Sampling error stems from the inherent variation of human populations which can never be summarised with absolute accuracy. It affects virtually all research and data collection that makes use of sampling. Only if every eligible adult aged between 16 and 65 in each participating country had taken part in the survey could it be stated with certainty that the results are totally representative of the attainment of the entire population of adults in

those countries. In reality, the data was collected from a sample of adults. Therefore, the results are a best estimation of how the total adult population could be expected to perform in these tests. There are statistical methods to measure how good the estimation is. However, it is important to recognise that all data on human performance or attitudes that are based on a sample carries a margin of error.

Measurement error relates to the results obtained by each individual and takes account of variations in their scores which are not directly due to underlying ability in the subject but which are influenced by other factors related to individuals or by the nature of the assessments.

The OECD Technical Report contains further information about the measures taken to minimise such error.

1.7.3 Interpreting rank order

Because of the areas of uncertainty described above, interpretations of very small differences between 2 sets of results are often meaningless. Were they to be measured again it could well be that the results would turn out the other way round. For this reason, this report focuses on statistically significant differences between mean scores, rather than the simple rank order of countries. Statistically significant differences are unlikely to have been caused by random fluctuations due to sampling or measurement error. Differences are reported as statistically significant if the probability of observing them by chance alone is of 5% or less.

Where significant differences between countries are found, these may be the result of a great number of factors. Although the background questionnaire provided a considerable amount of data against which to quantify results, there are many other differences in the experiences of such a large number of adults that could play a part in these differences. The Survey of Adult Skills can, therefore, only explain the reasons for differences between countries to a limited extent. It is important to bear this in mind while reading this report.

1.7.4 Changes over time

In this report, we focus on changes since the Round 1 data collection in Cycle 1 – that is, changes since data collected in 2012.

Cycle 1 collect data in 3 rounds, and England participated in Round 1 alongside 23 other countries. When comparing changes over time, for the purposes of this report, we compare England with the other 21 countries who participated in both rounds. See Chapter 3 for further details of which countries are in this comparison group.

1.8 Survey administration

The survey administration was carried out internationally on behalf of OECD by a consortium led by Educational Testing Service (ETS). This consortium worked with the national centre in each country through the National Project Manager (NPM). For England, the national centre was a consortium led by Verian, working in partnership with NFER and NatCen.

The National Project Manager and the National Sampling manager were based at Verian and the National Data Manager was based at NatCen. Verian and NatCen shared the data collection in England. NFER was responsible for making local adaptations to instruments and manuals and for translation where necessary, in line with the Technical Guidelines (OECD, 2022) provided by the international consortium.

Sampling used a multistage sampling frame based on postcodes in England to generate a sample that would be representative of the population of non-institutionalised civilians aged between 16 and 65 years[2]. Once the samples were drawn and agreed, letters and leaflets were sent to the selected households to inform them about the survey and establish its legitimacy. These were followed up by trained interviewers who visited each of the identified addresses and established if there were eligible adults in the household. Where there was more than 1 eligible person, the survey software randomly selected 1 of them to participate. To ensure a good response rate, interviewers made repeated visits to households. Interviewers were required to make a minimum of 6 visits to each address, unless unsuitability for participation was established earlier in the process. Participants were offered an incentive in recognition of the significant demands of the survey in terms of their time and effort (a £75 voucher which could be used in a range of high street retailers).

The survey was administered in 2 main stages: completion of the background questionnaire and completion of the cognitive assessments. Respondents were allowed a break between the 2 stages, although it was preferable for the respondent to complete both in 1 session.

A trained interviewer delivered the background questionnaire using a specially developed computer program. For the background questionnaire, respondents could seek help from others in the household in the case of language difficulties, disability or other factors that made it difficult for the respondent to answer without support. However, proxy respondents were not permitted for the background questionnaire – it was necessary for the respondents themselves to respond to the questions.

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[2] In Cycle 2 of the Survey of Adult Skills, there was an additional effort to include any students living in halls/boarding accommodation in the sample frame. These individuals were included in the sampling process if the householder indicated that they would return home to the sampled address during the fieldwork period. These individuals were not included in the sample for Cycle 1.

After the interviewer-administered background questionnaire, respondents were given a tutorial showing them how to enter answers using the touchscreen interface on their interviewer's tablet computer. After the tutorial had been completed, respondents were asked to complete a series of cognitive assessment tasks.

The assessment section was broken into several subsections. First the respondent completed the 'locator' section, which determined their broad skill levels. Those who failed the locator section were routed to the 'components' section which consisted of low-level questions relating to literacy and numeracy (and these respondents were not asked to complete the more challenging 'main' assessment section). Those who passed the locator section with a low score were asked to complete both the basic components section and the more challenging main assessment section. Those who passed the locator section with a high score generally skipped the components section and were only asked to complete the main section[3].

The main assessment section covered 3 domains – literacy, numeracy and adaptive problem solving. Each respondent who completed the main assessment section was asked questions relating to only 2 of the 3 domains. The selection of domains for each respondent was conducted randomly by the survey software.

Respondents could not receive help in understanding the meaning of the cognitive assessment questions or in determining how to answer them. Part of the interviewers' role was to ensure that no other household members intervened during the assessment section. The interviewers themselves were only permitted low-level involvement during the assessment section, such as encouraging the respondent to re-read the question instructions or dealing with any technical issues that might arise.

In cases where it was not possible for the respondent to self-complete the assessment section, for example because of language difficulties or severe disabilities, the survey was terminated after the background questionnaire.

In cases where the selected respondent did not speak English and no household translator was available for the background questionnaire, the respondent was asked to complete the short 'doorstep interview'. This collected basic information about their language, age, gender, education, work status and immigration background using self-completion questions in their main language. In practice, very few respondents in England completed the doorstep interview – the focus was on finding household translators to complete the full background questionnaire instead.

The entire survey took approximately 1 hour and 45 minutes to complete, with the cognitive assessment accounting for around 1 hour of the total interview time.

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[3] However, a minority of those who achieved a high passing score in the locator section was asked to complete the components section as well as the main section. This process was handled randomly within the interviewing software and was necessary for the assessment scaling process.

All data from the background questionnaire and the assessments were downloaded automatically using secure systems[4]. Scoring of the assessment items was handled automatically within the survey software. The background questionnaire was adaptive, so not all respondents answered all the questions: responses to early questions routed respondents to later sections which asked in more detail about such things as training courses and workplace practices in their current job. These questions would obviously be inappropriate for those who were out of work at the time of the survey or who were not working for other reasons.

1.9   England sample

The total achieved sample for England was 4,941. The response rate was 38%.

Chapter 2 compares changes in the weighted sample composition since Cycle 1. Further details of the sample, together with more information on the sampling procedures are available in Appendix A.

1.10 Organisation of the report

Chapter 2 compares the characteristics of the Cycle 2 and Cycle 1 samples, weighted to the national population at the time. Chapter 3 describes adult skills in England, with analysis of skills outcomes by gender, age, educational attainment, employment status and ethnicity. England's results are compared with other countries as well as with England's Cycle 1 outcomes. Chapter 4 presents the results of the survey in terms of adult skills and work, and Chapter 5 focuses on skills in everyday life. Chapter 6 reports levels of socio-emotional and wellbeing scores and their relationship to adult skills. Chapter 7 concentrates on the characteristics of those with low proficiency in literacy, numeracy or adaptive problem solving.

1.11 Report conventions

All tables are derived from the Online Data Explorer produced by the international consortium, with source data from PIAAC 2023, unless otherwise indicated.

Tables show correlations between scores and other variables but these do not imply causality, as unknown and unexamined variables may be the cause of similarities in results. As noted in section 1.7.3, differences are reported as statistically significant if there is a probability, at the 5% or lower level, that these differences are not due to chance.

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[4] In Cycle 2, all survey elements were administered via the interviewers' tablet computers. This differs from Cycle 1, when some respondents completed the assessments using paper booklets. Through the adoption of touchscreen technology it was found that virtually no respondents were unable to self-complete the assessment section due to a lack of the necessary IT skills in Cycle 2.

The sum of percentages in tables may not add to 100 per cent due to rounding.

Symbols used in the report are as follows:

‡ Reporting standards not met (that is, there were fewer than 62 cases in this cell therefore robust inferences cannot be made)

— Not available

* Significant at 5% level

Figure is larger than 0 but less than 0.5

[c] Caution is required in interpreting results due to the high share of respondents with unusual response patterns. See the Note for Poland in the Reader's Guide (OECD, forthcomingb).

2   Population characteristics and changes since 2012

Key findings

- There was a significant increase in the proportion of adults born outside the UK, with a first language other than English, and from ethnic minority groups in Cycle 2 compared with Cycle 1.

- There were significant increases in the proportions of adults who were employed and adults who had a professional occupation in Cycle 2.

When interpreting differences in skills it is important to examine the extent to which this might be attributable to changes in the composition of the population.

The samples for the Cycle 2 Survey of Adult Skills, in 2022/23, and Cycle 1, in 2011/12, were weighted to population estimates at the time. This chapter compares demographic and employment characteristics of the weighted samples from 2023 and 2012. The comparison provides useful contextual information to help understand differences in performance since 2012.

As the sample is weighted to the national population, small changes in the percentage of the sample are statistically significant. In this chapter, we focus on changes that are significant and substantial (at least 5 percentage points).

2.1   Changes in demographic characteristics

This section provides insights into how the demographic characteristics of the samples have changed over time. See Appendix B1 for a full sample breakdown and comparison with Cycle 1, including unweighted frequencies.

2.1.1 Country of birth

There has been a significant increase in the proportion of adults who were born outside the UK compared with 2012 (7 percentage point increase).

2.1.2 First language learned as a child

Compared with Cycle 1, a significantly smaller proportion of adults in Cycle 2 learned English as their first language (8 percentage point decrease).

2.1.3 Ethnicity

There was significant change between Cycle 1 and 2 in the ethnic diversity of participating adults. A significantly smaller proportion of adults in Cycle 2 were of White

ethnicity (6 percentage point decrease) and significantly higher proportions of adults were Asian, from a Mixed ethnic background, Black or from any other ethnic groups.

2.1.4 Disability status

There was a small increase between Cycle 1 and 2 in the proportion of adults with self-reported disabilities (4 percentage point increase). This is coupled with a decrease in the proportion of adults with no self-reported disability limitation (5 percentage point increase). This change is consistent with increasing disability prevalence in the UK population (e.g. Adam, Brown and Diong, 2023; Kirk-Wade, Stiebahl and Wong, 2024).

2.1.5 Highest education level attained

The differences between the 2 samples provide some evidence of a more educated population since 2011, but the difference is small (4 percentage point increase in adults educated to at least upper secondary level and 3 percentage points decrease in adults whose highest educational level was below upper secondary level).

2.1.6 Age groups

The differences between the 2 samples provide some evidence of an aging population since 2011, but the difference is small (2 percentage point increase in the 55-65 years age group).

2.2   Changes in employment characteristics

This section provides insights into how the employment status and employment characteristics of the samples have changed over time. See Appendix B2 for full sample breakdown and comparison with Cycle 1, including unweighted frequencies.

2.2.1 Employment status

In Cycle 2, slightly more adults were employed (5 percentage point increase) and fewer were unemployed or out of the labour force (2 and 3 percentage points decrease, respectively), compared with Cycle 1.

2.2.2 Occupation

There was a large increase in the proportion of adults in Cycle 2 with a professional oc-cupation, compared with Cycle 1 (10 percentage points).

3   Distribution of adult skills in England

Key findings

Literacy

England's performance in literacy was significantly above the OECD average. Japan was the only G7 country to outperform England. England was similar in performance to Canada and was significantly above other English-speaking countries. England's literacy score has been stable since Cycle 1.

The gap between England's highest and lowest achievers has increased since Cycle 1, but changes to the measurement of literacy mean that the gap has increased significantly in all but 3 countries. Only Japan and Sweden were higher achieving and had better equity than England. Young people had significantly improved literacy scores compared with Cycle 1.

Higher literacy skills were associated with educational attainment, employment status, disability, country of birth / language first learned as a child and ethnicity. People who did not have upper secondary level qualifications had lower skills on average than in Cycle 1. Those in full-time employment, as well as those who work part-time, were studying or who were retired, had higher levels of literacy than those who were unemployed.

Numeracy

England's performance in numeracy was significantly above the OECD average. Japan and Germany were the only G7 countries to outperform England. England's numeracy score has increased significantly since Cycle 1.

The gap between England's highest and lowest achievers has increased since Cycle 1. This is driven by an increase in performance by top performers, whilst the lowest achievers' skill level remained unchanged.

Men achieved significantly higher scores than women and the gap between men and women was larger than the international average. Young people have significantly improved numeracy scores compared with Cycle 1.

The patterns for educational attainment, employment status and country of birth / language first learned as a child were similar to those for literacy.

Adaptive problem solving

England's performance in adaptive problem solving was significantly above the OECD average, and Japan was the only G7 country to outperform England. Of the 8 countries which outperformed England, 4 did so whilst achieving better equity between highest and lowest achievers.

Introduction

In this chapter, we report the attainment of adults in England in literacy, numeracy and adaptive problem solving. We draw on findings outlined in the international report (OECD, 2024c) and place outcomes for England in the context of those findings.

The international report includes outcomes for 31 participating countries and sub-national regions. In this chapter, we compare scores for England with the other 30 participating countries.

As outlined in Chapter 1, the survey measured the proficiency of adults' *key information-processing skills* in the 3 domains of literacy, numeracy and adaptive problem solving.

Each domain was measured on a scale from 0 to 500. The scores were grouped into levels: numeracy and literacy each have 6 levels, with 'Below Level 1' representing the lowest ability level. Adaptive problem solving was grouped into 5 levels, with 'Below Level 1' again representing the lowest ability level. Descriptions of the proficiency levels for each domain, detailing the scale scores and expected skills at each level are presented in Appendix A.

The sections that follow describe the distribution of skills among adults of working age (16-65 years) living in private households in England (adults living in institutional collective dwellings, such as prisons, hospitals, nursing homes and military barracks and bases, were excluded). Patterns of performance in literacy, numeracy and adaptive problem solving in England are compared with all other participating countries, particularly highlighting outcomes compared with other G7 countries (Canada, France, Germany, Italy, Japan and the United States), other English-speaking countries (Canada, Ireland, New Zealand and the United States) and high-performing Northern European countries (Denmark, Estonia, Finland, Ireland, Norway and Sweden). For literacy and numeracy, we also compare outcomes with Cycle 1 of the Survey of Adult Skills. For this, we compare changes in England with the other 21 countries which also participated in 2012 (see Table 1 in Chapter 1).

The chapter presents the results of analyses of demographic variables of interest, including gender, age, educational attainment and occupational status. Chapter 7 deals more specifically with the correlates of low performance.

As outlined in sections 1.5.4 and 1.8, adults were routed through the assessment depending on their score on an initial 'locator' assessment of low-level literacy and numeracy questions.

3.1 Scores in England

The mean scores[5] for adults in England are presented in Table 2 alongside the international OECD means for each of the 3 domains. Analysis by OECD suggests that an increase in 7 score points is approximately equivalent to an additional year in education (OECD, 2013).

Table 2 Mean scores for England in each domain, compared with OECD mean, significant differences between England and OECD identified

Domain	England mean	OECD mean
Literacy	*272	260
Numeracy	*268	263
Adaptive problem solving	*259	251

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Scores in each of the domains are on a scale from 0 to 500. Comparisons between scores should be made relative to other participating countries rather than across domains. England's mean score was significantly above the OECD average for literacy, numeracy and adaptive problem solving. Section 3.3 describes and discusses performance in terms of proficiency levels for the 3 domains.

Comparisons between England's performance and that of other countries are outlined for each of the 3 domains in sections 3.1.1 to 3.1.3 below.

3.1.1 Literacy performance in England

In this section, we compare England's literacy score with other participating countries.

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[5] The mean score is the estimate of the country's average skill score.

Table 3 Literacy scores in participating countries

Performance relative to England	Country and score
Countries outperforming England in literacy	Finland (296), Japan (289), Sweden (284), Norway (281), Netherlands (279), Estonia (276), Flemish Region (Belgium) (275)
Countries not significantly different from England in literacy	Denmark (273), Canada (271)
Countries significantly lower than England in literacy	Switzerland (266), Germany (266), Ireland (263), Czechia (260), **OECD average (260)**, New Zealand (260), United States (258), France (255), Singapore (255), Austria (254), Croatia (254), Slovak Republic (254), Korea (249), Hungary (248), Latvia (248), Spain (247), Italy (245), Israel (244), Lithuania (238), Poland [c] (236), Portugal (235), Chile (218)

[c] Caution is required in interpreting results due to the high share of respondents with unusual response patterns. See the Note for Poland in the Reader's Guide (OECD, forthcomingb).

Source: OECD, PIAAC 2023 database

England's mean score was significantly higher than the OECD average.

Of the 30 other participating countries, 7 significantly outperformed England, 2 had similar scores to England, and 21 countries had significantly lower mean scores than England.

England and Canada performed similarly, and both these countries outperformed the other participating English-speaking countries of Ireland, New Zealand and the United States. Of the Northern European countries, Finland, Sweden, Norway and Estonia all outperformed England. Japan was the only G7 country to outperform England.

3.1.2 Numeracy

There were 11 countries which outperformed England in numeracy, 3 countries which performed similarly and 16 countries that had significantly lower mean scores.

Table 4 Numeracy scores in participating countries

Performance relative to England	Country and score
Countries outperforming England in numeracy	Finland (294), Japan (291), Sweden (285), Norway (285), Netherlands (284), Estonia (281), Flemish Region (Belgium) (279), Denmark (279), Switzerland (276), Singapore (274), Germany (273)
Countries not significantly different from England in numeracy	Canada (271), Czechia (267), Austria (267)
Countries significantly lower than England in numeracy	**OECD average (263)**, Latvia (263), Slovak Republic (261), Ireland (260), France (257), New Zealand (256), Hungary (254), Croatia (254), Korea (253), Spain (250), United States (249), Israel (246), Lithuania (246), Italy (244), Poland [c] (239), Portugal (238), Chile (214)

[c] Caution is required in interpreting results due to the high share of respondents with unusual response patterns. See the Note for Poland in the Reader's Guide (OECD, forthcomingb).

Source: OECD, PIAAC 2023 database

As seen for literacy, England and Canada performed similarly, and both countries outperformed other English-speaking countries. In addition to the Northern European countries which outperformed England in literacy (Finland, Sweden, Norway and Estonia), Denmark also outperformed England in numeracy. Japan and Germany were the G7 countries which outperformed England.

3.1.3 Changes in literacy and numeracy performance since Cycle 1

When comparing how England's literacy and numeracy mean scores have changed since Cycle 1, we should also consider how scores have changed across other participating countries. As discussed in the Chapter 1, participating countries have varied between Cycle 1 and Cycle 2. In addition, comparisons with Cycle 1 are complicated by 3 rounds of data collection, and, therefore, 3 timepoints.

Table 5 compares England's average literacy score with the average of countries which participated in Round 1 of Cycle 1 and Cycle 2 (Cycle 1 comparator countries) and the average for G7 countries.

Table 5 Literacy scores over time

Country	Cycle 2 mean score	Cycle 1 mean score
England	272	273
Cycle 1 comparator countries	*266	272
G7 countries	265	271

Asterisk (*) indicates the difference between the Cycle 2 mean score and the Cycle 1 mean score is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

England's literacy score has remained stable since Cycle 1, as has the average across G7 countries. However, the average literacy score across Cycle 1 comparator countries has significantly decreased by 7 scale points (after taking into account the rounding of figures).

There were only 1 country whose mean score increased significantly between Cycle 1 and Cycle 2; Finland's score increased by 9 points. There were 8 countries whose mean score decreased significantly between Cycle 1 Round 1 and Cycle 2; these were, from smallest to greatest decrease, Japan, France, the United States, Czechia, Austria, the Slovak Republic, Korea and Poland. See Appendix C1 for mean scores over time for individual trend countries.

Table 6 compares England's average numeracy score with the Cycle 1 comparator countries and the average for G7 countries.

Table 6 Numeracy scores over time

Country	Cycle 2 mean score	Cycle 1 mean score
England	*268	262
Cycle 1 comparator countries	268	269
G7 countries	265	263

Asterisk (*) indicates the difference between the Cycle 2 mean score and the Cycle 1 mean score is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

England's numeracy score has significantly increased since Cycle 1, whilst the average across Cycle 1 comparator countries and G7 countries has remained stable. There were 3 other countries whose mean score also significantly increased between Cycle 1 and Cycle 2; these were, from smallest to greatest decrease, the Northern European

countries of Finland, Estonia and Norway (ordered by largest to smallest increase in score). There were 6 Cycle 1 comparator countries whose mean score decreased significantly between Cycle 1 and Cycle 2; these were Austria, the United States, Czechia, Korea, the Slovak Republic and Poland.

3.1.4 Adaptive Problem Solving

There were 8 countries which outperformed England in adaptive problems solving, 3 countries which performed similarly and 19 countries that had significantly lower mean scores.

Table 7 Adaptive problem solving scores in participating countries

Performance relative to England	Country and score
Countries outperforming England in adaptive problem solving	Finland (276), Japan (276), Sweden (273), Norway (271), Netherlands (265), Denmark (264), Estonia (263), Flemish Region (Belgium) (262)
Countries not significantly different from England in adaptive problem solving	Germany (261), Canada (259), Switzerland (257)
Countries significantly lower than England in adaptive problem solving	Austria (253), Singapore (252), **OECD average (251),** Czechia (250), New Zealand (249), Ireland (249), France (248), United States (247), Slovak Republic (247), Latvia (244), Spain (241), Hungary (241), Korea (238), Israel (236), Croatia (235), Portugal (233), Italy (231), Lithuania (230), Poland [c] (226), Chile (218)

[c] Caution is required in interpreting results due to the high share of respondents with unusual response patterns. See the Note for Poland in the Reader's Guide (OECD, forthcomingb).

Source: OECD, PIAAC 2023 database

As seen for literacy and numeracy, England and Canada performed similarly, and both countries outperformed other English-speaking countries. The same group of Northern European countries outperformed England as for numeracy (Finland, Sweden, Norway, Denmark and Estonia). Japan was the only G7 country which outperformed England.

3.1.5 Adult skills by region

In order to explore regional differences and whether there have been changes in literacy and numeracy since Cycle 1, the mean scores were calculated in each of the 3 domains and split by the different regions of England. These are presented in Tables 8 to 10 below. For mean scores by mayoral region, see Appendix E data tables.

Adults in the South West region had the highest mean scores for literacy, numeracy and problem solving. The lowest mean scores for all 3 domains were found in the West Midlands.

Table 8 Average scores in literacy by region in Cycle 2 and Cycle 1

Region	Cycle 2 mean score	Cycle 1 mean score
South West	283	279
Eastern	279	279
South East	279	282
London	271	270
North West	271	268
East Midlands	269	274
Yorkshire and The Humberside	267	269
North East	261	259
West Midlands	258	264

Differences between Cycle 2 mean score and Cycle 1 mean score are not statistically significant at the 5% level. Regions ordered by literacy mean score. Differences between regions have not been tested for significance.

Source: OECD PIAAC 2023 England database

Table 9 Average scores in numeracy by region in Cycle 2 and Cycle 1

Region	Cycle 2 mean score	Cycle 1 mean score
South West	279	270
Eastern	277	269
South East	278	274
London	268	256
North West	268	258
East Midlands	265	263
Yorkshire and The Humberside	263	258
North East	257	247
West Midlands	253	251

Differences between Cycle 2 mean score and Cycle 1 mean score are not statistically significant at the 5% level. Regions ordered by literacy mean score. Differences between regions have not been tested for significance.

Source: OECD PIAAC 2023 England database

Table 10 Average scores in adaptive problem solving by region in Cycle 2

Region	Cycle 2 mean score
South West	269
Eastern	267
South East	266
London	252
North West	259
East Midlands	257
Yorkshire and The Humberside	256
North East	253
West Midlands	248

Differences between regions have not been tested for significance.

Source: OECD PIAAC 2023 England database

Changes in literacy and numeracy scores since Cycle 1 were not significant for any region.

3.2 Differences between highest and lowest achievers

Understanding the distribution of achievement and spread in performance between the highest and lowest achievers is important. For instance, amongst countries sharing similar mean scores there may be differences in the proportions of high- and low-scoring adults. A country with a wide spread of attainment may have large numbers of adults who are performing at the lowest levels as well as adults performing at the highest levels, creating a diverse workforce in terms of ability. A country with a lower spread of attainment may have fewer very high achievers but may also have fewer adults performing at the lower levels. Therefore, 2 countries may have a very similar mean score, but the pattern of performance may vary considerably, with different policy implications. For instance, it may be important at a national level to know whether there is a large group of people with very poor skills, or if most people have very similar skills levels. Whether a country has a narrow spread or a wide spread could determine how best resources should be spent to improve adult skills, whether it is to target underachievers, a lack of high achievers, specific demographic groups, or the general population if the spread is narrow.

3.2.1 Distribution of scores

The first way in which the spread of performance in each country can be examined is by looking at the distribution of scores and the difference between very low and very high achievers (at the 5th and 95th percentiles).

The 5th percentile is the point at which 5% of adults score lower than the rest of the population. The 95th percentile is the point at which 5% score higher than the rest of the population. The difference between those with scores at the 5th and 95th percentiles is a better measure of the typical spread of attainment than the difference between the lowest and highest scoring individuals. This is because the latter can be affected by unusually high or low scores.

Table 11 Attainment gap in England and the OECD in each domain

Domain	Country	5th percentile score	95th percentile score	95th – 5th percentile
Literacy	England	*168	*350	182
Literacy	OECD average	157	341	184
Numeracy	England	161	*354	194
Numeracy	OECD average	159	348	190
Adaptive Problem Solving	England	167	*328	160
Adaptive Problem Solving	OECD average	166	321	155

Asterisk (*) indicates the difference between England and OECD average is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

England had a similar spread of attainment compared with the OECD average for literacy, numeracy and adaptive problem solving. However, the scores at the 5th and 95th percentiles showed that England's highest achieving adults (at the 95th percentile) had significantly higher scores than the OECD average in literacy, numeracy and adaptive problem solving. England's lowest achieving adults (at the 5th percentile) scored significantly higher in literacy than their peers across the OECD on average, but in numeracy and adaptive problem solving there was no significant difference.

The following sections provide more detail on England's attainment gap compared with other countries and changes over time.

Figure 1 Literacy attainment gap across countries
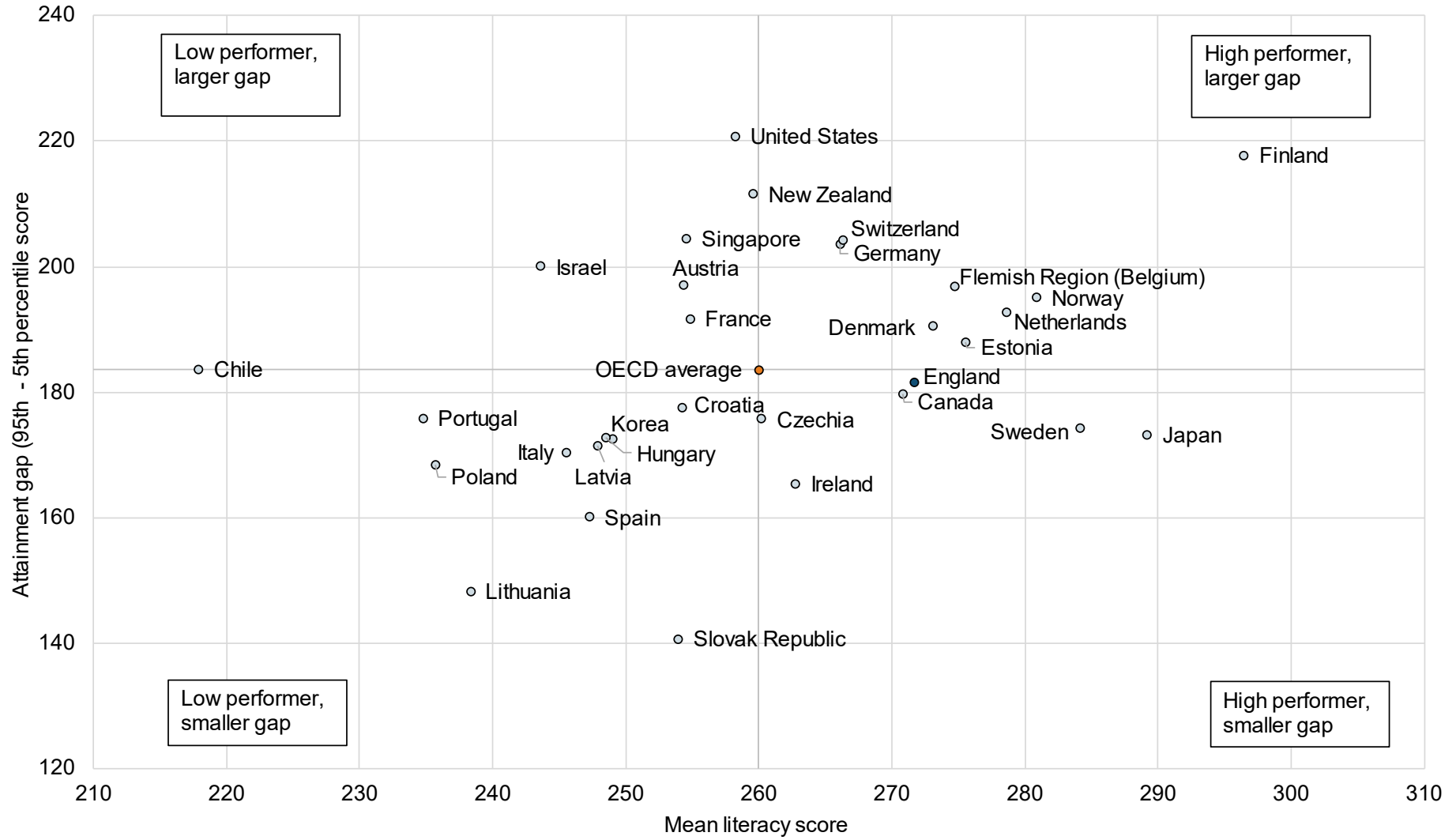
Figure 1 Literacy attainment gap across countries compares countries' mean literacy scores with the size of their attainment gap. Countries can be separated into 4 categories in relation to the OECD average: lower performing countries with a larger gap, lower performing countries with a smaller gap, higher performing countries with a larger gap and higher performing countries with a smaller gap, although some countries lie so close to the OECD average that they may be more reasonably characterised as similarly performing, or with a similar attainment gap. England can be categorised as higher performing compared with the OECD average, with a similar attainment gap. Only Japan and Sweden are higher achieving and have better equity than England. Canada has a similar attainment gap in literacy to England, as well as performing similarly overall.

Figure 2 Literacy attainment at the 5th and 95th percentiles
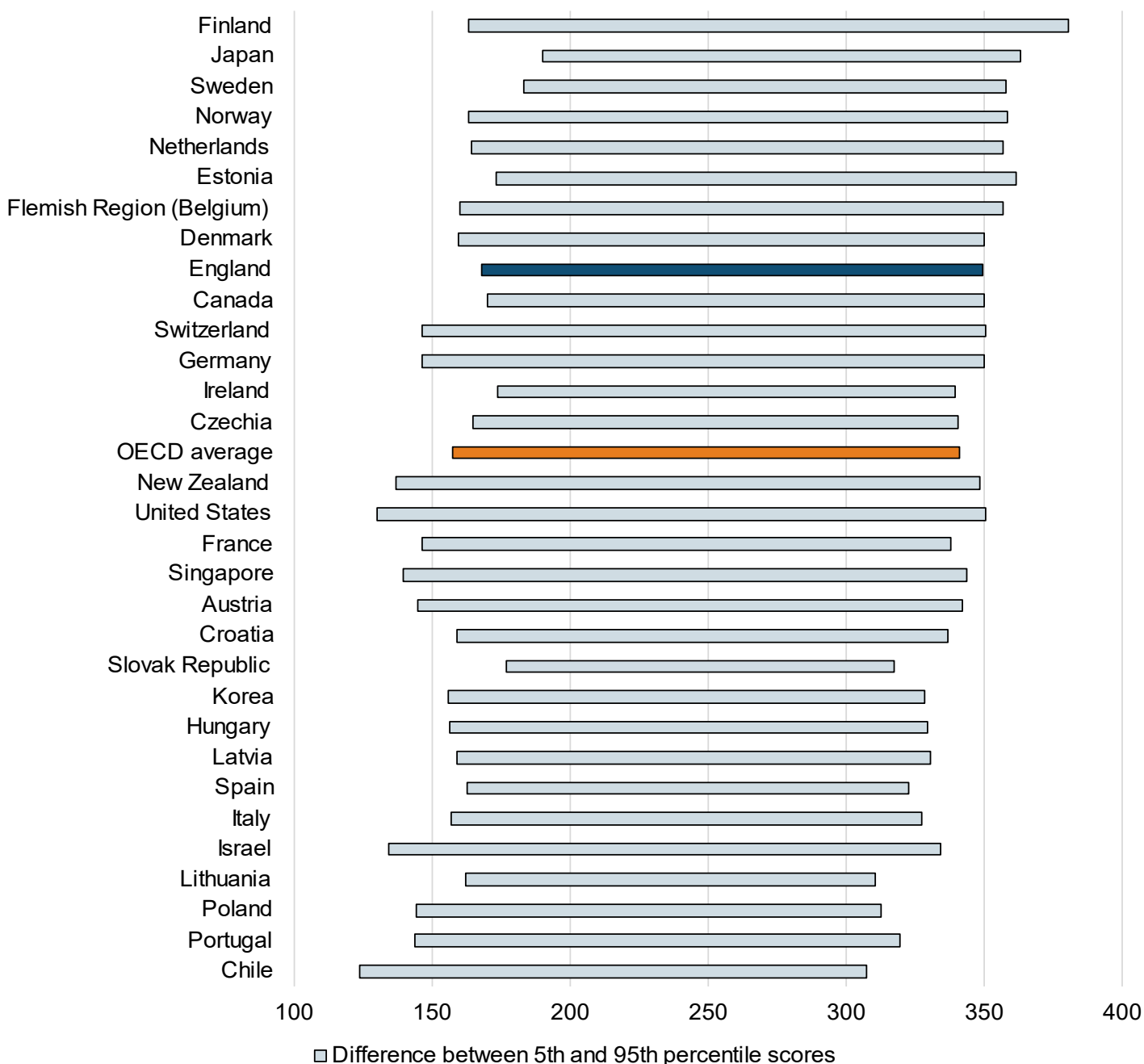
Difference between 5th and 95th percentile scores

47

Country	Mean score	5th percentile score	95th percentile score	95th – 5th percentile
Finland	296	163	381	218
Japan	289	190	363	173
Sweden	284	183	358	174
Norway	281	163	358	195
Netherlands	279	164	357	193
Estonia	276	173	361	188
Flemish Region (Belgium)	275	160	357	197
Denmark	273	159	350	191
England	272	168	350	182
Canada	271	170	350	180
Switzerland	266	146	351	204
Germany	266	147	350	204
Ireland	263	174	339	165
Czechia	260	165	340	176
OECD average	260	157	341	184
New Zealand	260	137	348	212
United States	258	130	351	221
France	255	146	338	192
Singapore	255	139	344	204
Austria	254	145	342	197
Croatia	254	159	337	178
Slovak Republic	254	177	318	141
Korea	249	156	328	172
Hungary	248	157	329	173
Latvia	248	159	331	172
Spain	247	162	323	160
Italy	245	157	327	171
Israel	244	134	334	200
Lithuania	238	162	311	148
Poland [c]	236	144	313	168
Portugal	235	144	320	176
Chile	218	124	308	184

[c] Caution is required in interpreting results due to the high share of respondents with unusual response patterns. See the Note for Poland in the Reader's Guide (OECD, forthcomingb).

Source: OECD, PIAAC 2023 database

In Figure 2, the attainment gap is shown for countries and the OECD average so that scores at the 5th and 95th percentiles can be compared. The countries are ordered by mean literacy score from highest to lowest. Finland had the highest mean score, with a much wider distribution of attainment than England. Germany and Switzerland performed significantly below England, and we can see that their low achieving adults performed less well than their peers in England, (adults at the 95th percentile performed very similarly in England to adults in Germany and Switzerland). Adults in England outperformed adults in Ireland on average, and the distributions indicate that this is due to higher performance of adults in England at the 95th percentile, whereas performance at the 5th percentile was similar. New Zealand and United States' comparatively poor performance can be attributed to poorer performance of adults at the 5th percentile while their performance at the 95th percentile was similar to England.

Since Cycle 1, the gap between lowest and highest performing adults in England has increased. This was driven by a significant decrease in score for adults at the 5th percentile, whilst the performance of adults at the 95th percentile remained similar. Across the Cycle 1 comparator countries, on average, the performance of adults at the 5th percentile has also fallen. This fall at the 5th percentile is likely to be a combination of more accurate assessment of low ability adults (due to the reading components measure and doorstep interview) and changes in demographics between the 2 cycles.

Table 12 Changes in performance at the 5th and 95th percentiles over time in literacy

Country	Percentile	Cycle 2 score	Cycle 1 score	Difference between Cycle 1 and Cycle 2
England	5th percentile	168	188	*-20
England	95th percentile	350	347	3
England	95th – 5th percentile	182	159	*23
Cycle 1 comparator countries	5th percentile	162	190	*-28
Cycle 1 comparator countries	95th percentile	345	342	4
Cycle 1 comparator countries	95th – 5th percentile	176	152	*32

Asterisk (*) indicates the difference between Cycle 2 and Cycle 1 is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Comparing changes in other countries since Cycle 1, all countries except Spain, Ireland and Sweden had a significant increase in gap between the score at the 5th and 95th percentiles, as shown in Figure 3 (changes for the Slovak Republic and Poland were not significant).

Figure 3 Change in literacy average and gap since Cycle 1

Higher change in average, smaller gap (relative to OECD average)

Higher change in average, larger gap (relative to OECD average)

Lower change in average, smaller gap (relative to OECD average)

Lower change in average, larger gap (relative to OECD average)

Finland

Sweden

Denmark   Norway

England (UK)   Estonia

Cycle 1 comparator countries

Canada   Flemish Region (Belgium)

Spain   Ireland   Germany

Italy   Netherlands

France   Japan

United States

Czechia

Austria

Slovak Republic

Korea

Poland

Change in the average since cycle 1

Change in achievement gap since cycle 1

Numeracy

Figure 4 Numeracy attainment gap across countries
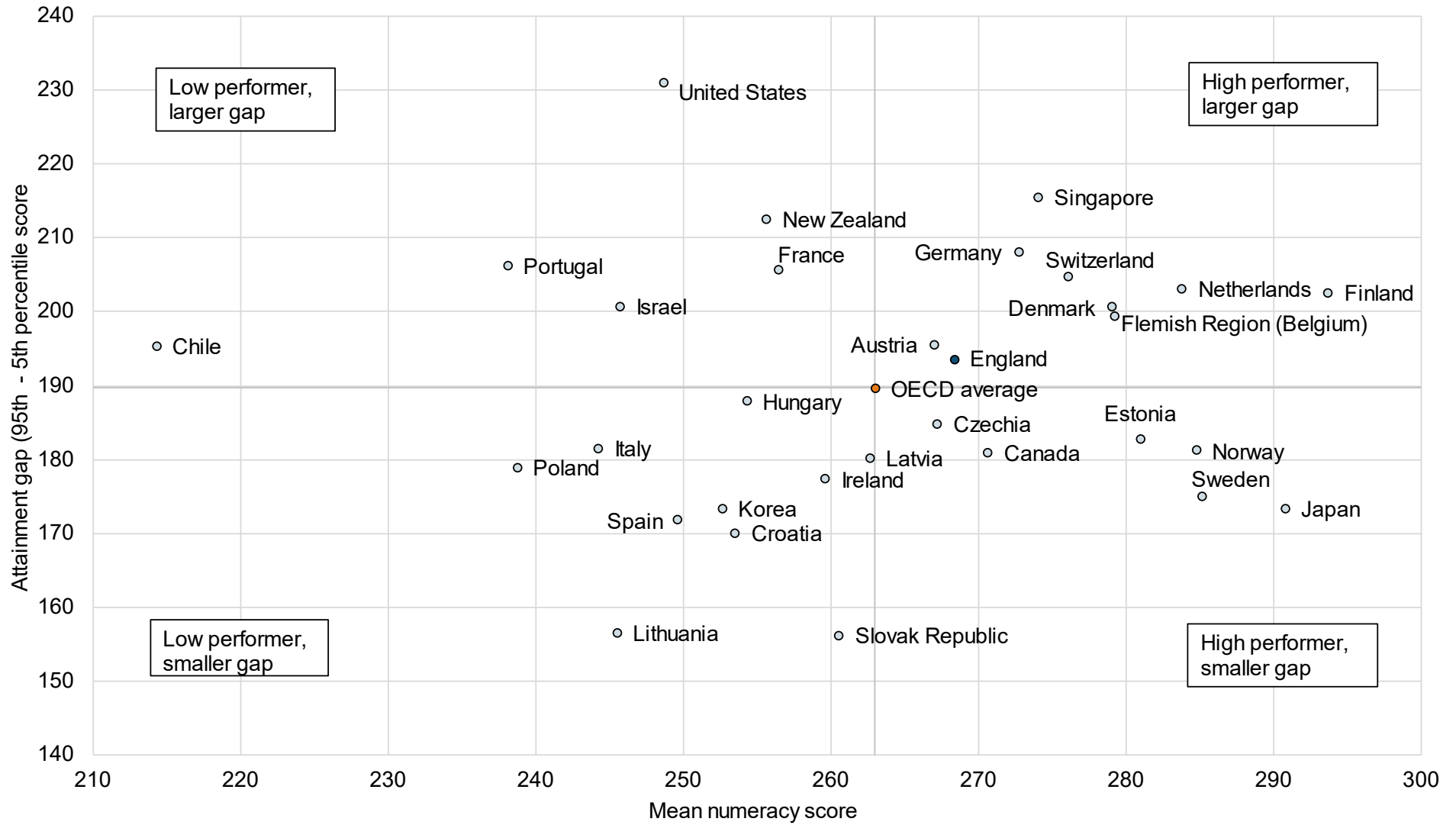
Figure 4 compares countries' mean numeracy scores with the size of their attainment gap. England can be categorised as higher performing compared with the OECD average with a similar attainment gap. Japan, Sweden, Norway and Estonia were higher achieving and had better equity than England.

Figure 5 Numeracy attainment at the 5th and 95th percentiles
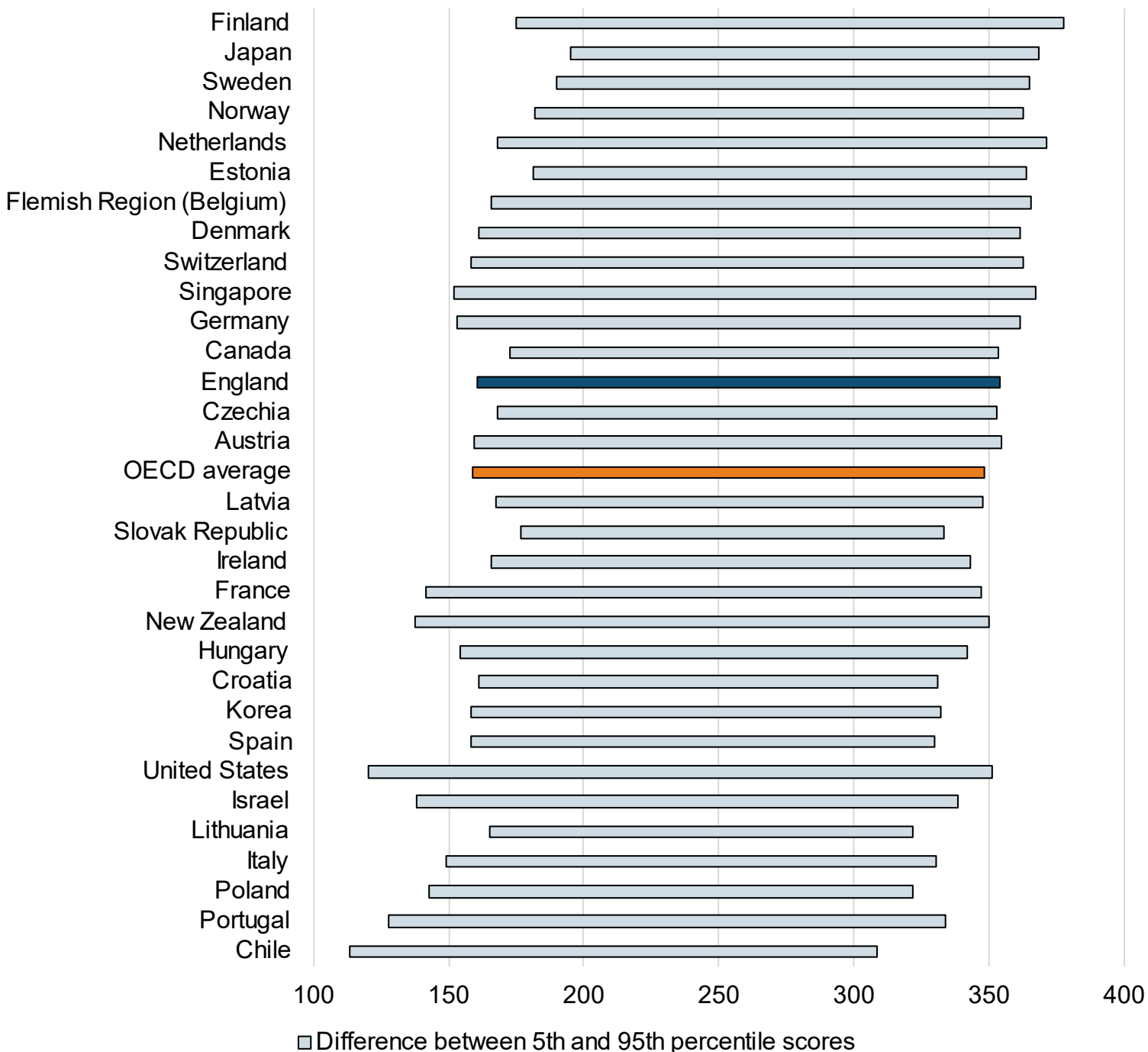
☐ Difference between 5th and 95th percentile scores

Country	Mean score	5th percentile score	95th percentile score	95th – 5th percentile
Finland	294	175	377	202
Japan	291	195	368	173
Sweden	285	190	365	175
Norway	285	182	363	181
Netherlands	284	168	371	203
Estonia	281	181	364	183
Flemish Region (Belgium)	279	166	365	199
Denmark	279	161	362	201
Switzerland	276	158	363	205
Singapore	274	152	367	215
Germany	273	153	361	208
Canada	271	173	354	181
England	268	161	354	194
Czechia	267	168	353	185
Austria	267	159	355	195
OECD average	263	159	348	190
Latvia	263	168	348	180
Slovak Republic	261	177	333	156
Ireland	260	166	343	177
France	257	141	347	206
New Zealand	256	137	350	212
Hungary	254	154	342	188
Croatia	254	161	331	170
Korea	253	159	332	173
Spain	250	158	330	172
United States	249	120	351	231
Israel	246	138	339	201
Lithuania	246	165	322	157
Italy	244	149	331	181
Poland [c]	239	143	322	179
Portugal	238	128	334	206
Chile	214	113	309	195

[c] Caution is required in interpreting results due to the high share of respondents with unusual response patterns. See the Note for Poland in the Reader's Guide (OECD, forthcomingb).

Source: OECD, PIAAC 2023 database

In Figure 5, the attainment gap is shown for countries and the OECD average so that scores at the 5th and 95th percentiles can be compared. The countries are ordered by mean numeracy score from highest to lowest. Finland had the highest mean score and we can see that this was achieved with a wider spread of attainment than other top performers of Japan, Sweden and Norway. As seen for literacy, New Zealand and United States' comparatively poor performance was due to poorer performance of adults at the 5th percentile while their performance at the 95th percentile was similar to England's.

Since Cycle 1, the gap between the lowest and highest performing adults in England has increased. This was driven by a significant increase in scores for adults at the 95th percentile. Across Cycle 1 comparator countries, on average, the performance of adults at the 5th percentile has fallen, and increased at the 95th percentile; both these changes are significant.

Table 13 Changes in performance at the 5th and 95th percentiles over time in numeracy

Country	Percentile	Cycle 2 score	Cycle 1 score	Difference between Cycle 1 and Cycle 2
England	5th percentile	161	167	-7
England	95th percentile	354	346	*9
England	95th – 5th percentile	194	178	*15
Cycle 1 comparator countries	5th percentile	164	179	*-15
Cycle 1 comparator countries	95th percentile	352	345	*7
Cycle 1 comparator countries	95th – 5th percentile	188	166	*22

Asterisk (*) indicates the difference between Cycle 2 and Cycle 1 is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Comparing changes in other countries since Cycle 1, all countries except Sweden, Spain, the Slovak Republic, Canada, Ireland and Norway had a significant increase in the gap between the scores at the 5th and 95th percentiles as shown in Figure 6.

Figure 6 Change in numeracy average and gap since Cycle 1
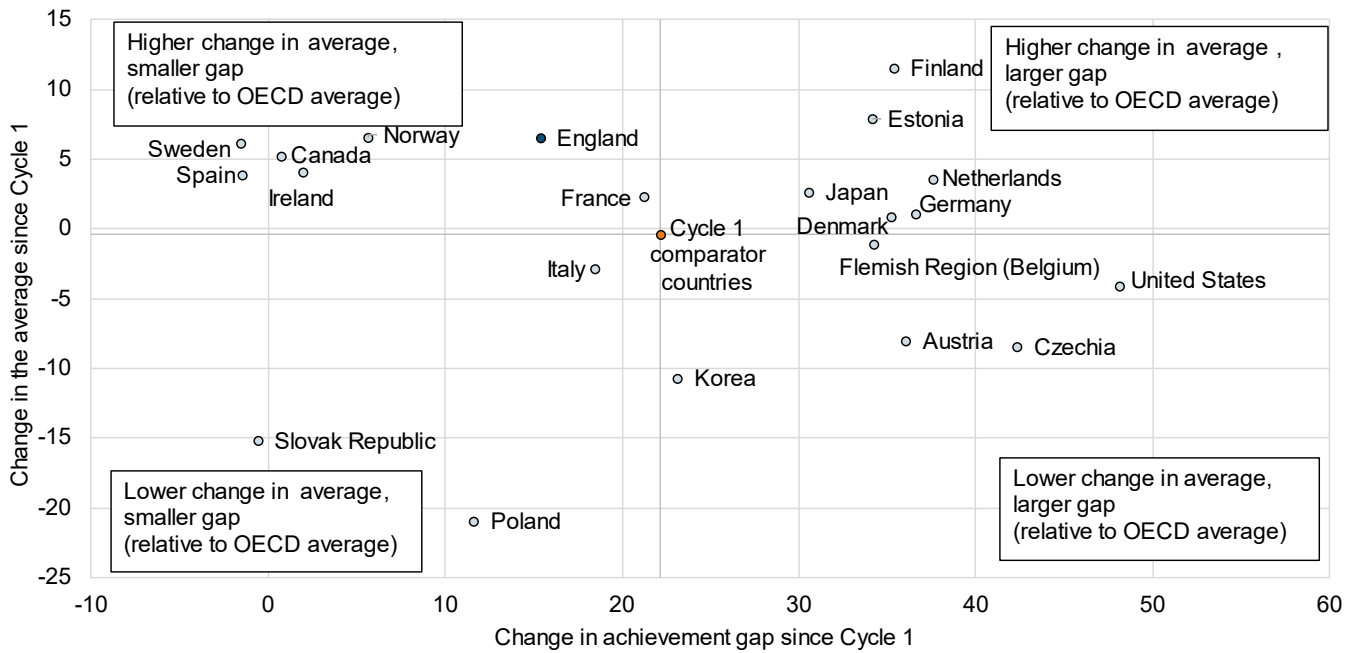
Adaptive problem solving

Figure 7 Adaptive problem solving attainment gap across countries
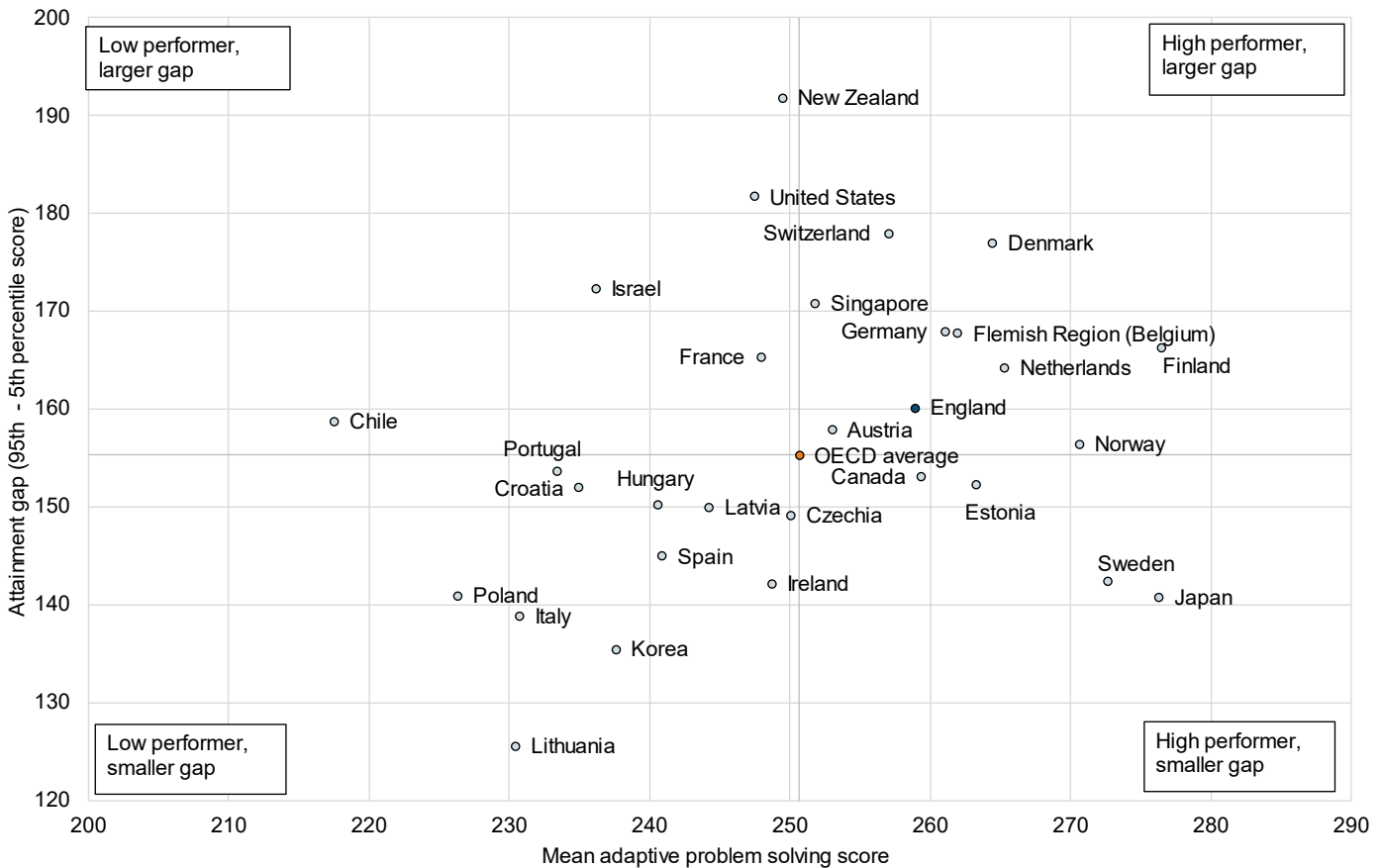
Figure 7 compares countries' mean adaptive problem solving scores with the size of their attainment gap. England can be categorised as higher performing compared with the OECD average with a similar attainment gap. As seen for numeracy, Japan, Sweden, Norway and Estonia were higher achieving and had better equity than England.

Figure 8 Adaptive problem solving attainment at the 5th and 95th percentiles
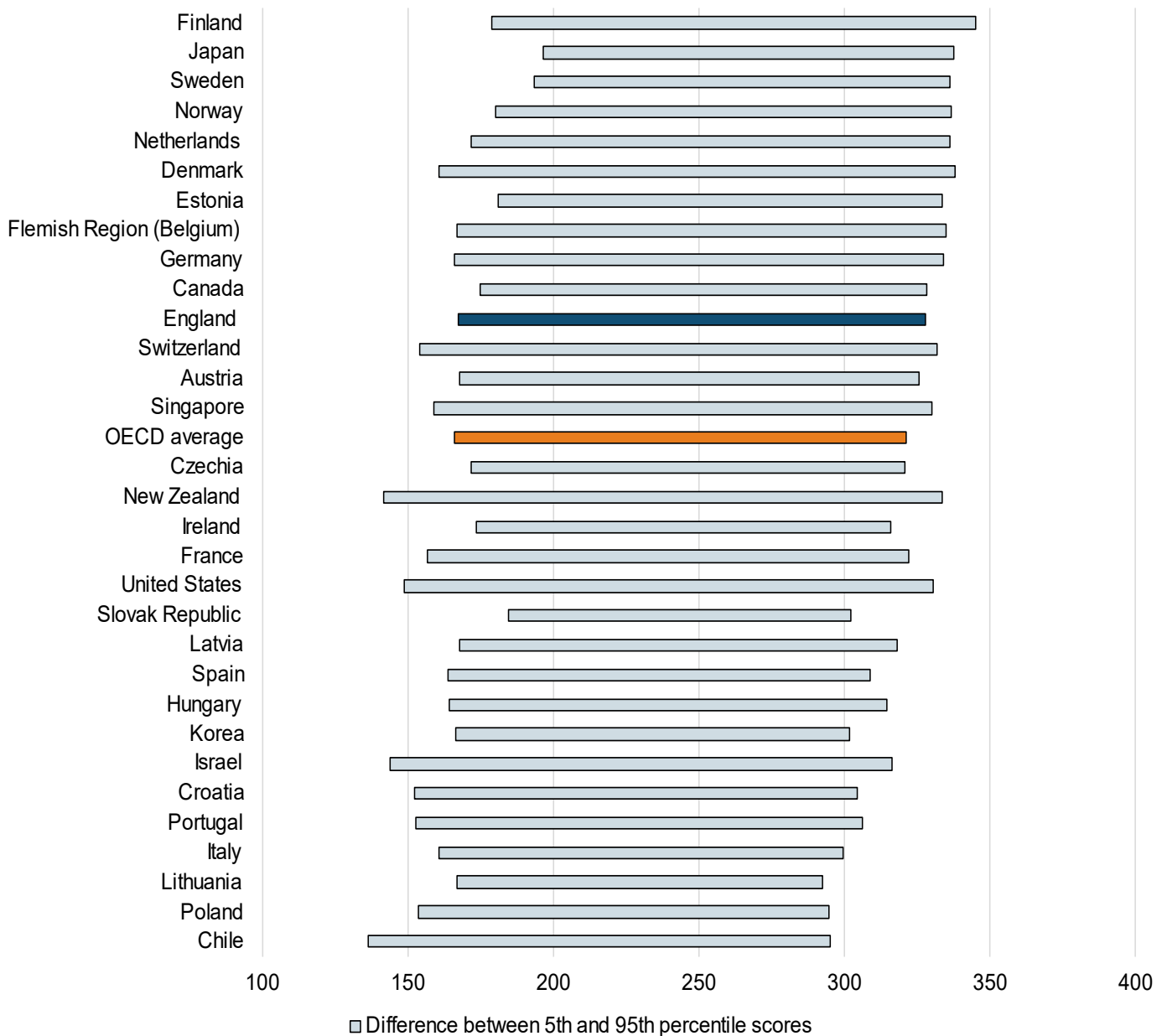
□ Difference between 5th and 95th percentile scores

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Country	Mean score	5th percentile score	95th percentile score	95th – 5th percentile
Finland	276	179	345	166
Japan	276	197	337	141
Sweden	273	194	336	143
Norway	271	180	337	156
Netherlands	265	172	336	164
Denmark	264	161	338	177
Estonia	263	181	333	152
Flemish Region (Belgium)	262	167	335	168
Germany	261	166	334	168
Canada	259	175	328	153
England	259	167	328	160
Switzerland	257	154	332	178
Austria	253	168	326	158
Singapore	252	159	330	171
OECD average	251	166	321	155
Czechia	250	172	321	149
New Zealand	249	142	334	192
Ireland	249	173	316	142
France	248	157	322	165
United States	247	149	330	182
Slovak Republic	247	185	302	118
Latvia	244	168	318	150
Spain	241	164	309	145
Hungary	241	164	315	150
Korea	238	166	302	135
Israel	236	144	316	172
Croatia	235	152	305	152
Portugal	233	153	306	154
Italy	231	160	299	139
Lithuania	230	167	292	126
Poland [c]	226	153	294	141
Chile	218	136	295	159

[c] Caution is required in interpreting results due to the high share of respondents with unusual response patterns. See the Note for Poland in the Reader's Guide (OECD, forthcomingb).

Source: OECD, PIAAC 2023 database

In Figure 8, the attainment gap is shown for countries and the OECD average so that scores at the 5th and 95th percentiles can be compared. The countries are ordered by mean score on adaptive problem solving from highest to lowest. Finland and Japan had the highest mean score (276) and we can see that this was achieved with a narrow distribution of attainment in Japan. Japan had the highest score for adults at the 5th percentile, and a score at the 95th percentile which only Denmark matches and Finland betters. Canada's performance was similar at the 5th and 95th percentiles, whereas New Zealand and the United States had much lower performance at the 5th percentile. Ireland's lower mean score can be attributed due to lower performance at the 95th percentile.

3.2.2 Performance across proficiency levels

The second way of examining the spread of attainment is by looking at England's performance at each of the proficiency levels. In the Survey of Adult Skills, literacy and numeracy skills are described in terms of 6 levels of achievement and problem solving in terms of 5 levels. Descriptions of the proficiency levels, with details of expected performance at different skills levels are presented in the section 1.6 and Appendix A. The literacy and numeracy proficiency levels in the Survey of Adult Skills are not equivalent to England's National Qualification Framework (NQF) levels in literacy and numeracy.

Table 14 below shows the percentage of adults at each level for literacy, numeracy and problem solving.

Table 14 Literacy, numeracy and adaptive problem solving proficiency levels in England and the OECD

Domain	Country	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Literacy	England	6%	12%	32%	37%	13%	1%
Literacy	OECD average	9%	17%	31%	31%	11%	1%
Numeracy	England	7%	14%	31%	33%	14%	2%
Numeracy	OECD average	9%	16%	31%	31%	12%	2%
Adaptive problem solving	England	6%	15%	40%	34%	6%	n/a
Adaptive problem solving	OECD average	8%	22%	38%	27%	5%	n/a

Source: OECD, PIAAC 2023 database

Adults who scored Level 1 or below are considered to be low performers. Compared with the OECD average, England had a lower proportion of low performers in all domains. If we use the outcomes from the Survey of Adult Skills to estimate the number of working-age adults, there would be an estimated 8.5 million adults in England with low basic skills (that is low proficiency in literacy, low proficiency in numeracy, or both).

Literacy

For literacy, 18% of adults in England were classified as low performers, compared with 26% across the OECD. Countries with a significantly smaller proportion were Japan, Sweden, Finland and Norway, all countries from the group which outperformed England, on average. Therefore, Japan was the only G7 country with a smaller proportion of low performing adults than England, and no other English-speaking country had a smaller proportion of low performers.

Looking at the higher achieving adults (those with literacy Levels 4 or 5), England had 14% of adults who achieved Level 4 and above for literacy, which was slightly higher than the OECD average of 12%. England's high performance in literacy compared with the OECD average was driven by a lower proportion of low performers and higher proportions of Level 3 and 4 adults and not by a large proportion of very high performers at Level 5.

The proportion of adults achieving Levels 4 and 5 in England was much lower than some of the highest-scoring countries; Finland had 35% of adults at Level 4 or above and Japan had 23% of adults in the 2 top levels. The Northern European countries of Norway, Sweden, Estonia and Denmark all ranked higher than England by the proportion of adults achieving Level 4 or 5. The other G7 countries of Germany, Canada and United States had a similar proportion of adults at Level 4 or 5 to England, and France and Italy a much lower proportion (9% and 5% respectively).

In all countries, a small proportion of adults achieved the highest level (Level 5) for literacy, including 1% in England and the OECD on average. Finland had the highest proportion of adults at Level 5 (6%).

Numeracy

For numeracy, 21% of adults in England were classified as low performers, compared with 25% across the OECD. Japan had the smallest proportion of low performers (10%). If countries are ranked by the proportion of low performers, all countries, except for Singapore, from the group which outperformed England had a smaller proportion of low performers on average; Japan, Finland, Sweden, Norway, the Netherlands, Estonia, Denmark and Flemish Region (Belgium) all had a significantly smaller proportion of low performers than England. The G7 countries of France, United States and Italy had a significantly larger proportion of low performers (28%, 34% and 35% respectively). Canada and England had a similar proportion of low performers; Ireland and New

Zealand had 25% and 28% of adults classified as low performers, a significantly greater proportion than England.

Looking at the higher achieving adults (those with numeracy Levels 4 or 5), 15% of adults in England achieved Level 4 and above for numeracy, compared with 14% across the OECD, on average. England's high performance in numeracy compared with the OECD average was driven by a lower proportion of low performers and higher proportions of Level 3 and 4 adults and not by a large proportion of very high performers at Level 5.

All countries which significantly outperformed England in numeracy had a greater proportion of adults achieving Levels 4 and 5. Many of these countries had a much higher proportion of high achievers. For instance, in Finland 31% of adults were high achieving, and in Japan and the Netherlands 25% and 24%, respectively, were high achieving. The proportion of adults in Germany (18%) and Canada (15%) was more similar to England, and other G7 countries had much lower proportions of high achievers (United States 12%, France 12%, Italy 6%). Ireland had the lowest proportion of high achievers amongst English speaking countries (10%).

In all countries, a small proportion of adults achieved the highest level (Level 5) for numeracy, including 2% in England and the OECD on average. Finland had the highest proportion of adults at Level 5 (5%).

Adaptive problem solving

For adaptive problem solving, 21% of adults in England were classified as low performers, compared with 29% across the OECD. Japan had the smallest proportion of low performers (11%). Of the countries which outperformed England, on average, 3 had a similar proportion of low performers: Denmark (20%), Flemish Region (Belgium) (21%) and Estonia (21%); the others had a significantly smaller proportion of low performers. The G7 countries of France, the United States and Italy had a much larger proportion of low performers (30%, 32% and 46% respectively). Canada and England had a similar proportion of low performers, while Ireland and New Zealand had 28% and 29%, respectively, of adults classified as low performers (a significantly larger proportion than England).

Looking at the higher achieving adults (those achieving Level 4 in adaptive problem solving), 6% of adults in England achieved Level 4, compared with 5% across the OECD, on average. England's high performance in adaptive problem solving compared with the OECD average was driven by a lower proportion of low performers and not by a large proportion of very high performers at Level 4.

All countries which significantly outperformed England in adaptive problem solving had a larger proportion of high achieving adults, as did most countries who performed similarly and some who performed less well. New Zealand and the United States had a notably larger proportion of high achieving adults compared with other countries with a similar

average performance. As was seen for literacy and numeracy, Finland had the largest proportion of high achievers (13%).

3.3 Adult skills and gender

In this section, we examine the differences in adult skills between men and women in England, focusing on literacy, numeracy, and adaptive problem solving. We compare the average scores for men and women to the OECD average and look at how these scores have changed since Cycle 1. Additionally, we assess whether the gender gap in skills reflects the international trend, which often shows slight gender differences across these domains.

We also explore how the distribution of skill levels varies by gender. We highlight the proportions of men and women achieving each proficiency level, from Below Level 1 to Level 5, and assess whether these differences align with those seen in OECD countries on average. This comparison will help to identify any notable disparities or similarities between England and the wider international context.

Finally, we discuss any changes in the gender gap between Cycle 1 and Cycle 2, noting areas where men or women have improved or declined.

3.3.1 Literacy

In England, for literacy, men scored an average of 273, significantly higher than the OECD average for men by 14 points. Women in England scored an average of 271, 9 points significantly higher than the OECD average for women.

In England, men scored, on average, 2 points higher than women, but this difference was not significant. This was similar to Cycle 1, when men scored 3 points on average higher than women, and the difference was also not significant (Wheater *et al.*, 2013). Across the OECD, women scored 3 points higher than men on average, and this difference was significant.

In most countries (23 out of 31), women had higher scores than men, but this difference was significant in only 10 of these countries. Most of the differences in score points were small, but there were some exceptions. For instance, women in New Zealand and Estonia scored 13 and 11 points higher, respectively, than men. There were 8 countries (including England), where men scored higher than women, but this difference was significant only in Singapore.

In England, the proportions of low performing (Level 1 and below) men and women were similar (18% and 17%, respectively). The distribution across proficiency levels was similar, with a slighter larger proportion of women achieving Level 2 (33% compared with 30%), and a slightly higher proportion of men achieving Level 4 (15% compared with 12%).

Figure 9 Percentage of respondents by proficiency levels in literacy by gender in England and OECD
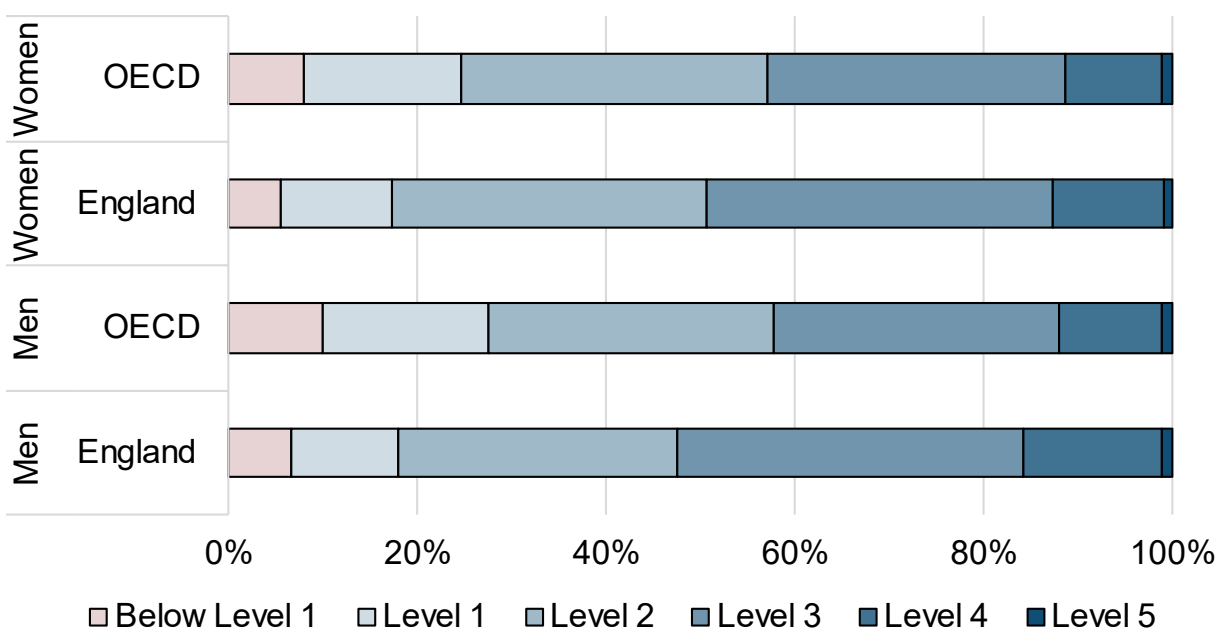
Gender	Country	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Men	England	7%	11%	30%	37%	15%	1%
Men	OECD average	10%	18%	30%	30%	11%	1%
Women	England	6%	12%	33%	37%	12%	1%
Women	OECD average	8%	17%	33%	32%	10%	1%

Source: OECD, PIAAC 2023 database

In England there were larger proportions of men and women achieving Level 3 and Level 4, and a smaller proportion of low achievers compared with the OECD. This is in line with England's higher achievement overall in literacy compared with the OECD average.

3.3.2 Numeracy

In England, for numeracy, men scored an average of 276, which was 9 points significantly higher than the OECD average for men. Women in England scored an average of 261, similar to the OECD average for women of 258.

In England, men scored significantly higher than women by 16 points on average. This is a similar gap to what was found in Cycle 1, when men scored 14 points higher than

women, on average. Across the OECD, men scored 10 points significantly higher than women on average.

In all but 2 countries (Poland and Croatia), men had higher scores than women and this difference was significant in 26 countries. The difference between men and women was particularly large in England; only Switzerland and Canada had a bigger difference.

In England, a greater proportion of low achievers (Level 1 or below) were women (24% of women compared with 18% of men). Men in England were also more likely to achieve the highest levels; 20% of men achieved Level 4 or 5 compared with 11% of women.

Figure 10 Percentage of respondents by proficiency levels in numeracy by gender in England and OECD
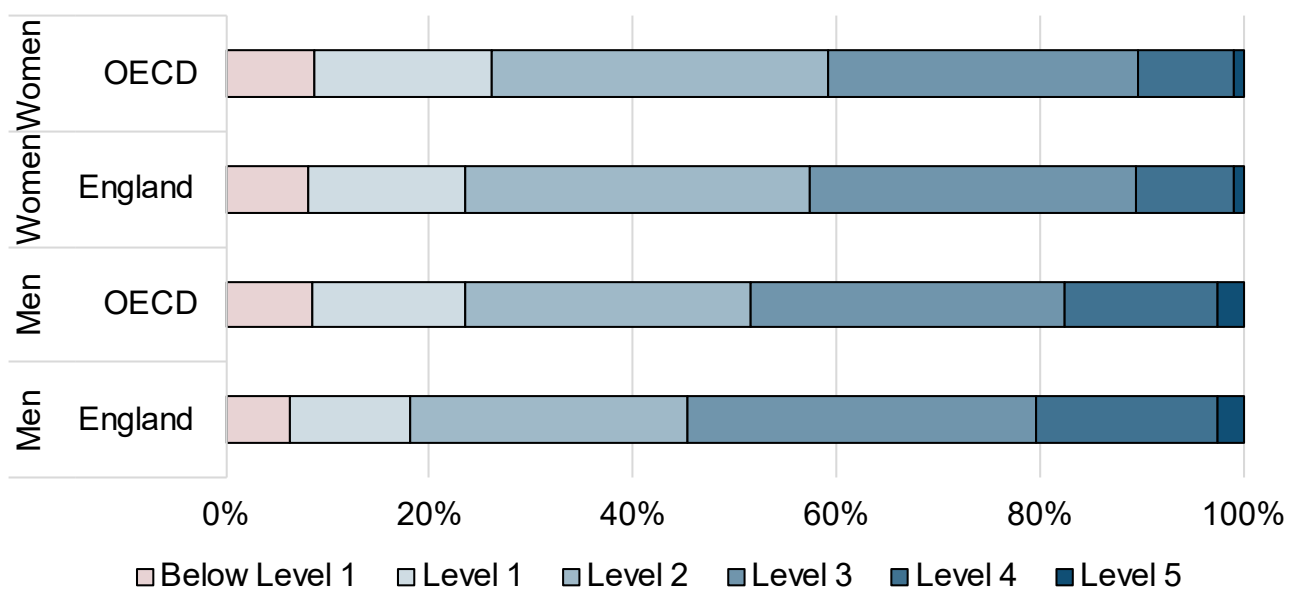
Gender	Country	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Men	England	6%	12%	27%	34%	18%	3%
Men	OECD average	8%	15%	28%	31%	15%	3%
Women	England	8%	15%	34%	32%	10%	1%
Women	OECD average	9%	17%	33%	30%	9%	1%

Source: OECD, PIAAC 2023 database

Compared with the OECD averages, there was a smaller proportion of men who were low achievers in numeracy in England (5 percentage points lower), and a similar proportion of women who were low achievers (2 percentage points lower in England).

3.3.3 Adaptive problem solving

In England, for adaptive problem solving, men scored an average of 261, significantly higher by 9 points than the OECD average for men. Women in England scored an average of 257, significantly higher than the OECD average for women by 7 points.

In England, men scored on average 5 points significantly higher than women. Across the OECD, men scored on average 2 points higher than women, and this difference was also significant.

Men scored significantly higher than women in 11 countries. There were 6 countries with a larger difference between men and women than England. Portugal had the largest difference, with men scoring 7 points higher than women, on average.

Figure 11 Percentage of respondents by proficiency levels in adaptive problem solving by gender in England and OECD
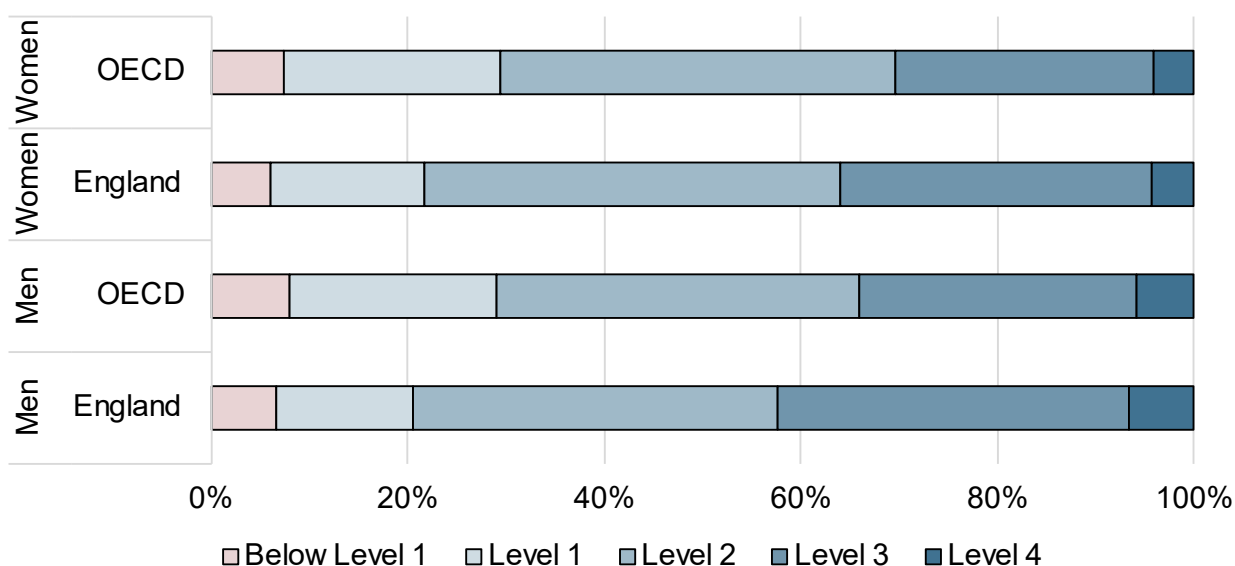
Gender	Country	Below Level 1	Level 1	Level 2	Level 3	Level 4
Men	England	7%	14%	37%	36%	7%
Men	OECD average	8%	21%	37%	28%	6%
Women	England	6%	16%	42%	32%	4%
Women	OECD average	7%	22%	40%	26%	4%

Source: OECD, PIAAC 2023 database

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In England, for adaptive problem solving, the proportion of low performing (Level 1 and below) men and women was similar (21% and 22%, respectively). However, men were more likely to achieve Levels 3 or 4 than women (42% of men compared with 36% of women). This differed from the OECD average distribution, which was more similar for men and women (34% of men and 30% of women at Levels 3 or 4).

3.4 Adult skills and age

This section explores how skills in literacy, numeracy, and adaptive problem solving vary across different age groups in England, comparing the mean scores with the OECD average. We analyse the percentage of participants at each proficiency level within each age group, including a breakdown for the youngest age groups (16-19 years and 20-24 years) to examine differences between the group of young people predominantly still in compulsory education or training, with those who have entered the labour market or chosen further study. We examine whether the trends observed in England match the international pattern. The youngest age groups' schooling and further education were affected by the Covid-19 pandemic.

3.4.1 Literacy

In England and across the OECD, after an initial increase in literacy skills with age, there was a decline, with youngest adults scoring more highly than the oldest adults, on average. Adults in England significantly outperformed the OECD average in all but the 20-24 years age group. In England, skills in literacy were highest in the group aged 25-34, whereas they were highest in the group aged 20-24 across the OECD, on average.

Figure 12 Literacy score by age in England compared with the OECD average
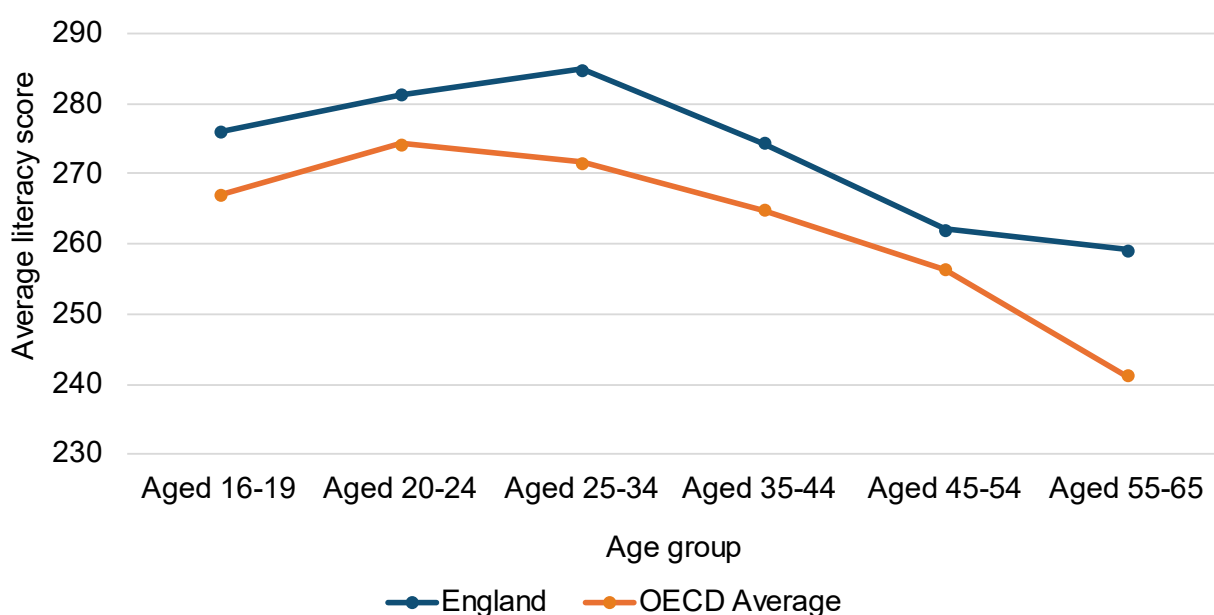
Age group	England mean score	OECD average mean score
Aged 16-19	*276	267
Aged 20-24	281	274
Aged 25-34	*285	272
Aged 35-44	*274	265
Aged 45-54	*262	256
Aged 55-65	*259	241

Asterisk (*) indicates the difference between England and OECD average is statistically significant at the 5% level.

When analysing the distribution across Survey of Adult Skills literacy proficiency levels, a smaller proportion of younger adults, that is, those aged between 16 and 34, had low proficiency (Level 1 or below in literacy) compared with older adults (for instance, 10% of participants aged 16-19 had low proficiency compared with 24% of adults aged 55-65). The OECD average showed a similar pattern of proficiency with age, but with a larger proportion of adults with low proficiency in each age group compared with England (see Appendix C2). In England, the adults most likely to be highly skilled, that is those with literacy Level 4 or 5, were aged 20 to 44.

Figure 13 Percentage of respondents by proficiency levels in literacy by age
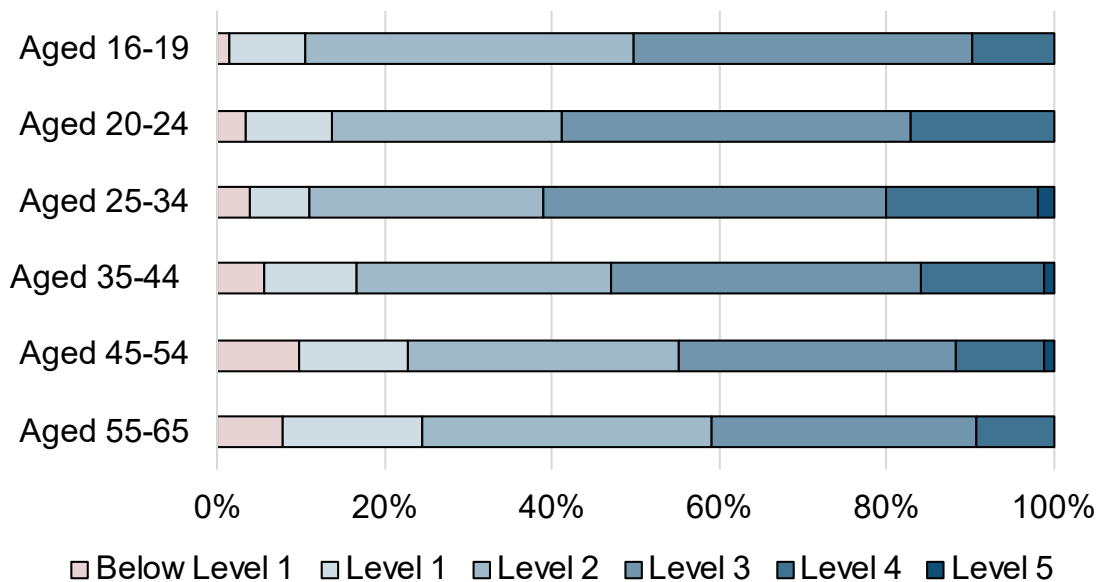
Age group	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Aged 16-19	1%	9%	39%	40%	10%	‡
Aged 20-24	3%	10%	27%	41%	17%	‡
Aged 25-34	4%	7%	28%	41%	18%	2%
Aged 35-44	6%	11%	31%	37%	15%	1%
Aged 45-54	10%	13%	32%	33%	11%	1%
Aged 55-65	8%	17%	34%	32%	9%	#

‡ indicates the reporting standards not met. # indicates rounded to 0.

A key finding in Cycle 1 of the Survey of Adult Skills was the relatively poor performance of the youngest adults in England compared with adults internationally. In Cycle 2, the youngest adults in England had significantly higher scores, on average, than the youngest adults in Cycle 1. For instance, adults aged 16-19 in Cycle 1 had an average score of 260, whereas in Cycle 2, 16-19 year olds had an average score of 276, a significant increase of 16 points. The same pattern is not found in the Cycle 1 comparator countries. Adults aged 16-19 had an average score of 272 in Cycle 2, compared with 275 in Cycle 2, and this difference was not significant. Similarly, adults aged 20-24 in England had a significantly higher average score in Cycle 2, an increase of 12 points from 269 in Cycle 1 to 281 in Cycle 2. In contrast, the average across Cycle 1 comparator countries for the 20-24 age group decreased by 4 points (after taking into account the rounding of figures), which was not a significant difference. In line with the pattern across Cycle 1 comparator countries, the scores for adults aged 35-44, aged 45-54 and aged 55-65 were lower in Cycle 2 than Cycle 1 in England, and this difference was significant only for adults aged 45-55.

Figure 14 Literacy scores by age in England and Cycle 1 comparator countries, in Cycle 1 and Cycle 2
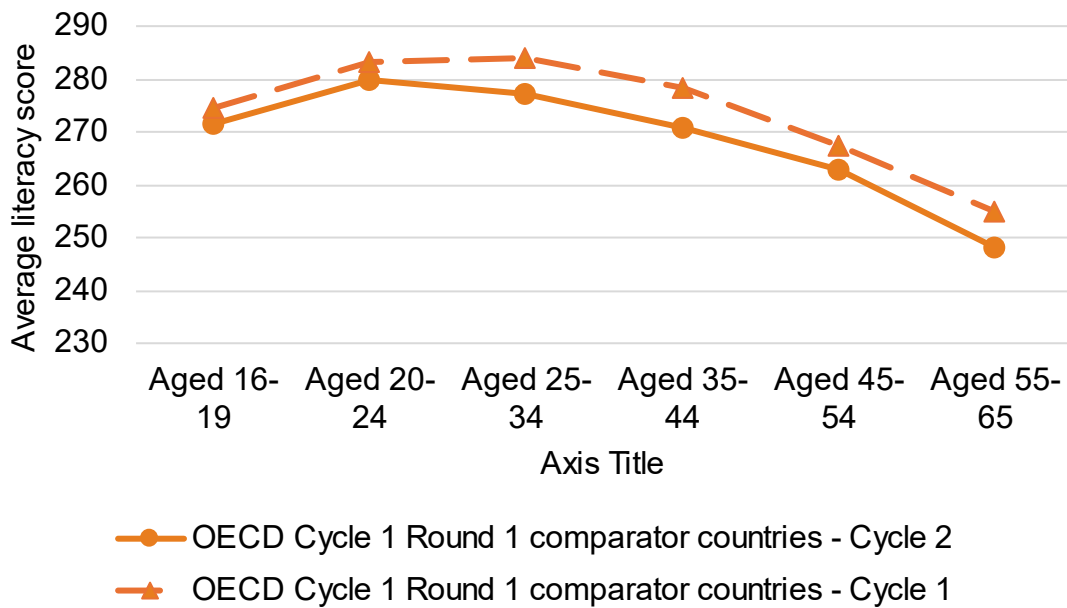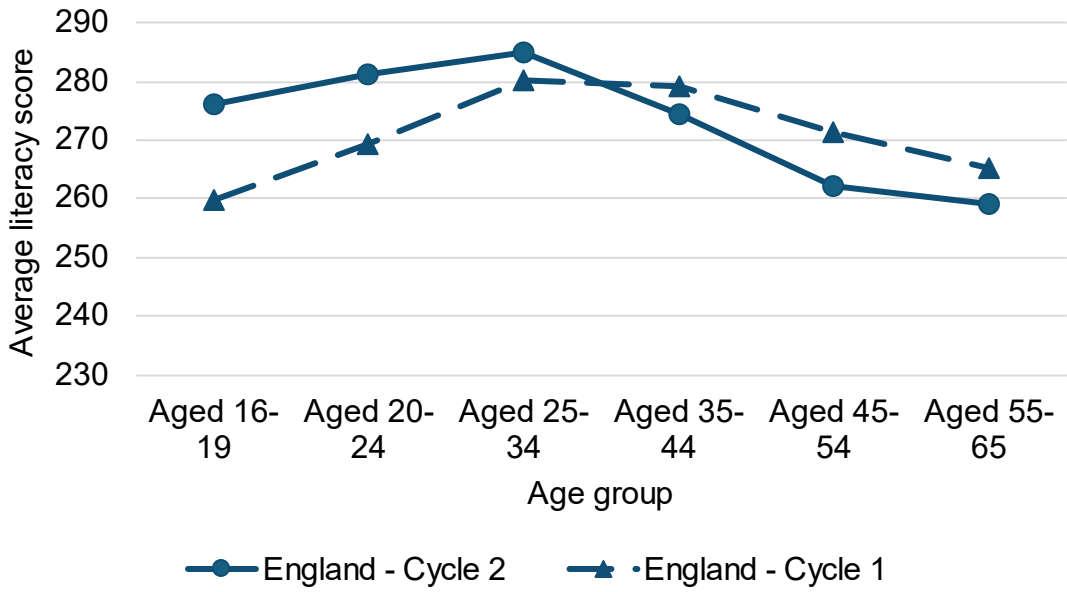
Age group	Country	Cycle 2 mean	Cycle 1 mean
Aged 16-19	England	*276	260
Aged 16-19	Cycle 1 comparator countries	272	275
Aged 20-24	England	*281	269
Aged 20-24	Cycle 1 comparator countries	280	283
Aged 25-34	England	285	280
Aged 25-34	Cycle 1 comparator countries	*277	284
Aged 35-44	England	274	279
Aged 35-44	Cycle 1 comparator countries	*271	278
Aged 45-54	England	*262	271
Aged 45-54	Cycle 1 comparator countries	263	267
Aged 55-65	England	259	265
Aged 55-65	Cycle 1 comparator countries	*248	255

Asterisk (*) indicates the difference between the Cycle 2 mean score and the Cycle 1 mean score is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

3.4.2 Numeracy

A similar trend to that seen for literacy is observed for numeracy skills; there was a pattern of increasing numeracy skills with age and then a decline, and younger adults tended to score higher than older adults. Adults aged 25-34, 35-44 and 55-65 in England scored significantly higher than adults in the same age groups across the OECD.

Figure 15 Numeracy score by age in England compared with the OECD average
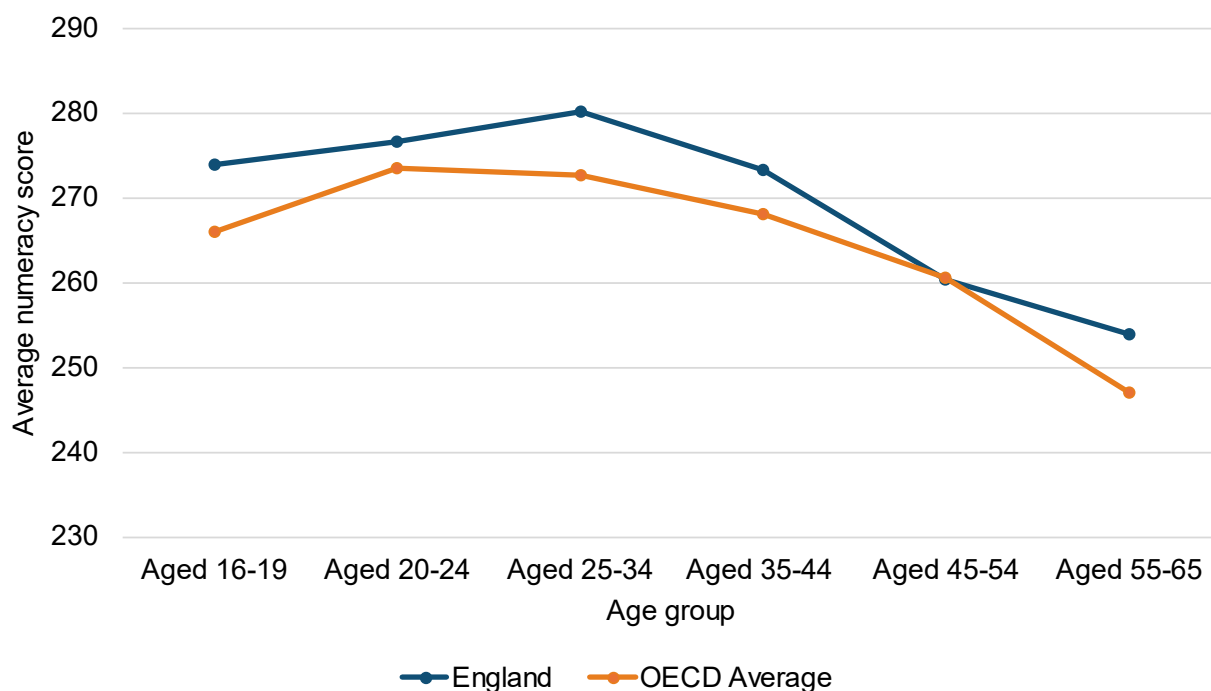
Age group	England mean score	OECD average mean score
Aged 16-19	274	266
Aged 20-24	277	274
Aged 25-34	*280	273
Aged 35-44	*273	268
Aged 45-54	260	261
Aged 55-65	*254	247

Asterisk (*) indicates the difference between England and OECD average is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

When analysing the distribution across numeracy proficiency levels, adults aged 45 to 65 were more likely to have low proficiency than adults in younger age groups. For instance, among those aged 16-19, 16% had low proficiency, that is, achieved Level 1 or below Level 1, in numeracy compared with 29% of adults aged 55-65. These findings are consistent the pattern of low proficiency by age across the OECD, where a higher proportion of adults in older age groups achieved lower proficiency levels. In England, the adults most likely to be highly skilled, that is with numeracy proficiency Level 4 or 5, were those aged 25 to 34.

Figure 16 Percentage of respondents by proficiency levels in numeracy by age
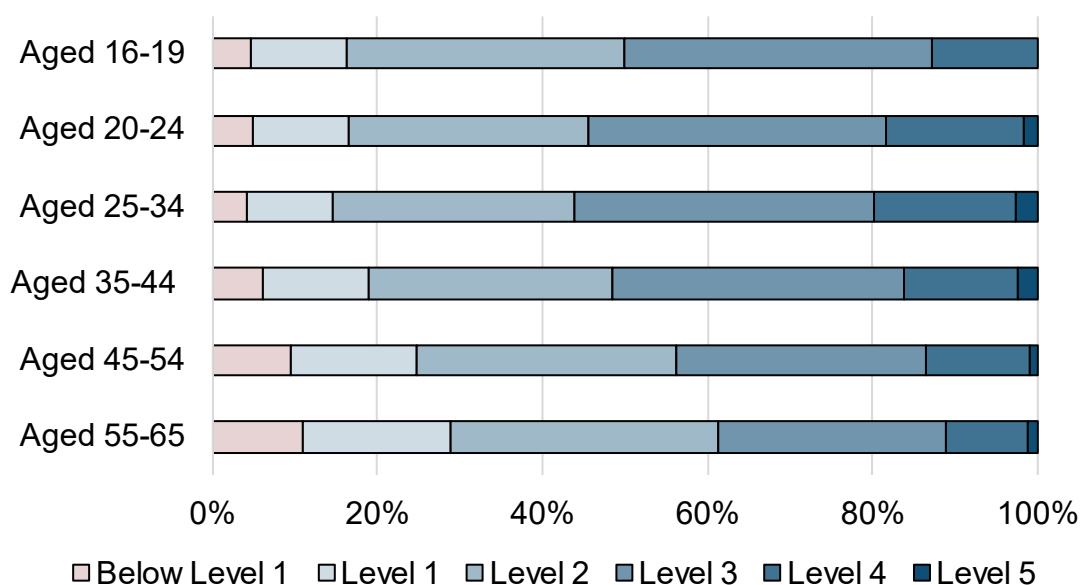
Age group	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Aged 16-19	5%	11%	33%	37%	13%	‡
Aged 20-24	5%	12%	29%	36%	17%	2%
Aged 25-34	4%	10%	29%	36%	17%	3%
Aged 35-44	6%	13%	30%	35%	14%	2%
Aged 45-54	9%	15%	31%	30%	13%	1%
Aged 55-65	11%	18%	32%	28%	10%	1%

‡ indicates the reporting standards not met.

Source: OECD, PIAAC 2023 database

When we look at changes over time, the average numeracy scores of adults aged 16 to 34 were significantly higher in 2023 than adults in 2012. The average score of adults aged 16-19 increased significantly by 24 points from 250 to 274, but there was no significant difference in the average score of adults aged 16-19 across Cycle 1 comparator countries on average. Adults in England aged 20-24 scored, on average, 16 points higher in Cycle 2, and adults aged 25-34 scored 14 points higher. Similar significant increases in scores were not found on average across Cycle 1 comparator countries; there were no significant changes in score for any age groups. Average scores for the age groups which spanned 35 to 65 years were neither significantly different in England nor across the Cycle 1 comparator countries.

Figure 17 Numeracy scores by age in England and OECD in Cycle 1 and Cycle 2
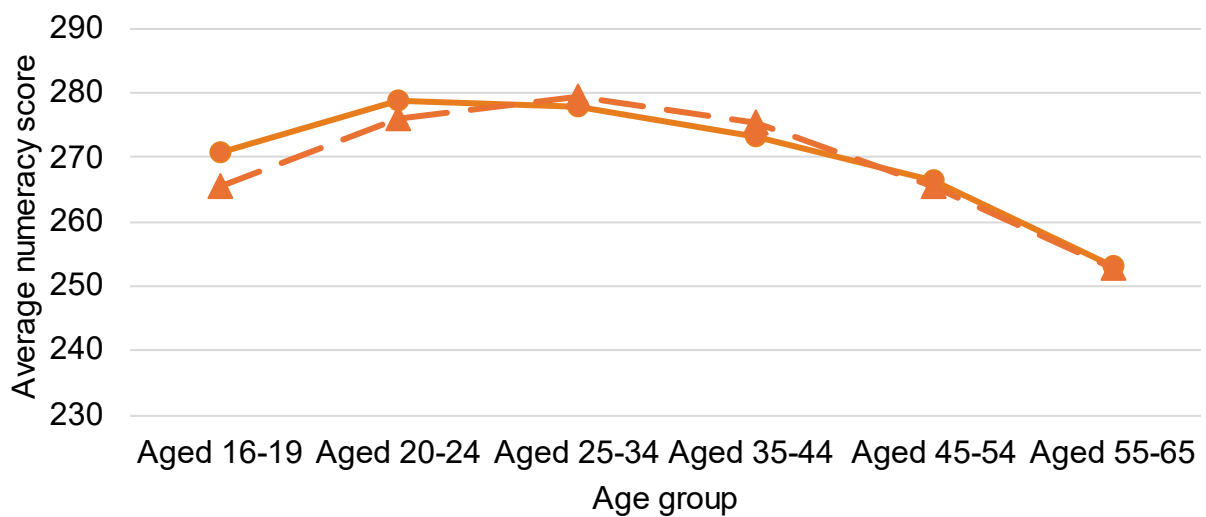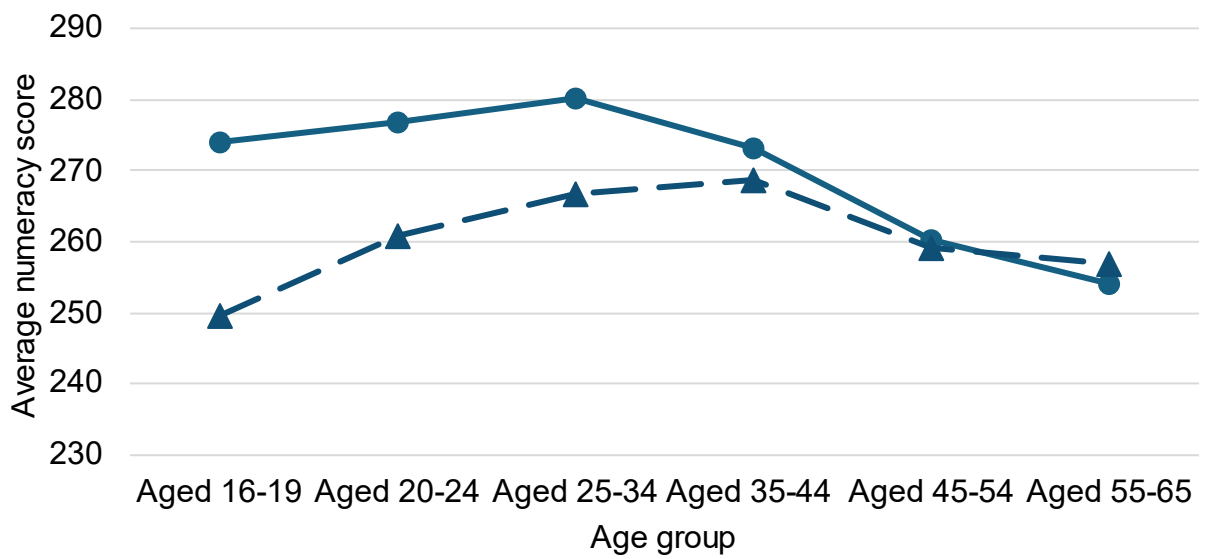
Age group	Country	Cycle 2 mean	Cycle 1 mean
Aged 16-19	England	*274	250
Aged 16-19	Cycle 1 comparator countries	271	265
Aged 20-24	England	*277	261
Aged 20-24	Cycle 1 comparator countries	279	276
Aged 25-34	England	*280	267
Aged 25-34	Cycle 1 comparator countries	278	280
Aged 35-44	England	273	269
Aged 35-44	Cycle 1 comparator countries	273	275
Aged 45-54	England	260	259
Aged 45-54	Cycle 1 comparator countries	266	266
Aged 55-65	England	254	257
Aged 55-65	Cycle 1 comparator countries	253	253

Asterisk (*) indicates the difference between the Cycle 2 mean score and the Cycle 1 mean score is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

3.4.3 Adaptive problem solving

In adaptive problem solving, the age-related decline in skills is again noticeable. Adults aged 16-19 scored an average of 267 in England, 8 points higher than the OECD average of 259. Meanwhile, adults aged 55-65 scored an average of 244 in England, 11 points above the OECD average of 233. Adults in England scored significantly higher than similarly aged participants across the OECD, except for those aged 20-24.

Figure 18 Adaptive problem solving score by age in England compared with the OECD average
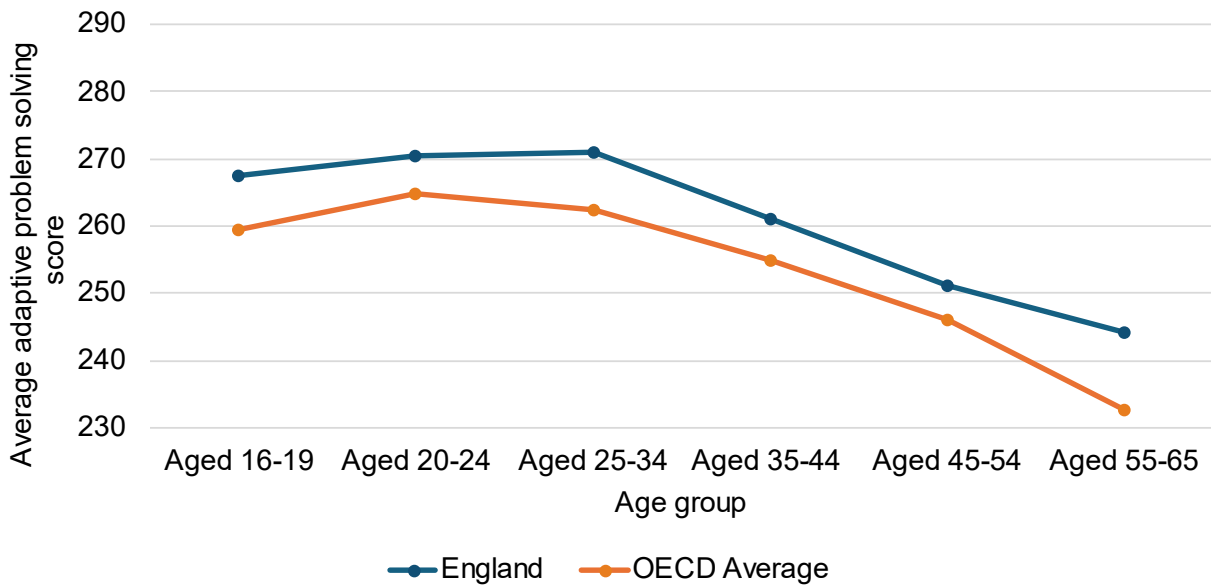
Age group	England mean score	OECD average mean score
Aged 16-19	*267	259
Aged 20-24	270	265
Aged 25-34	*271	262
Aged 35-44	*261	255
Aged 45-54	*251	246
Aged 55-65	*244	233

Asterisk (*) indicates the difference between England and OECD average is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

When analysing the distribution across adaptive problem solving proficiency levels, adults aged 45 to 65 were more likely to have low proficiency than adults in younger age groups. For instance, 31% of adults aged 55-65 had low proficiency, compared with 12% of adults aged 16-19. Adults aged 20-34 were the most likely to achieve Level 3 or above; 50% of adults aged 20-34 achieved Level 3 or above compared with 27% of adults aged 55-65. Compared with the OECD average, England had a lower proportion of low performers and a higher proportion of adults achieving the highest levels. Overall, the pattern of performance across the age groups was consistent with the international pattern.

Figure 19 Percentage of respondents by proficiency levels in adaptive problem solving by age
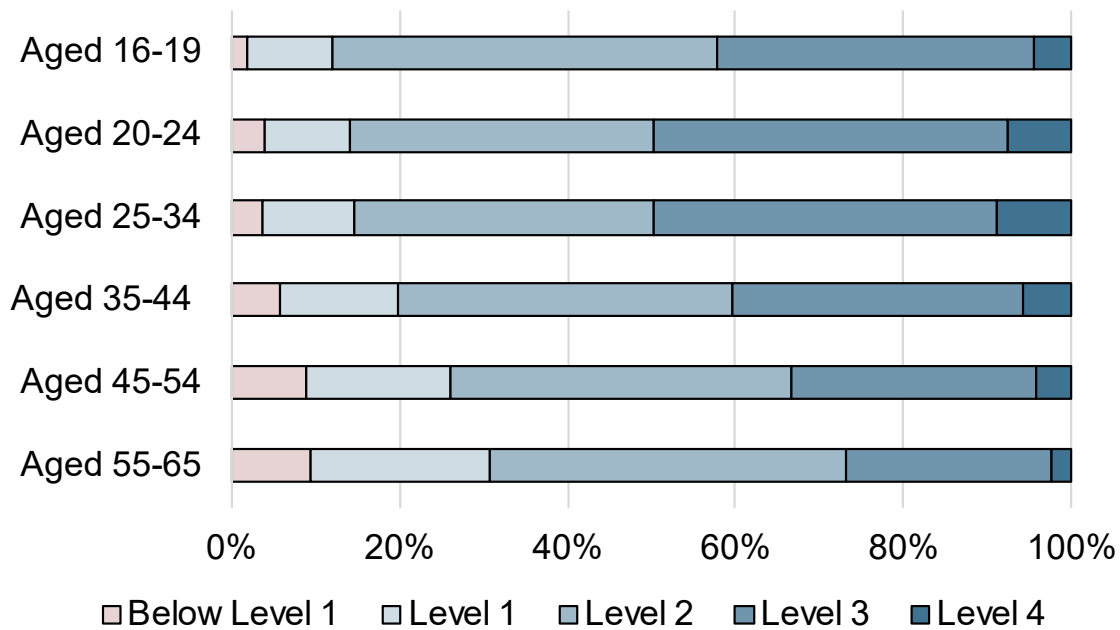
Age group	Below Level 1	Level 1	Level 2	Level 3	Level 4
Aged 16-19	2%	10%	46%	38%	4%
Aged 20-24	4%	10%	36%	42%	8%
Aged 25-34	4%	11%	36%	41%	9%
Aged 35-44	6%	14%	40%	34%	6%
Aged 45-54	9%	17%	40%	29%	4%
Aged 55-65	10%	21%	43%	24%	2%

Source: OECD, PIAAC 2023 database

3.5 Adult skills and educational attainment

In order to compare the skills of adults who have similar qualifications in England with other participating countries, all qualifications are coded to the International Standard Classification of Education (ISCED) (International Labour Organization, 2012). ISCED maps country-level qualifications onto ISCED levels based on information such as entry requirements, entry age and duration of the course in consultation with experts from each country.

Qualifications are split into three broad categories: 'below upper secondary', 'upper secondary' and 'tertiary'. Examples of adults in the *below upper secondary* group include those with no formal qualifications and those with lower level qualifications such as Entry Level qualifications, Basic Skills qualifications or fewer than five GCSEs (classified as ISCED 1, 2 and 3 short). Adults with *upper secondary* qualifications include those with five or more GCSEs, BTEC Level 2 or 3 qualifications, and A levels (ISCED 3 and 4). Adults with *tertiary* level qualifications include those with a degree or BTEC Level 4 or higher (ISCED 5, 6, 7 and 8).

In our analysis, we include all eligible adults aged between 16 and 65. This differs from similar analysis in the international report where adults aged 25-65 only are included.

3.5.1 Literacy

As expected, higher qualifications were associated with better literacy skills.

Table 15 Literacy score by educational attainment in England and OECD

Educational attainment	England	OECD Average
Less than upper secondary	225	230
Upper secondary	*267	256
Tertiary	*292	285

Asterisk (*) indicates the difference between England and the OECD average mean score is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In England, adults with less than upper secondary qualifications had an average literacy score of 225, which was lower by 5 points than similarly qualified adults across the OECD on average, but not significantly different. Adults with upper secondary or tertiary qualifications scored significantly above the OECD average compared to similarly qualified adults.

Table 16 Literacy scores by educational attainment in England and OECD in Cycle 1 and Cycle 2

Educational attainment	Country	Cycle 2	Cycle 1
Less than upper secondary	England	*225	239
Upper secondary	England	267	273
Tertiary	England	292	294
Less than upper secondary	Cycle 1 comparator countries	*236	245
Upper secondary	Cycle 1 comparator countries	*262	271
Tertiary	Cycle 1 comparator countries	*290	297

Asterisk (*) indicates the difference between Cycle 1 and Cycle 2 is statistically significant at the 5% level.

Compared with Cycle 1, adults in England with less than an upper secondary qualification had a lower score by 14 points, on average, and this difference was significant. There was no significant change in score for adults in England with upper secondary or tertiary qualifications.

Table 17 Percentage of respondents by proficiency levels in literacy by educational attainment in England and OECD

Educational attainment	Country	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Less than upper secondary	England	18%	27%	39%	15%	1%	‡
Upper secondary	England	5%	12%	37%	36%	9%	#
Tertiary	England	3%	6%	24%	44%	22%	2%
Less than upper secondary	OECD average	20%	26%	31%	20%	4%	1%
Upper secondary	OECD average	7%	19%	37%	29%	7%	1%
Tertiary	OECD average	2%	9%	28%	41%	18%	2%

‡ indicates the reporting standards not met. # indicates rounded to 0.

In England, 24% of adults with a tertiary level qualification achieved Level 4 or 5 in literacy, compared with 9% of adults with an upper secondary highest qualification and 1% of those with lower than upper secondary qualifications.

Compared with similarly qualified adults across the OECD, adults in England with upper secondary level or tertiary level highest qualifications were more likely to achieve Level 3 or above in literacy (45% in England with an upper secondary level education compared with 37% across the OECD; and 68% in England with a tertiary level education compared with 61% across the OECD). Adults with less than upper secondary level qualifications were less likely to achieve Level 3 or above (16% in England compared with 24% (after taking into account the rounding of figures) across the OECD).

The proportion of adults at each literacy proficiency level was generally consistent with the proportion in Cycle 1. For adults with a less than upper secondary, there was a larger proportion of adults with low proficiency (Level 1 or below) (by 10 percentage points in Cycle 2). This may be attributed to the change in assessment design for low ability adults, where adults who completed the reading components assessment were assigned a proficiency level in Cycle 2.

3.5.2 Numeracy

As expected, and similar to literacy, higher qualifications were associated with better numeracy skills.

Table 18 Numeracy score by educational attainment in England and OECD

Educational attainment	England	OECD Average
Less than upper secondary	215	229
Upper secondary	*263	259
Tertiary	291	290

Asterisk (*) indicates the difference between England and the OECD average mean score is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In England, adults with less than an upper secondary qualification had an average numeracy score of 215, lower than the OECD average by 14 points, but not significantly different. Adults with an upper secondary qualification scored significantly above similarly qualified adults across the OECD (by 4 points, on average). Adults with tertiary qualifications in England had a similar average score as similarly qualified adults across the OECD.

Table 19 Numeracy scores by educational attainment in England and OECD in Cycle 1 and Cycle 2

Educational attainment	Country	Cycle 2	Cycle 1
Less than upper secondary	England	215	225
Upper secondary	England	263	262
Tertiary	England	291	286
Less than upper secondary	Cycle 1 comparator countries	235	237
Upper secondary	Cycle 1 comparator countries	264	268
Tertiary	Cycle 1 comparator countries	294	297

Differences between Cycle 2 mean score and Cycle 1 mean score are not statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

There were no significant changes in score compared with Cycle 1 for adults in England or across Cycle 1 comparator countries for numeracy.

Table 20 Percentage of respondents by proficiency levels in numeracy by educational attainment in England and OECD

Educational attainment	Country	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Less than upper secondary	England	24%	28%	34%	12%	1%	‡
Upper secondary	England	6%	16%	36%	32%	10%	1%
Tertiary	England	2%	7%	25%	41%	22%	3%
Less than upper secondary	OECD average	20%	26%	31%	19%	4%	1%
Upper secondary	OECD average	7%	18%	36%	30%	8%	1%
Tertiary	OECD average	2%	8%	26%	39%	21%	3%

‡ Reporting standards not met.

Source: OECD, PIAAC 2023 database

In England, 26% (after taking into account the rounding of figures) of adults with a tertiary level qualification achieved Level 4 or 5 in numeracy, compared with 12% (after taking into account the rounding of figures) of adults with an upper secondary highest qualification and 1% of those with lower than upper secondary qualifications.

Compared with similarly qualified adults across the OECD, adults in England with less than an upper secondary qualification were less likely to achieve Level 3 or above in numeracy (14% in England compared with 24% across the OECD, (after taking into account the rounding of figures)). The proportion of adults at each proficiency level with upper secondary and tertiary level qualifications was similar in England and across the OECD.

The proportion of adults in England at each proficiency level was generally consistent with the proportions in Cycle 1 for numeracy.

3.5.3 Adaptive problem solving

As for literacy and numeracy, higher qualifications were associated with better adaptive problem solving skills.

Table 21 Adaptive problem solving score by educational attainment in England and OECD

Educational attainment	England	OECD Average
Less than upper secondary	221	228
Upper secondary	*256	248
Tertiary	*274	269

Asterisk (*) indicates the difference between England and the OECD average mean score is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In England, adults with less than upper secondary qualification had an average score of 221, not significantly different from the OECD average for adaptive problem solving. The average scores for adults with upper secondary and tertiary qualifications was significantly higher than the OECD average for similarly qualified adults.

Table 22 Percentage of respondents by proficiency levels in problem solving by educational attainment in England and OECD

Educational attainment	Country	Below Level 1	Level 1	Level 2	Level 3	Level 4
Less than upper secondary	England	18%	29%	41%	11%	‡
Upper secondary	England	5%	17%	44%	30%	4%
Tertiary	England	3%	8%	36%	44%	9%
Less than upper secondary	OECD average	16%	30%	35%	17%	2%
Upper secondary	OECD average	6%	24%	42%	24%	3%
Tertiary	OECD average	2%	13%	38%	38%	8%

‡ indicates the reporting standards not met.

Source: OECD, PIAAC 2023 database

In England, 48% (after taking into account the rounding of figures) of those with less than upper secondary qualifications were at or below Level 1 (low proficiency) of the adaptive problem solving proficiency scale and only 11% achieved Level 3 or above. This performance was generally similar to the OECD average.

In comparison, 22% of adults with upper secondary and 12% (after taking into account the rounding of figures) of adults with tertiary qualifications in England had low proficiency in adaptive problem solving.

3.6   Adult skills and employment status

The skills of adults (literacy, numeracy and problem solving) in England were examined according to employment status. The comparisons below are based on participants' self-allocation to categories which they thought best described their current employment status and show the proportion of adults at each proficiency level for literacy, numeracy and adaptive problem solving.

Table 23 Mean scores in literacy by employment status

Employment status	England mean score	OECD mean score
Full-time employed (self-employed, employee)	*281	267
Part-time employed (self-employed, employee)	*270	262
Unemployed	231	240
Pupil, student	285	280
Apprentice, intern	‡	271
In retirement or early retirement	*274	237
Permanently disabled	214	210
In compulsory military or community service	‡	—
Fulfilling domestic tasks or looking after children/family	251	245
Other	254	245

Asterisk (*) indicates the difference between England and OECD average is statistically significant at the 5% level. ‡ indicates the reporting standards not met. — indicates data are not available.

Source: OECD PIAAC 2023 England database

In England and across the OECD on average, adults in full-time employment and adult pupils had the highest literacy skills on average. Table 23 shows that across England and the OECD, employed adults (full-time as well as part-time) had higher literacy scores than unemployed adults.

Adults in England who were employed (full-time and part-time), had significantly higher literacy scores (281 and 270, respectively) than employed adults across the OECD, on average (267 and 262, respectively), in line with England's overall strong performance in literacy compared with the OECD.

Unemployed adults across the OECD had higher literacy scores (240) than unemployed adults in England (231), but the difference was not significant. However, unemployed adults in England were more likely to be a low performer (Level 1 or below) compared with the OECD on average (45% compared with 36%) (see Appendix C3 data table).

Those in retirement or early retirement in England had significantly higher literacy scores (274) than retired adults across the OECD (237), on average. In fact, across the OECD countries, the retirement group had slightly lower average literacy scores (237) than the unemployed group (240) – something that was not replicated in England, where retired adults scored much higher than unemployed adults (274 and 231 respectively).

Table 24 Mean scores in numeracy by employment status

Employment status	England mean score	OECD mean score
Full-time employed (self-employed, employee)	*280	273
Part-time employed (self-employed, employee)	263	262
Unemployed	*225	242
Pupil, student	281	280
Apprentice, intern	‡	273
In retirement or early retirement	*272	244
Permanently disabled	200	210
In compulsory military or community service	‡	—
Fulfilling domestic tasks or looking after children/family	238	242
Other	253	246

Asterisk (*) indicates the difference between England and OECD average is statistically significant at the 5% level. ‡ indicates the reporting standards not met. — indicates data are not available.

Source: OECD, PIAAC 2023 database

For numeracy, unemployed adults had lower scores than adults in full- and part-time employment, adult pupils and those in retirement or early retirement. A similar pattern was seen across the OECD on average, aside adults in (early) retirement, where retired adults from across the OECD (244) scored similarly to unemployed adults (242).

Adults in full-time employment in England scored on average significantly higher (280) than full-time employed adults across the OECD (273), like for literacy. However, adults in part-time employment in England had comparable numeracy scores to those across the OECD (263 and 262, respectively).

Similar to the pattern seen for literacy, unemployed adults in England (scored lower in numeracy (225) than unemployed adults across the OECD (242), and for numeracy, this difference was statistically significant. Nearly one third (32%) of unemployed adults in England were low performers (Level 1 or below) in numeracy compared with 30% across the OECD on average.

Table 25 Mean scores in Adaptive Problem Solving by employment status

Employment status	England mean score	OECD mean score
Full-time employed (self-employed, employee)	*267	256
Part-time employed (self-employed, employee)	*256	251
Unemployed	226	235
Pupil, student	273	269
Apprentice, intern	‡	265
In retirement or early retirement	*256	230
Permanently disabled	207	208
In compulsory military or community service	‡	—
Fulfilling domestic tasks or looking after children/family	241	236
Other	246	238

Asterisk (*) indicates the difference between England and OECD average is statistically significant at the 5% level. ‡ indicates the reporting standards not met. — indicates data are not available.

Source: OECD PIAAC 2023 England database

For adaptive problem solving, employed adults scored significantly better in England compared with the OECD and this was true for both the full-time and the part-time group. Unemployed adults in England had lower problem solving scores (226) than unemployed adults across the OECD (235), but this difference was not statistically significant. As seen across all 3 domains, adults in employment (full-time and part-time), adult pupils and to those in (early) retirement all had higher problem solving skills than unemployed adults. The latter was not replicated for the OECD where, on average, unemployed adults had slightly higher problem solving skills (235) than adults in (early) retirement (230).

Like for literacy and numeracy, in England, those in (early) retirement scored highly on problem solving (256) which was significantly higher than the comparable group across the OECD (230). In conclusion, this suggests very high literacy, numeracy, as well as problem solving skills in retired individuals in England, on average.

3.7   Differences by self-reported disability

Adults in England were asked whether their day-to-day activities were limited because of a health problem or disability which has lasted, or is expected to last, at least 12 months. The question did not ask for further information about the disability or illness. This question was asked only to participants in England and so international comparisons are not possible.

As discussed in section 2.1.4, the proportion of adults who said their lives were limited *A lot* by a health problem or disability has increased significantly by 4 percentage points since Cycle 1. In Cycle 2, 21% of adults answered *Yes* to this question; 10% said their activities were limited *A lot* and a further 11% said that their activities were limited *A little*.

Table 26 Average scores in literacy, numeracy and problem solving by self-reported disability

Response	Literacy	Numeracy	Adaptive problem solving
A lot	243	233	233
A little	269	260	254
No limitations	277	275	264

Source: OECD PIAAC 2023 England database

In all 3 domains, on average, adults with *No limitations* due to disability, scored higher than those who said they had a problem that limited them *A little*, who in turn scored higher than those saying a problem limited them *A lot*. Those who had a health problem or disability that limited them *A lot* had large differences in scores compared to those reporting *No limitations*: 33 points lower in literacy; 42 points lower in numeracy; and 31 points lower in adaptive problem solving, on average.

Table 27 Average scores in literacy and numeracy by self-reported disability in Cycles 1 and 2

Domain	Response	Cycle 2	Cycle 1
Literacy	A lot	243	242
Numeracy	A lot	233	224
Literacy	A little	269	271
Numeracy	A little	260	261
Literacy	No limitations	277	275
Numeracy	No limitations	*275	265

Asterisk (*) indicates the difference between Cycle 1 and Cycle 2 is statistically significant at the 5% level.

Source: OECD PIAAC 2023 England database

Compared with outcomes in Cycle 1, adults who reported *No limitations* in Cycle 2 scored 10 scale points higher in numeracy, and this difference was significant. There were no other significant differences across cycles.

3.8 Adult skills, country of birth and first language spoken as a child

In England, the proportion of adults born outside the UK has increased from 15% (Wheater *et al.*, 2013) in 2012 to 22% in 2023. This is the tenth highest proportion of the population of participating countries and higher than the OECD average of 15%.

Table 28 Average scores of adults born in the UK and elsewhere for literacy, numeracy and adaptive problem solving

Place of birth	Domain	England mean score	OECD average mean score
Born in the UK	Literacy	*278	267
Born outside of the UK	Literacy	*249	237
Born in the UK	Numeracy	*273	269
Born outside of the UK	Numeracy	*254	245
Born in the UK	Adaptive problem solving	*265	256
Born outside of the UK	Adaptive problem solving	*240	234

Asterisk (*) indicates the difference between England and OECD average is statistically significant at the 5% level.

Source: OECD PIAAC 2023 database

In common with the OECD average, adults born outside the country of testing (outside the UK for adults in England) had significantly lower scores than those born in the country of testing in all 3 domains, on average. Adults born in the UK and adults born outside the UK scored significantly above their peers across the OECD, on average, in literacy numeracy and adaptive problem solving. The literacy scores of adults in England (both those born in the UK and those born outside of the UK) were 12 points higher than the respective peer groups across the OECD as a whole. For numeracy, adults born outside the UK scored 9 points above their peers across the OECD, whereas adults born in the UK scored 4 points higher than their peers across the OECD.

Table 29 Average scores by place of birth in Cycle 1 and Cycle 2

Place of birth	Domain	Cycle 2	Cycle 1
Born in the UK	Literacy	278	276
Born in the UK	Numeracy	*273	266
Born outside of the UK	Literacy	249	255
Born outside of the UK	Numeracy	*254	238

Source: OECD PIAAC 2023 England database

The average numeracy scores of adults born in the UK and outside of the UK have significantly increased since Cycle1, but are similar for literacy.

In terms of the proficiency levels for each domain, the proportions of adults in England who were born in the UK and were low achievers (with scores at or below Level 1), were smaller than the proportions for their peers across the OECD on average. For example, in literacy, of those adults born in the UK, 13% were low achievers compared with 22% across the OECD as a whole for adults born in the country of the test. The same pattern of findings for low achievers was found for adults born outside of the country of test for all three domains.

At the higher achieving end of the proficiency levels, adults in England born in the UK, outperformed their peers across the OECD in all 3 domains on average. This was also the case of those born outside of the UK compared with their peers across the OECD.

As well as country of birth, the language first spoken as a child is also an important indicator of achievement and adds more to the picture than country of birth alone. For instance, an adult who comes to the UK from another English-speaking country will have a different experience compared with an adult who comes to the UK with little language proficiency or grows up in a household where English is not spoken.

Table 30 presents the average scores of adults with English as a first language and those who first spoke another language compared with adults with similar backgrounds in Cycle 1 comparator countries for literacy and numeracy and Cycle 2 OECD countries for adaptive problem solving.

Table 30 Average scores in literacy, numeracy and problem solving by whether language first spoken as a child is the same as the language of the survey

Domain	Country	Cycle	Learned English first as a child	Learned another language first
Literacy	England	Cycle 2	278	243
Literacy	England	Cycle 1	276	248
Literacy	Cycle 1 comparator countries	Cycle 2	273	238
Literacy	Cycle 1 comparator countries	Cycle 1	276	245
Numeracy	England	Cycle 2	273	250
Numeracy	England	Cycle 1	265	233
Numeracy	Cycle 1 comparator countries	Cycle 2	275	247
Numeracy	Cycle 1 comparator countries	Cycle 1	272	241
Adaptive problem-solving	England	Cycle 2	264	235
Adaptive problem-solving	OECD average	Cycle 2	256	235

Source: OECD PIAAC 2023 England database

In England, those who learned English first as a child had significantly higher scores than those who learned another language first. Adults who learned English first as a child also scored significantly above their peers across the OECD on average in literacy, numeracy and adaptive problem solving (that is, compared with adults in other countries who learned the language of assessment as a child). However, those who learned another language first performed more similarly to their peers in other OECD countries.

Compared with Cycle 1, adults who first learned English and adults who first learned another language had significantly higher scores in numeracy. The average in the Cycle 1 comparator countries was not significantly different. There was no significant change in literacy scores for either group of adults in the UK, although literacy scores for adults who did not learn the language of assessment first as a child significantly decreased across the Cycle 1 comparator countries between Cycles 1 and 2.

To understand more about the impact of learning English or another language and whether adults were born in the UK or elsewhere, Table 31 presents the interactions between the average scores for adults who were born in or outside the country of testing and who learned to speak the language of testing at home or another language at home.

Table 31 Average scores in literacy, numeracy and problem solving by interaction of country of birth and language first spoken as a child

Domain	Country	Born in the UK and learned English first as a child	Born in the UK and learned another language first	Born outside of the UK and learned English first as a child	Born outside of the UK and learned another language first
Literacy	England	*279	‡	*268	240
Literacy	OECD average	267	253	253	233
Numeracy	England	*274	‡	*267	248
Numeracy	OECD average	269	256	257	243
Adaptive problem solving	England	*265	‡	*254	234
Adaptive problem solving	OECD average	256	246	245	230

Asterisk (*) indicates OECD average score is significantly different from England's at the 5% level. ‡ indicates reporting standards not met.

Adults who first learned English as a child and were born in the UK or were born in another country performed significantly better than their peers across the OECD in literacy, numeracy and adaptive problem solving. There was no significant difference between adults born outside of the UK who first learned a language other than English as

a child and their peers across the OECD. There was an insufficient number of cases of adults born in the UK who learned a language other than English as a child to report.

3.9   Adult skills by ethnic group

This section presents literacy, numeracy and adaptive problem solving outcomes by ethnic backgrounds in England.

Tables 32 to 34 show the mean literacy, numeracy and adaptive problem solving scores for adults from different ethnic backgrounds. In literacy, numeracy and adaptive problem solving, adults from Asian and Black ethnic backgrounds had, on average, lower scores than adults from White or mixed ethnic backgrounds.

Table 32 Literacy score by ethnic background in England

Ethnic background	Score	Standard error
White	278	(1.2)
Mixed	282	(6.4)
Asian	240	(5.0)
Black	238	(4.5)
Other	253	(9.0)

Source: OECD PIAAC 2023 England database

Table 33 Numeracy score by ethnic background in England

Ethnic background	Score	Standard error
White	275	(1.2)
Mixed	269	(9.0)
Asian	244	(6.6)
Black	230	(5.1)
Other	260	(10.6)

Source: OECD PIAAC 2023 England database

Table 34 Problem solving score by ethnic background in England

Ethnic background	Score	Standard error
White	265	(1.0)
Mixed	267	(6.4)
Asian	231	(4.4)
Black	221	(4.9)
Other	248	(8.0)

Source: OECD PIAAC 2023 England database

Table 35 shows the distribution by literacy proficiency levels for adults from each ethnic background. This shows that 21% of adults from a mixed ethnic background and 16% of adults from a White ethnic background were considered high achieving in literacy (that is, they reached Level 4 or above). Fewer adults from an Asian or Black ethnic background achieved Level 4 or above (6% and 3% respectively). Further, 18% of adults from an Asian ethnic background and 13% of adults from a Black ethnic background scored below Level 1, suggesting that a large portion of adults from these backgrounds lack basic literacy skills. This is in comparison to 4% of those from a White ethnic background, and 1% of adults with a mixed ethnic background.

Table 35 Percentage of respondents by proficiency levels in literacy by ethnic background in England

Ethnic background	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5
White	4%	10%	31%	39%	15%	1%
Mixed	1%	11%	36%	29%	19%	3%
Asian	18%	19%	31%	26%	6%	0%
Black	13%	24%	39%	20%	3%	0%
Other	13%	16%	32%	30%	8%	1%

Source: OECD PIAAC 2023 England database

Proficiency levels in numeracy highlight these disparities further. While 17% adults from both White and mixed ethnic backgrounds reached at least a Level 4, only 9% of adults from an Asian ethnic background and 2% of adults from a Black ethnic background reached this level. Moreover, adults from a Black ethnic background had the highest percentage of individuals below Level 1 (19%), followed closely by Asian adults (15%).

Table 36 Percentage of respondents by proficiency levels in numeracy by ethnic background in England

Ethnic background	Below Level 1	Level 1	Level 2	Level 3	Level 4	Level 5 and above
White	5%	12%	31%	35%	15%	2%
Mixed	6%	18%	30%	28%	14%	3%
Asian	15%	22%	29%	26%	8%	1%
Black	19%	24%	37%	18%	2%	0%
Other	14%	11%	28%	32%	12%	3%

Source: OECD PIAAC 2023 England database

Similarly to the other two domains, for problem solving, more adults from mixed and White ethnic backgrounds reached Level 4 than adults from Asian and Black ethnic backgrounds (11%, 6%, 1% and 0% respectively). Around a fifth of adults from a Black ethnic background (20%) and an Asian ethnic background (19%) scored below Level 1, indicating limited problem solving skills. This is in comparison to 4% of those with a White and 3% for those with a mixed ethnic background. These figures highlight the persistent challenge of ensuring equitable development of skills.

Table 37 Percentage of respondents by proficiency levels in adaptive problem solving by ethnic group in England

Ethnic Group	Below Level 1	Level 1	Level 2	Level 3	Level 4
White	4%	13%	40%	37%	6%
Mixed	3%	14%	40%	31%	11%
Asian	19%	20%	39%	20%	1%
Black	20%	28%	40%	11%	0%
Other	14%	13%	39%	29%	5%

Source: OECD PIAAC 2023 England database

The demographic characteristics of adults have been considered in turn in this chapter. However, many characteristics are likely to be interrelated, for instance, educational attainment and employment status. Chapter 7 explores the characteristics which predict low proficiency in literacy, numeracy and problem solving when other characteristics are considered simultaneously.

4   Adult skills and work in England

Key findings

Adult skills and industry

Adults working in transportation and storage, and wholesale and retail trades, and repair of motor vehicles and motorcycles had the lowest average scores in literacy, numeracy and adaptive problem solving in England. Adults working in professional, scientific and technical activities had the highest average scores for literacy, numeracy and adaptive problem solving in England. Their average scores in literacy and adaptive problem solving were significantly higher than adults working in the same professions across the OECD on average.

Adult skills and occupation

On average, adults working in professional occupations had the highest literacy, numeracy and adaptive problem solving skills, and these scores were significantly above the OECD average. This group includes science and engineering professionals, health professionals and teaching professionals, among others. The lowest average scores in England were found among adults working as plant and machine operators and assemblers, or in elementary occupations, and this was also the case across the OECD, on average.

Adult skills and salary

In England, the highest earners had the highest skills in literacy, numeracy and adaptive problem solving, but there was little relationship between salary and skills for adults in the lowest deciles of salary – from the 6th to the 10th decile. The same pattern between salary and skills was seen across OECD countries. It is likely that outcomes for the lower deciles are impacted by the uneven distribution of full-time and part-time workers across the deciles: 63% of part-time workers in England (and 50% across the OECD) were in the 9th and 10th deciles of salary, whereas only 5% of full-time workers in England were in the 9th and 10th deciles.

Skills use in the workplace

The relationships between the skills that adults utilise as part of their job and the 3 proficiency domains were also considered. These skills were: reading at work; writing at work; ICT skills at work; learning at work; influencing skills at work; problem solving skills at work; cooperating skills at work; and planning and organising.

In general, more frequent use of skills was associated with higher average scores in literacy, numeracy and adaptive problem solving compared with adults using these skills infrequently. This provides strong evidence of the importance of developing and assisting workers to build and utilise their skills in the workplace.

4.1 Introduction

This chapter looks in depth at the relationship between employment and literacy, numeracy and adaptive problem solving in England and the OECD. The findings reported are based only on those adults in paid work (full- and part-time) at the time of interview. Comparisons were made with the OECD average. Changes over time are in comparison to the other 21 countries who participated in 2012 and 2023 (see sections 1.3 Table 1 and section 1.7.4 for further details).

4.2 Adult skills and industry

Participants were asked what industry they worked in, with responses coded to national industry codes and converted to the International Standard Industrial Classification of All Economic Activities (ISIC) (United Nations, 2013). As industry sector differences influence the skill sets required of workers, the specific skills that adults possess are likely to change in response to changes in the industrial composition of employment. The literacy, numeracy and adaptive problem solving assessments in the Survey of Adult Skills are intended to reflect the skill types needed by countries in an era of heightened use of technology at work and decline in traditional manufacturing.

Table 38 shows the average scores in the 3 domains for each industry sector in England, compared with the OECD, with significant differences indicated. The table is ordered by average literacy score for England, from highest to lowest. The following industry sectors have been removed from the table as the reporting standards were not met: Agriculture, forestry and fishing; Mining and quarrying; Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities; Real estate; Activities of households as employers; undifferentiated goods- and services-producing activities of house; Activities of extraterritorial organizations and bodies.

Adults working in transportation and storage, and wholesale and retail trade, and repair of motor vehicles and motorcycles had the lowest average scores in literacy, numeracy and adaptive problem solving in England.

Adults working in professional, scientific and technical activities had the highest average scores for literacy, numeracy and adaptive problem solving in England. Their average scores in literacy and adaptive problem solving were significantly higher than adults working in the same professions across the OECD. Adults working in public administration and defence; information and communication; financial and insurance activities; arts, entertainment and recreation; and education also scored highly. The rank order of average scores by industry sector for numeracy and problem solving was similar to literacy, with small exceptions. For instance, adults working in education had comparatively stronger literacy skills than numeracy and adaptive problem solving skills, and adults working in manufacturing had comparatively stronger numeracy skills than adaptive problem solving skills

Table 38 Average literacy, numeracy and adaptive problem solving scores by industry sector in England and internationally

Industry sector	Literacy – England	Literacy – OECD average	Numeracy – England	Numeracy – OECD average	Adaptive problem solving – England	Adaptive problem solving – OECD average
Professional, scientific and technical activities	*302	291	302	297	*285	276
Public administration and defence; compulsory social security	*296	280	*292	282	*276	265
Information and communication	294	297	299	305	278	282
Financial and insurance activities	294	289	294	294	274	273
Arts, entertainment and recreation	293	280	288	281	277	265
Education	*292	282	283	282	*273	265
Other service activities	*279	262	276	263	264	252
Human health and social work activities	*275	266	268	264	*260	253
Manufacturing	*275	261	*282	270	*267	254
Construction	*271	248	*275	259	*257	244
Accommodation and food service activities	*265	253	261	254	*257	246
Administrative and support service activities	*265	249	262	252	251	242

Industry sector	Literacy – England	Literacy – OECD average	Numeracy – England	Numeracy – OECD average	Adaptive problem solving – England	Adaptive problem solving – OECD average
Wholesale and retail trade; repair of motor vehicles and motorcycles	261	260	258	264	250	252
Transportation and storage	256	253	258	260	245	247

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Table 39 and Table 40 show the changes in average literacy and numeracy scores, respectively, for each industry between Cycle 1 and Cycle 2 in England and the average for Cycle 1 comparator countries.The following industry sectors have been removed from the table as the reporting standards were not met: Agriculture, forestry and fishing; Mining and quarrying; Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities; Real estate; Activities of households as employers; undifferentiated goods- and services-producing activities of house; Activities of extraterritorial organisations and bodies.

Table 39 Average literacy score by industry sector in England and internationally in Cycles 1 and 2

Industry sector	England – Cycle 2	England – Cycle 1	Cycle 1 comparator countries average – Cycle 2	Cycle 1 Round 1 countries average [n] – Cycle 1
Professional, scientific and technical activities	302	298	295	300
Public administration and defence; compulsory social security	296	293	287	290
Information and communication	*294	308	300	303
Financial and insurance activities	294	301	292	298
Arts, entertainment and recreation	293	281	285	289
Education	292	295	288	294
Other service activities	279	271	269	271
Human health and social work activities	275	276	272	276
Manufacturing	275	274	268	273
Construction	271	272	*256	265
Accommodation and food service activities	265	266	*258	266
Administrative and support service activities	265	267	*255	267

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Industry sector	England – Cycle 2	England – Cycle 1	Cycle 1 comparator countries average – Cycle 2	Cycle 1 Round 1 countries average [n] – Cycle 1
Wholesale and retail trade; repair of motor vehicles and motorcycles	261	269	268	274
Transportation and storage	256	258	*259	270

Asterisk (*) indicates the difference between Cycle 2 and Cycle 1 mean scores is statistically significant at the 5% level. [n] This is the OECD Cycle 1 Round 1 average and contains Australia and Northern Ireland in addition to the Cycle 1 comparator countries due to missing data in the PIAAC data explorer.

Sources: OECD, PIAAC 2023 database and (Wheater *et al.*, 2013)

Adults in England working in information and communications have significantly lower literacy scores in Cycle 2 compared with Cycle 1. Across the Cycle 1 comparator countries, on average, there were 5 sectors in which adults showed a significant drop in literacy skills. These were construction; accommodation and food service activities; administrative and support service activities; transportation and storage; and agriculture, forestry and fishing[6]. There was no similar significant drop in England.

Adults in England working in manufacturing had a significantly higher score in numeracy compared with in Cycle 1. Agriculture, forestry and fishing was the only industry with a significant difference between cycles in average numeracy scores for the Cycle 1 Round 1 countries, however it is not presented in Table 40 as the reporting standards for England were not met).

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[6] Agriculture forestry and fishing is not included in table 4.2 as the reporting standards were not met for England.

Table 40 Average numeracy score by industry sector in England and internationally in Cycles 1 and 2

Industry sector	England – Cycle 2	England – Cycle 1	Cycle 1 comparator countries - PIAAC Cycle 2	Cycle 1 Round 1 countries [n] - PIAAC Cycle 1
Professional, scientific and technical activities	302	294	300	301
Information and communication	299	304	308	304
Financial and insurance activities	294	296	297	298
Public administration and defence; compulsory social security	292	281	289	287
Arts, entertainment and recreation	288	271	283	282
Education	283	283	288	290
Manufacturing	*282	268	277	274
Other service activities	276	259	270	266
Construction	275	269	266	268
Human health and social work activities	268	263	269	269
Administrative and support service activities	262	255	258	261
Accommodation and food service activities	261	251	259	259
Transportation and storage	258	250	265	269
Wholesale and retail trade; repair of motor vehicles and motorcycles	258	257	270	272

Asterisk (*) indicates the difference between Cycle 2 and Cycle 1 mean scores is statistically significant at the 5% level. [n] This is the OECD Cycle 1 Round 1 average and contains Australia and Northern Ireland in addition to the Cycle 1 comparator countries due to missing data in the PIAAC data explorer.

Sources: OECD, PIAAC 2023 database and (Wheater *et al.*, 2013)

4.3 Adult skills and occupation

Participants' occupations were coded to national occupation codes and the International Standard Classification of Occupations (ISCO) (International Labour Organization, 2012). ISCO uses the skill level specialisation required for jobs to classify occupations. Generally, entry qualifications are higher for professions that are higher in the classification. Here, occupations are compared using the major groups defined in the tables below, which present average scores and proficiency level distributions by occupation for each domain in England and internationally.

Table 41 shows the average literacy, numeracy and adaptive problem solving scores for each occupation for England and the OECD, ordered by average literacy score in England.

On average, adults working in professional occupations had the highest literacy, numeracy and adaptive problem solving skills, and these scores were significantly above the OECD average for adults working in this sector. This group includes science and engineering professionals, health professionals and teaching professionals, among others. The lowest average scores in England were found among adults working as plant and machine operators and assemblers, or in elementary occupations, and this was also the case across the OECD, on average. Adults working in elementary occupations in England scored significantly above the OECD average for adults working in this sector in literacy.

Table 41 Average literacy, numeracy and adaptive problem solving scores by occupation in England and internationally

Industry sector	Literacy – England	Literacy – OECD average	Numeracy – England	Numeracy – OECD average	Adaptive problem solving – England	Adaptive problem solving – OECD average
Professionals	*302	292	*301	297	*283	275
Technicians and associate professionals	*287	276	284	280	*270	263
Legislators, senior officials and managers	287	283	290	292	272	269
Clerks	*280	270	274	271	*265	258
Service workers and shop and market sales workers	*262	253	255	253	*250	245
Craft and related trades workers	*261	244	*267	254	*255	242
Elementary occupations	*240	228	236	229	235	226
Plant and machine operators and assemblers	237	238	241	246	232	235

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

The industries with the highest skill levels in England matched those with the highest skill levels across the OECD. However, adults in England tended to outperform adults in the same occupations across the OECD in literacy and adaptive problem solving. Only legislators, senior officials and managers, and plant and machine operators and assemblers did not achieve higher literacy scores than on average across the OCED. This was also the case for adaptive problem solving, with the addition of elementary occupations. Adults in England performed similarly in numeracy to adults in the same occupations across the OECD, except for professionals, and craft and related trades workers who achieved significantly higher scores, on average, than adults in the same occupations across the OECD.

Figures 20, 21 and 22 show the distribution of proficiency levels for literacy, numeracy and adaptive problem solving, respectively, for each occupation. In England, more than 60% of adults in the 2 highest-scoring occupations (namely professionals, and legislators, senior officials and managers) achieved Level 3 or above in literacy and numeracy, a similar performance as across the OECD on average. In adaptive problem solving, 60% of professionals and 48% of legislators, senior officials and managers in England achieved at least Level 3. These numbers were lower across the OECD on average, at 52% and 46% respectively. Among England's adults in the 2 lowest-scoring occupations, between 73% and 83% of them achieved at Level 2 or below across all domains. Across the OECD on average, these percentages were similar: 70% and 84% respectively.

Figure 20 Distribution of proficiency levels in literacy by occupation in England and internationally
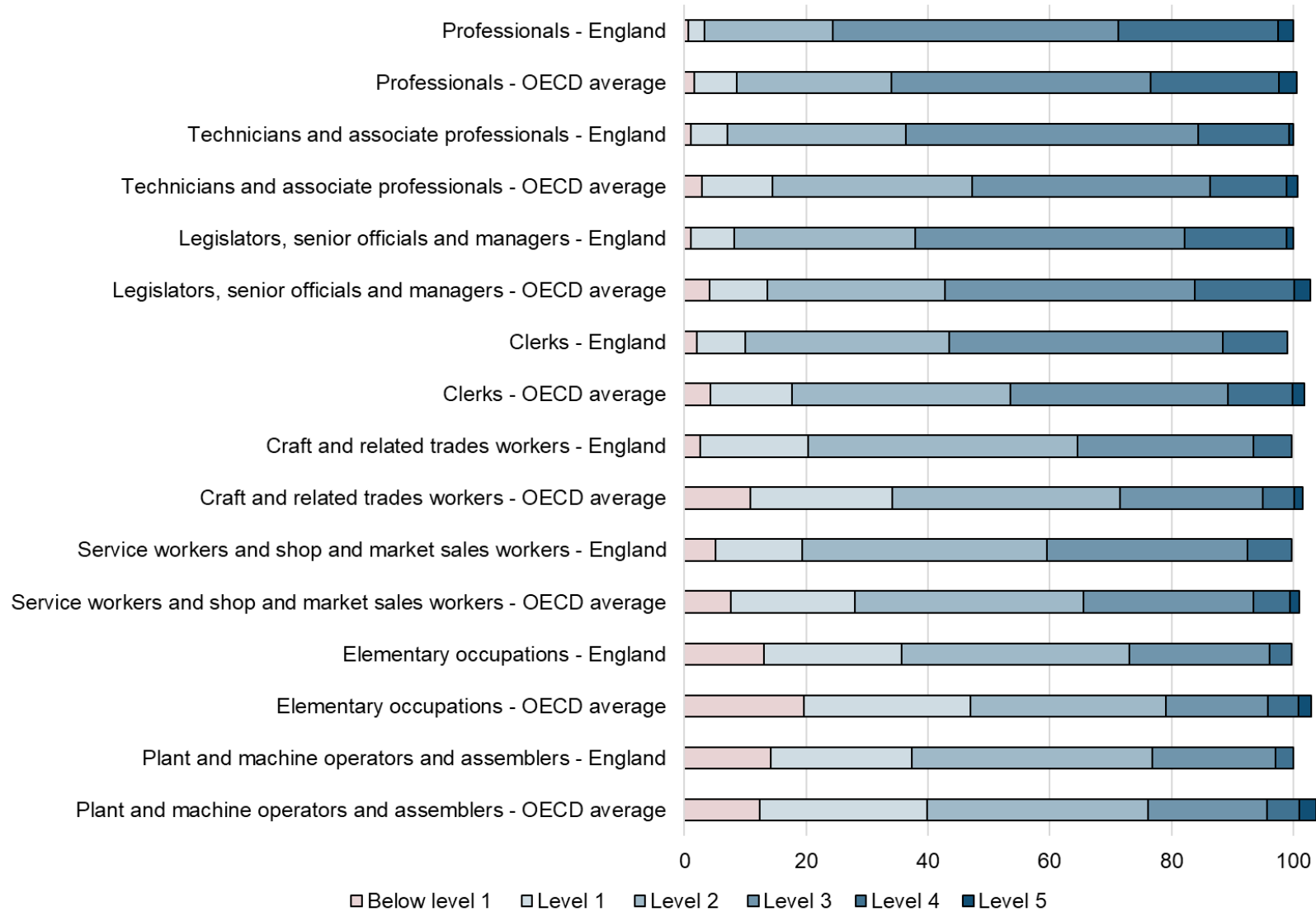
Legend: Below level 1 ■ Level 1 ■ Level 2 ■ Level 3 ■ Level 4 ■ Level 5

Occupation	Country	Below level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Professionals	England	1%	3%	21%	47%	26%	3%
Professionals	OECD average	2%	7%	25%	43%	21%	3%
Technicians and associate professionals	England	1%	6%	29%	48%	15%	1%
Technicians and associate professionals	OECD average	3%	11%	33%	39%	13%	2%
Legislators, senior officials and managers	England	1%	7%	30%	44%	17%	1%
Legislators, senior officials and managers	OECD average	4%	10%	29%	41%	16%	3%
Clerks	England	2%	8%	33%	45%	11%	‡
Clerks	OECD average	4%	13%	36%	36%	11%	2%
Craft and related trades workers	England	3%	18%	44%	29%	6%	‡
Craft and related trades workers	OECD average	11%	23%	37%	24%	5%	1%
Service workers and shop and market sales workers	England	5%	14%	40%	33%	7%	‡
Service workers and shop and market sales workers	OECD average	8%	20%	38%	28%	6%	1%
Elementary occupations	England	13%	23%	37%	23%	4%	‡
Elementary occupations	OECD average	20%	27%	32%	17%	5%	2%
Plant and machine operators and assemblers	England	14%	23%	39%	20%	3%	‡
Plant and machine operators and assemblers	OECD average	12%	28%	36%	20%	5%	3%

‡ indicates the reporting standards have not been met.

The following occupations sectors have been removed from the table as the reporting standards were not met: Armed forces; Skilled agricultural and fishery workers.

Source: OECD, PIAAC 2023 database

Figure 21 Distribution of proficiency levels in numeracy by occupation in England and internationally

Occupation	Country	Below level 1	Level 1	Level 2	Level 3	Level 4	Level 5
Professionals	England	1%	4%	23%	42%	27%	4%
Professionals	OECD average	2%	7%	24%	40%	24%	4%
Technicians and associate professionals	England	1%	7%	33%	44%	14%	1%
Technicians and associate professionals	OECD average	3%	11%	31%	39%	15%	2%
Legislators, senior officials and managers	England	1%	8%	26%	41%	20%	3%
Legislators, senior officials and managers	OECD average	3%	8%	25%	39%	22%	4%
Clerks	England	2%	13%	35%	38%	11%	‡
Clerks	OECD average	4%	13%	35%	36%	11%	2%
Craft and related trades workers	England	3%	14%	42%	31%	9%	‡
Craft and related trades workers	OECD average	9%	19%	36%	28%	8%	2%
Service workers and shop and market sales workers	England	7%	17%	41%	28%	6%	‡
Service workers and shop and market sales workers	OECD average	8%	20%	37%	28%	7%	1%
Plant and machine operators and assemblers	England	13%	23%	37%	22%	4%	‡
Plant and machine operators and assemblers	OECD average	10%	23%	37%	23%	6%	3%
Elementary occupations	England	15%	25%	34%	22%	4%	‡
Elementary occupations	OECD average	19%	26%	32%	18%	4%	2%

‡ indicates the reporting standards have not been met.

The following occupations sectors have been removed from the table as the reporting standards were not met: Armed forces; Skilled agricultural and fishery workers.

Source: OECD, PIAAC 2023 database

Figure 22 Distribution of proficiency levels in adaptive problem solving by occupation in England and internationally

Legend: Below level 1, Level 1, Level 2, Level 3, Level 4
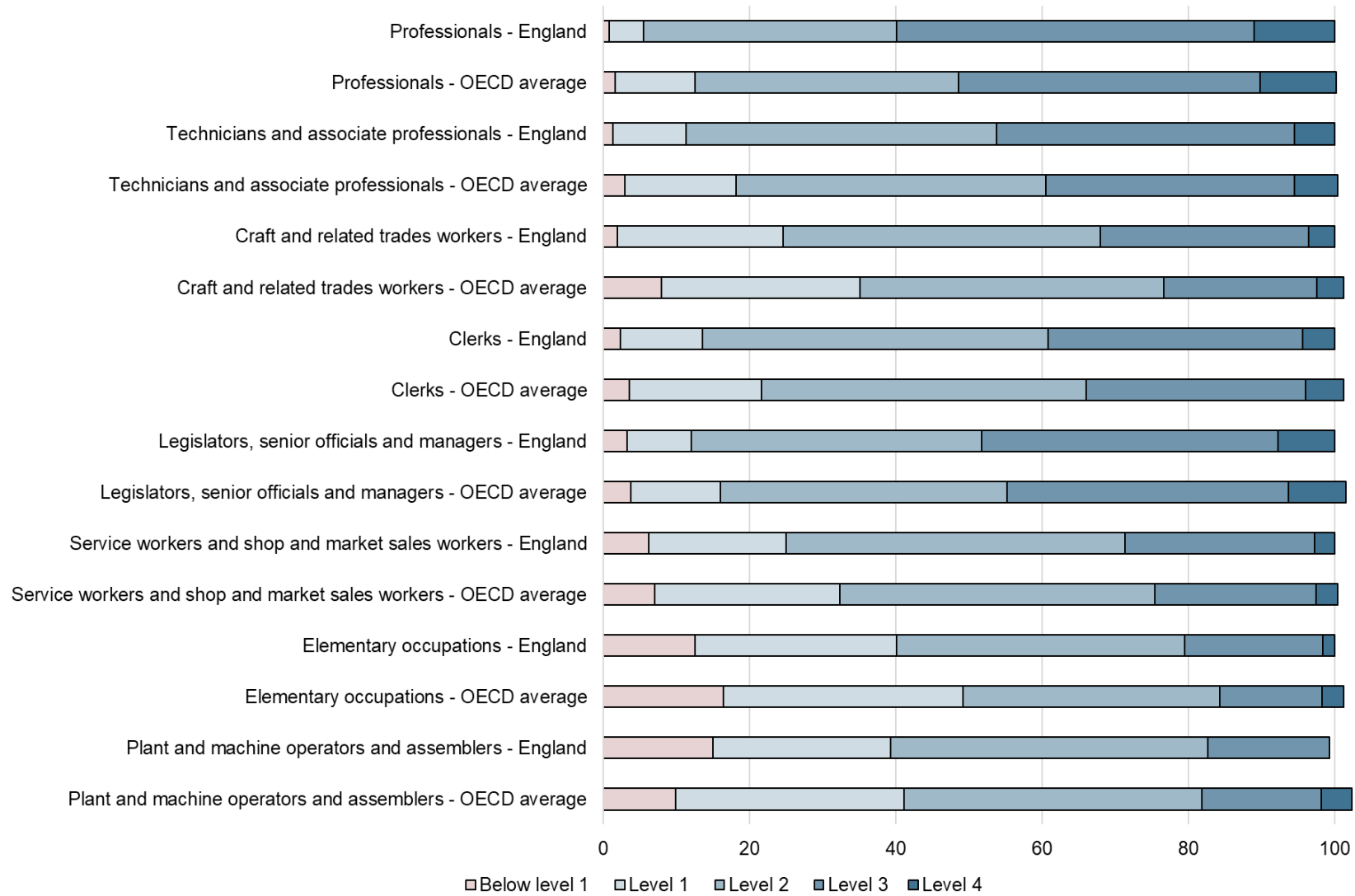
Occupation	Country	Below level 1	Level 1	Level 2	Level 3	Level 4
Professionals	England	1%	5%	35%	49%	11%
Professionals	OECD average	2%	11%	36%	41%	10%
Technicians and associate professionals	England	1%	10%	42%	41%	5%
Technicians and associate professionals	OECD average	3%	15%	42%	34%	6%
Craft and related trades workers	England	2%	23%	43%	29%	4%
Craft and related trades workers	OECD average	8%	27%	42%	21%	4%
Clerks	England	2%	11%	47%	35%	4%
Clerks	OECD average	4%	18%	44%	30%	5%
Legislators, senior officials and managers	England	3%	9%	40%	40%	8%
Legislators, senior officials and managers	OECD average	4%	12%	39%	38%	8%
Service workers and shop and market sales workers	England	6%	19%	46%	26%	3%
Service workers and shop and market sales workers	OECD average	7%	25%	43%	22%	3%
Elementary occupations	England	13%	28%	39%	19%	2%
Elementary occupations	OECD average	16%	33%	35%	14%	3%
Plant and machine operators and assemblers	England	15%	24%	43%	17%	‡
Plant and machine operators and assemblers	OECD average	10%	31%	41%	16%	4%

‡ indicates the reporting standards have not been met.
The following occupations sectors have been removed from the table as the reporting standards were not met: Armed forces; Skilled agricultural and fishery workers. There are only 5 proficiency levels for adaptive problem solving, that is, there is no Level 5.

Source: OECD, PIAAC 2023 database

Table 42 and Table 43 present the average scores for each occupation in literacy and numeracy, respectively, for England and the Cycle 1 comparator countries for Cycle 1 and Cycle 2.

In literacy (Table 42), there was a significant decrease in average score for adults working as plant and machine operators and assemblers in England, and no significant changes in all other occupational groups between Cycle 1 and Cycle 2. On average, in Cycle 1 comparator countries, 4 occupational groups significantly declined between Cycle 1 and Cycle 2: service workers and shop and market sales workers; craft and related trades workers; plant and machine operators and assemblers; and elementary occupations.

As shown in Table 43, there were no significant changes in average numeracy score for any occupational groups in England. Across the Cycle 1 comparator countries, there was a significant decrease in average numeracy score for skilled agricultural and fishery workers[7].

Table 42 Average literacy score by occupation in England and internationally in Cycle 1 and Cycle 2

Occupation	England – Cycle 2	England – Cycle 1	Cycle 1 comparator countries average – Cycle 2	Cycle 1 Round 1 countries average [n] – Cycle 1
Professionals	302	307	297	301
Technicians and associate professionals	287	291	282	288
Legislators, senior officials and managers	287	296	289	293
Clerks	280	283	277	282
Service workers and shop and market sales workers	262	266	*260	269
Craft and related trades workers	261	272	*252	263
Elementary occupations	240	245	*234	249
Plant and machine operators and assemblers	*237	253	*245	257

Asterisk (*) indicates the difference between Cycle 2 and Cycle 1 mean scores is statistically significant at the 5% level. [n] This is the OECD Cycle 1 Round 1 average and contains Australia and Northern Ireland in addition to the Cycle 1 comparator countries due to missing data in the PIAAC data explorer.

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[7] Not included in Table 43 as the reporting standards for this occupation were not met in England.

Table 43 Average numeracy scores by occupation in England and internationally in Cycle 1 and Cycle 2

Occupation	England – Cycle 2	England – Cycle 1	Cycle 1 comparator countries average – Cycle 2	Cycle 1 Round 1 countries average [n] – Cycle 1
Professionals	301	302	301	301
Legislators, senior officials and managers	290	290	298	296
Technicians and associate professionals	284	283	285	287
Clerks	274	271	277	277
Craft and related trades workers	267	270	261	264
Service workers and shop and market sales workers	255	252	259	262
Plant and machine operators and assemblers	241	246	252	256
Elementary occupations	236	231	235	241

The following industry sectors have been removed from the table as the reporting standards were not met: Armed forces; Skilled agricultural and fishery workers. [n] This is the OECD Cycle 1 Round 1 average and contains Australia and Northern Ireland in addition to the Cycle 1 comparator countries due to missing data in the PIAAC data explorer.

Sources: OECD, PIAAC 2023 database and (Wheater *et al.*, 2013)

4.4 Adult skills and salary

Participants were asked about their salary in the background questionnaire. Table 44 shows the average proficiency in literacy, numeracy and adaptive problem solving by salary band deciles in England compared with the OECD average. The deciles were constructed at a national level so that comparisons could be made between countries with different average earnings. Consequently, the actual salaries that the deciles equate to will be different for each participating country.

Table 44 Average literacy, numeracy and adaptive problem solving scores by salary decile

Earning decile	Literacy – England	Literacy – OECD average	Numeracy – England	Numeracy – OECD average	Adaptive problem solving – England	Adaptive problem solving – OECD average
Highest decile (highest earners)	*304	289	*312	301	*286	274
2nd decile	*302	286	*306	295	*285	272
3rd decile	*291	280	290	286	*274	267
4th decile	*293	272	*290	277	*277	261
5th decile	*281	266	*278	269	*266	255
6th decile	*273	261	268	263	*259	252
7th decile	*270	254	*265	256	*256	246
8th decile	*263	250	*261	250	*256	242
9th decile	*267	251	259	251	*256	244
Lowest decile (lowest earners)	*268	259	260	259	254	250

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In England, the highest earners had the highest skills in literacy, numeracy and adaptive problem solving, but there was little relationship between salary and skills for adults in the lowest deciles of salary (from the 6th to the 10th decile). The same pattern between salary and skills was observed across the OECD, on average. It is likely that outcomes for the lower deciles are impacted by the uneven distribution of full-time and part-time workers across the deciles: 63% of part-time workers in England (and 50% across the OECD) were in the 9th and 10th deciles of salary, whereas only 5% of full-time workers in England were in the 9th and 10th deciles.

For literacy, the average score for adults in England in each of the decile groups was significantly higher scores than the scores for adults in the same decile across the OECD, on average. In adaptive problem solving, adults in all but the lowest decile (10th) achieved higher than adults in the same decile across the OECD, on average. In numeracy, the picture was more mixed, with adults in England scores more highly than adults across the OECD in 6 deciles (1st, 2nd, 4th, 5th, 7th and 8th).

Tables 45 and 46 show changes across cycles in literacy and numeracy score points, respectively, for each decile of salary and identifies significant changes for England and also for the Cycle 1 comparator countries. For literacy, there were no significant differences in scores across the 2 cycles in England. This pattern was similar across comparator countries, with the exception of 1 significant drop in the 8th decile of salary. As shown in Table 46 for numeracy, there were significant improvements for adults in England in the 2nd and 8th decile of salary, with increases of 13 and 22 score points respectively. There were no significant changes for the Cycle 1 comparator countries in numeracy.

Table 45 Average literacy score by salary decile in England and internationally in Cycles 1 and 2

Earning decile	England – Cycle 2	England – Cycle 1	Cycle 1 comparator countries average – Cycle 2	Cycle 1 comparator countries average – Cycle 1
Highest decile (highest earners)	304	312	293	299
2nd decile	302	297	290	293
3rd decile	291	289	286	287
4th decile	293	289	279	283
5th decile	281	278	273	278
6th decile	273	271	268	273
7th decile	270	269	262	269
8th decile	263	254	*256	263

Earning decile	England – Cycle 2	England – Cycle 1	Cycle 1 comparator countries average – Cycle 2	Cycle 1 comparator countries average – Cycle 1
9th decile	267	270	258	265
Lowest decile (lowest earners)	268	271	266	270

Asterisk (*) indicates the difference between Cycle 2 and Cycle 1 mean scores is statistically significant at the 5% level.

Table 46 Average numeracy scores by salary decile in England and internationally in Cycles 1 and 2

Earning decile	England – Cycle 2	England – Cycle 1	Cycle 1 comparator countries average – Cycle 2	Cycle 1 comparator countries average – Cycle 1
Highest decile (highest earners)	312	309	306	305
2nd decile	*306	293	299	296
3rd decile	290	284	291	288
4th decile	290	282	283	283
5th decile	278	268	276	276
6th decile	268	263	270	270
7th decile	265	260	263	263
8th decile	*261	239	255	257
9th decile	259	253	257	258
Lowest decile (lowest earners)	260	259	265	265

Asterisk (*) indicates the difference between Cycle 2 and Cycle 1 mean scores is statistically significant at the 5% level.

4.5 Skills use in the workplace

Workers in different activities and levels of responsibility may use similar transferable skills. This section explores adults' skills use at work, focusing on reading, writing, ICT, learning, influencing, simple and complex problem solving, and cooperating. The use of skills outside of work, in everyday life, is explored in Chapter 5.

Participants answered questions on how often they carried out activities specific to each skill at work. Skill indexes were generated using Item Response Theory (IRT) whenever responses from multiple, related questions were analysed in a combined way. Each index measures how often a participant conducted the tasks forming part of the index. Participants were categorised into quintiles based on how frequently they performed the tasks.

4.5.1 Reading at work

Participants were asked about their use of reading skills at work. There were 6 questions on how often participants usually had to read different text types at work: directions or instructions; letters, memos or emails; newspapers, magazines or newsletters; books, scholarly publications or articles in professional journals; manuals or reference materials; and bills, invoices, bank statements or other financial statements. The responses to the questions on each text type were combined into a single index quantifying the overall reading frequency at work across all text types. In addition, participants were grouped in quintiles indicating how often they usually read the text type in question. For example, participants who reported reading at work some or all of the text types infrequently belong in the quintile called *lowest-to-20%*, whereas those who reported reading many of the text types frequently were placed in the *more-than-80%* quintile.

Table 47 shows the average scores for each skill domain under the index of *reading skills use at work*. The table enables comparisons with the OECD average.

Table 47 Average literacy, numeracy and adaptive problem scores by the frequency of use of reading skills at work in England and internationally

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	*250	*265	*279	*291	*289
Literacy	OECD average	238	259	273	280	279
Numeracy	England	246	264	277	289	289
Numeracy	OECD average	240	262	276	285	285
Adaptive problem solving	England	*242	254	265	*275	*272
Adaptive problem solving	OECD average	234	250	261	266	265

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

The more frequently adults in England reported using reading skills at work, the higher their average scores in literacy, numeracy and adaptive problem solving. The exception was for adults in the 5th (highest) reading frequency quintile, who scored no higher than adults in the 4th quintile (or had a lower average score, though significance has not been tested). This pattern was mirrored internationally.

Average literacy scores were significantly higher in England than internationally, independent of reading frequency. Average adaptive problem solving scores were higher internationally across 3 quintiles (1st, 4th and 5th). Numeracy scores for adults in England were not significantly different to what was seen internationally, across any quintiles.

Table 48 shows how frequently adults in England read each text type at work. It is compared with the OECD average and ordered by frequency of reading each text *Every day*. The proportions of adults who *Never* read the different text types was considerably lower in England compared with the OECD average, and daily reading activities tended to be higher in England compared with the OECD average.

Table 49 shows how the frequency of reading each text type may have changed over time in England. The frequency of reading in England has generally increased since Cycle 1. Notably, more adults in Cycle 2 reported they read letters, memos or emails, as well as directions or instructions, *Every day*.

Table 48 Frequency of use of reading skills at work in England and internationally

In your current job, how often do you usually read…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
letters, memos or emails	England	9%	3%	4%	10%	74%
letters, memos or emails	OECD average	19%	4%	5%	11%	61%
directions or instructions	England	8%	9%	8%	19%	56%
directions or instructions	OECD average	16%	13%	12%	21%	38%
manuals or reference materials	England	19%	19%	19%	23%	20%
manuals or reference materials	OECD average	28%	20%	18%	19%	14%
bills, invoices, bank statements or other financial statements	England	40%	11%	13%	17%	19%
bills, invoices, bank statements or other financial statements	OECD average	43%	10%	12%	16%	19%
articles in newspapers, magazines or newsletters	England	29%	12%	14%	26%	19%
articles in newspapers, magazines or newsletters	OECD average	37%	12%	12%	20%	19%

In your current job, how often do you usually read…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
books, scholarly publications, or articles in professional journals	England	41%	19%	15%	17%	9%
books, scholarly publications, or articles in professional journals	OECD average	45%	18%	15%	15%	7%

Source: OECD, PIAAC 2023 database

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Table 49 Frequency of use of reading skills at work in England across Cycles

In your current job, how often do you usually read…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
letters, memos or emails	Cycle 2	9%	3%	4%	10%	74%
letters, memos or emails	Cycle 1	17%	5%	4%	11%	63%
directions or instructions	Cycle 2	8%	9%	8%	19%	56%
directions or instructions	Cycle 1	11%	12%	9%	19%	49%
manuals or reference materials	Cycle 2	19%	19%	19%	23%	20%
manuals or reference materials	Cycle 1	22%	22%	18%	22%	16%
bills, invoices, bank statements or other financial statements	Cycle 2	40%	11%	13%	17%	19%
bills, invoices, bank statements or other financial statements	Cycle 1	49%	9%	10%	15%	18%
articles in newspapers, magazines or newsletters	Cycle 2	29%	12%	14%	26%	19%
articles in newspapers, magazines or newsletters	Cycle 1	29%	13%	14%	25%	19%

Source: OECD, PIAAC 2023 database

4.5.2 Writing at work

Participants were asked about their use of writing skills at work. There were 3 questions on how often participants usually had to write letters, memos or emails; write reports or articles; and fill in forms. The responses to the questions on each text type were combined into a single index quantifying the overall writing frequency at work across all text types. Participants were grouped in quintiles indicating how often they usually wrote the text type.

Table 50 shows the average scores for each skill domain under the index of *writing skills use at work* for England and the OECD average.

Table 50 Average literacy, numeracy and adaptive problem scores by the frequency of use of writing skills at work in England and internationally

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	*250	265	*288	*293	*278
Literacy	OECD average	237	261	277	282	269
Numeracy	England	*248	264	284	*295	276
Numeracy	OECD average	239	264	281	288	274
Adaptive problem solving	England	*243	255	*272	*275	*265
Adaptive problem solving	OECD average	233	252	264	268	257

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In England, the more frequently adults reported using writing skills at work, the higher their average scores in literacy, numeracy and adaptive problem solving. This was true for the lowest 4 quintiles. However, there were large decreases in average scores across all domains from the 4th to the 5th quintile (adults who reported using the writings skills most frequently), placing adults from England's highest writing frequency quintile at an average score level between the 2nd and 3rd quintiles. These trends were also found internationally.

For literacy and adaptive problem solving, England achieved significantly higher average scores than the OECD average across all quintiles apart from the 2nd (*more than 20% to 40%*). Numeracy scores at only 2 quintiles were significantly higher than the OECD average (1st and 4th quintiles), otherwise numeracy scores were not significantly different.

Tables 51 and 52 show how frequently adults use each writing skill at work for England and the OECD (Table 51) as well as differences from Cycle 1 in England (Table 52)[8]. Both tables are ordered by frequency of writing each output *Every day*. Frequency of writing each of the 3 outputs was higher in England than across the OECD, indicated by higher proportions of respondents writing *Every day* and fewer writing *Never*. In England Cycle 2, higher proportions of adults reported writing letters, memos or emails *Every day* than in Cycle 1.

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[8] Writing reports and articles is new for Cycle 2 so trend data is unavailable.

Table 51 Frequency of use of writing skills at work in England and internationally

In your current job, how often do you usually…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
write letters, memos or emails	England	16%	4%	5%	12%	63%
write letters, memos or emails	OECD average	24%	5%	5%	13%	53%
fill in forms	England	14%	14%	15%	21%	36%
fill in forms	OECD average	25%	15%	15%	18%	26%
write reports or articles	England	33%	11%	14%	20%	23%
write reports or articles	OECD average	42%	12%	13%	15%	18%

Source: OECD, PIAAC 2023 database

Table 52 Frequency of use of writing skills at work in England across cycles

In your current job, how often do you usually…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
write letters, memos or emails	Cycle 2	16%	4%	5%	12%	63%
write letters, memos or emails	Cycle 1	27%	6%	4%	11%	52%
fill in forms	Cycle 2	14%	14%	15%	21%	36%
fill in forms	Cycle 1	17%	15%	14%	20%	35%

4.5.3 ICT skills at work

Participants were asked about their use of ICT skills at work. There were questions on whether they used a *computer* in their current jobs, including smartphones, tablets and other hand-held electronic devices that are used to connect to the internet and check emails; and how often they usually used a computer or digital device such as a tablet or smartphone in their jobs for 5 purposes: creating or editing electronic documents, spreadsheets or presentations (using Microsoft Word, Excel, PowerPoint or similar software); using specialised software (for example, for computer-aided design, the processing or analysis of data, sound and images or quality control); communicating with others (for instance, via emails, social networking sites or internet calls), excluding normal phone calls using a mobile phone; accessing information (such as by using a search engine, finding information or reading documents); and using a programming language to program software (for example, applications) or websites. The responses to the questions were combined into a single index quantifying the overall frequency of use of ICT skills at work. Participants were grouped in quintiles indicating how often they usually engaged with the ICT in this way.

Table 53 shows the average scores for each skill domain under the index of *ICT skills use at work* for England and the OECD average.

Table 53 Average literacy, numeracy and adaptive problem scores by the frequency of use of ICT skills at work in England and internationally

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	*263	265	*285	*302	*291
Literacy	OECD	252	263	278	289	285
Numeracy	England	*263	260	284	298	291
Numeracy	OECD	255	266	281	294	291
Adaptive problem solving	England	*254	251	*270	*283	*275
Adaptive problem solving	OECD	244	252	264	273	271

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In general, the more frequently adults in England reported using ICT skills at work, the higher their average scores in literacy, numeracy and adaptive problem solving. However, there were exceptions: adults who reported using ICT the most had a lower average score than adults who used ICT skills less frequently (and this was also the case across the OECD, on average), and adults in the 2nd lowest quintile had lower average numeracy and adaptive problem solving scores than adults in the bottom quintile.

England achieved significantly higher average scores than the OECD average in literacy and adaptive problem solving across most quintiles. Aside from the lowest quintile, there was no significant differences for numeracy scores between the OECD and England.

Table 54 shows how frequently participants use ICT for each purpose at work in England and internationally. The table is ordered by frequency of using the skill *Every day*. Over 80% of adults in England use ICT to communicate with others and access information daily. Generally, ICT skills were used *Every day* by a greater proportion of adults in England than the OECD average, with the biggest difference seen in creating or editing electronic documents, spreadsheets or presentations.

Table 54 Frequency of use of ICT skills at work in England and internationally

In your current job, how often do you usually use a computer or digital device to…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
communicate with others (e.g. via emails, social networking sites, or internet calls). Exclude normal phone calls using a mobile phone	England	6%	1%	2%	6%	85%
communicate with others (e.g. via emails, social networking sites, or internet calls). Exclude normal phone calls using a mobile phone	OECD average	8%	2%	3%	9%	79%
access information (e.g. use a search engine, find information or read documents)	England	5%	2%	3%	8%	83%
access information (e.g. use a search engine, find information or read documents)	OECD average	7%	3%	4%	12%	74%
create or edit electronic documents, spreadsheets or presentations (using Microsoft Word, Excel, PowerPoint, or similar software)	England	18%	4%	5%	11%	61%
create or edit electronic documents, spreadsheets or presentations (using Microsoft Word, Excel, PowerPoint, or similar software)	OECD average	23%	7%	8%	15%	48%
use specialised software (e.g. for computer-aided design, the processing or analysis of data, sound and images, or quality control)	England	32%	7%	5%	9%	47%

In your current job, how often do you usually use a computer or digital device to…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
use specialised software (e.g. for computer-aided design, the processing or analysis of data, sound and images, or quality control)	OECD average	39%	7%	6%	10%	38%
use a programming language to program software (e.g. applications) or websites	England	79%	5%	3%	3%	10%
use a programming language to program software (e.g. applications) or websites	OECD average	81%	5%	3%	3%	8%

Table 55 shows the change over time in England in ICT use for 2 purposes: accessing information and using a programming language. These 2 purposes were included in both cycles and are therefore the only ones which are comparable. There has been a large increase in the number of adults using ICT to access information *Every day* over the 2 cycles, an increase of 35 percentage points. Using a programming language *Every day* has also increased across cycles.

Table 55 Frequency of use of ICT skills at work in England across cycles

In your current job, how often do you usually use a computer or digital device to…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
access information (e.g. use a search engine, find information or read documents)	Cycle 2	5%	2%	3%	8%	83%
access information (e.g. use a search engine, find information or read documents)	Cycle 1	16%	8%	7%	22%	47%
use a programming language to program software (e.g. applications) or websites	Cycle 2	79%	5%	3%	3%	10%
use a programming language to program software (e.g. applications) or websites	Cycle 1	88%	4%	2%	2%	4%

Source: OECD, PIAAC 2023 database

4.5.4 Learning at work

Participants were asked about their use of learning skills at work. There were questions asking how often their jobs involved learning new things; learning by doing the tasks they performed; and keeping up to date with new products or services. The responses to the questions were combined into a single index quantifying the overall frequency of use of learning skills at work. Participants were grouped in quintiles indicating how often they usually engaged with the learning practices.

Table 56 shows the average scores for each skill domain under the index of *learning skills use at work* for England and the OECD average.

Table 56 Average literacy, numeracy and adaptive problem scores by the frequency of learning at work in England and internationally

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	*258	*279	*291	*286	*270
Literacy	OECD average	247	267	273	277	263
Numeracy	England	*260	*280	*290	286	265
Numeracy – OECD average	OECD average	251	270	277	282	266
Adaptive problem solving	England	*248	*265	*275	*272	*258
Adaptive problem solving	OECD average	240	256	261	265	253

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

England's average scores increased across each domain of literacy, numeracy and adaptive problem solving from adults who reported the least learning at work to the 3rd quintile, and then decreased. The reductions were such that adults who reported the most learning at work achieved scores between the 2 bottom quintiles, on average. The international pattern was similar to England's.

England achieved significantly higher average scores than the OECD on average across all quintiles for literacy and adaptive problem solving. Scores at the first 3 quintiles for numeracy were also significantly higher than seen across the OECD on average.

Table 57 shows how frequently adults use the 2 learning skills at work. It is compared with the OECD and ordered by frequency of using the skill. Higher proportions of adults reported *learning by doing from the tasks they perform* and *keeping up to date with new products or services* on a daily basis in England than across the OECD on average. Among those who keep up to date with new products or services, England had a higher proportion of adults doing so *at least once a week (but not every day)* and a lower proportion of adults *never* doing it or doing so *less than once a month*. The frequency of learning skills at work has been mostly consistent over the 2 cycles (see Table C4 in appendix data tables).

Table 57 Frequency of use of learning skills at work in England and internationally

How often does your current job involve…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
learning by doing from the tasks you perform	England	6%	16%	19%	26%	34%
learning by doing from the tasks you perform	OECD average	9%	19%	20%	24%	29%
keeping up to date with new products or services	England	9%	19%	22%	24%	26%
keeping up to date with new products or services	OECD average	14%	26%	21%	19%	20%

Source: OECD, PIAAC 2023 database

4.5.5 Influencing skills at work

Participants were asked how often their jobs usually involved persuading or influencing people and how often their job involved negotiating with people either inside or outside their organisation. The responses to the questions were combined into a single index quantifying the overall frequency of use of influencing skills at work. Participants were grouped in quintiles indicating how often they usually used influencing skills.

Table 58 shows average literacy, numeracy and problem solving scores by how often adults reported using influencing skills at work, compared with the OECD average.

Table 58 Average literacy, numeracy and adaptive problem scores by the frequency of use of influencing skills at work in England and internationally

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	250	*273	*283	*281	*287
Literacy	OECD average	244	262	271	274	276
Numeracy	England	247	271	*282	279	*287
Numeracy	OECD average	247	265	275	279	282
Adaptive problem solving	England	243	*260	270	*266	*271
Adaptive problem solving	OECD average	239	252	260	262	263

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In general, the more frequently adults in England reported using influencing skills at work, the higher their average scores, although the average score for adults in the 2nd and 3rd highest quintiles (*more than 40% to 60%* and *more than 60% to 80%*) for frequency of influencing skills at work was similar. Internationally, the average scores for each domain increased with increased frequency of influencing skills.

England's average scores were significantly higher than the OECD average across most quintiles in literacy and adaptive problem solving and in 2 quintiles for numeracy.

Tables 59 and 60 show the frequency of the 2 influencing skills at work in England internationally (59) and over time (Table 60). Adults in England were more likely to use these skills *Every day* compared with the OECD average and compared with Cycle 1.

Table 59 Frequency of use of influencing skills at work in England and internationally

How often does your current job involve…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
persuading or influencing people	England	20%	7%	8%	19%	47%
persuading or influencing people	OECD average	28%	8%	9%	19%	36%
negotiating with people either inside or outside your firm or organisation	England	25%	9%	10%	18%	38%
negotiating with people either inside or outside your firm or organisation	OECD average	36%	11%	11%	17%	26%

Source: OECD, PIAAC 2023 database

Table 60 Frequency of use of influencing skills at work in England across cycles

How often does your current job involve…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
persuading or influencing people	Cycle 2	20%	7%	8%	19%	47%
persuading or influencing people	Cycle 1	26%	8%	8%	18%	41%
negotiating with people either inside or outside your firm or organisation	Cycle 2	25%	9%	10%	18%	38%
negotiating with people either inside or outside your firm or organisation	Cycle 1	32%	9%	9%	17%	33%

Source: OECD, PIAAC 2023 database

4.5.6 Problem solving skills at work

Participants were told to consider problem solving as what happens when faced with a new or difficult situation that required them to think for a while about what to do next. They were asked 2 questions about problem solving tasks they performed in their jobs. One of the questions was how often they were usually faced with relatively simple problems that take no more than 5 minutes to find a good solution to. Another question asked how often they were usually confronted with more complex problems that take at least 30 minutes to find a good solution to (it was explained to them that the 30 minutes referred to the time needed to think of a solution, not to execute it). Moreover, participants were classified into five groups corresponding to the frequency they faced each type of problem solving task.

Table 61 and Table 62 show the average scores for each skill domain for questions about simple and complex problem solving skills at work, respectively. The tables enable comparisons with the average scores across OECD countries as a whole.

Table 61 Average literacy, numeracy and adaptive problem scores by the frequency of use of simple problem solving skills at work in England and internationally

Domain	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
Literacy – England	England	*240	249	*273	*280	*284
Literacy – OECD average	OECD average	228	244	257	270	276
Numeracy – England	England	240	247	*273	*282	280
Numeracy – OECD average	OECD average	231	248	261	274	279
Adaptive problem solving – England	England	234	240	*263	*266	*268
Adaptive problem solving – OECD average	OECD average	225	238	249	259	263

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Table 62 Average literacy, numeracy and adaptive problem scores by the frequency of use of complex problem solving skills at work

Domain	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
Literacy	England	248	*272	*286	*287	*280
Literacy	OECD average	241	260	272	278	273
Numeracy	England	243	*271	*287	287	276
Numeracy	OECD average	243	263	276	283	278
Adaptive problem solving	England	241	*260	*270	*273	265
Adaptive problem solving	OECD average	236	250	261	265	261

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In general, adults in England who reported solving *simple problems* at work more often had higher literacy, numeracy and adaptive problem solving scores.

In England and the OECD, solving *complex problems* more frequently at work was associated with higher literacy, numeracy and adaptive problem solving skills for adults who solved complex problems less frequently than *Every day*. Solving complex problems *Every day* was associated with a drop in literacy, numeracy and problem solving skills compared with the adults who solved complex problems at least once a month (but not every day).

Most literacy and adaptive problem solving average scores were significantly higher in England than across the OECD for those that solved both *simple* and *complex* problem solving skills more regularly. The numeracy and problem solving scores for England and the OECD average did not differ significantly for those that don't tend to solve simple and complex problem solving skills at work.

Table 63 shows how frequently adults use problem solving skills at work. Table 64 shows how the frequency of problem solving over time in England has changed. England had higher proportions of adults than the OECD average who faced simple (60% in England compared to 46% across the OECD) or complex problems *Every day* (20% in England compared to 13% across the OECD).

In England, more adults in Cycle 2 reported facing *simple* (8 percentage point increase) and *complex* (6 percentage point increase) problems *Every day* than in Cycle 1. There was also a 5 percentage point increase in the proportion of those facing *complex* problems *At least once a week (but not every day)*, and a 7 percentage point reduction in the proportions of those reporting *Never* facing complex problems.

Table 63 Frequency of use of problem solving skills at work in England and internationally

How often are you usually…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
faced by relatively simple problems that take no more than 5 minutes to find a good solution	England	4%	5%	7%	24%	60%
faced by relatively simple problems that take no more than 5 minutes to find a good solution	OECD average	7%	10%	11%	26%	46%
confronted with more complex problems that take at least 30 minutes to find a good solution	England	13%	14%	18%	35%	20%
confronted with more complex problems that take at least 30 minutes to find a good solution	OECD average	18%	20%	21%	28%	13%

Source: OECD, PIAAC 2023 database

Table 64 Frequency of use of simple and complex problem solving skills at work in England across cycles

How often are you usually…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
faced by relatively simple problems that take no more than 5 minutes to find a good solution	Cycle 2	4%	5%	7%	24%	60%
faced by relatively simple problems that take no more than 5 minutes to find a good solution	Cycle 1	7%	8%	9%	25%	52%
confronted with more complex problems that take at least 30 minutes to find a good solution	Cycle 2	13%	14%	18%	35%	20%
confronted with more complex problems that take at least 30 minutes to find a good solution	Cycle 1	20%	17%	19%	30%	14%

Source: OECD, PIAAC 2023 database

4.5.7 Cooperating skills at work

Participants were asked 1 question about the proportion of their time in their current jobs that they usually spent cooperating or collaborating with co-workers. Participants were classified into 5 groups depending on the proportion of this time.

Table 65 shows the average scores for each domain for the questions on cooperating skills at work for England and the OECD average.

Table 65 Average literacy, numeracy and adaptive problem scores by the frequency of use of cooperating skills at work in England and internationally

Domain	Country	None of the time	Up to a quarter of the time	Up to half of the time	More than half of the time	All of the time
Literacy	England	258	*285	279	*288	*271
Literacy	OECD average	248	275	274	276	255
Numeracy	England	254	283	283	*289	*267
Numeracy	OECD average	252	280	279	280	257
Adaptive problem solving	England	243	*269	267	*273	*260
Adaptive problem solving	OECD average	241	262	262	264	247

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

In general, adults in England who cooperated more tended to have higher scores in literacy, numeracy and adaptive problem solving, a notable exception was adults who reported cooperating all of the time. A similar pattern was found internationally.

England's average scores were significantly higher than the OECD average for the 2 most frequent categories (*more than half of the time* and *all the time*) across all 3 domains. Those adults in England who cooperated or collaborated with co-workers *up to a quarter of the time* also had a significantly higher average literacy and adaptive problem solving score than seen across the OECD.

England's findings related to cooperating or collaborating with coworkers were similar to what was seen over time (see Table C5 in appendix data tables).

5　Adult skills in everyday life

Key findings

Literacy practices outside of work are important. Adults in England and internationally who write and read frequently in their everyday life tend to achieve higher standards of literacy, numeracy and adaptive problem solving; a similar pattern was found in Cycle 1. England's adults who reported writing the least frequently had disproportionally lower literacy and adaptive problem solving mean scores than the OECD average.

The most frequent readers and writers in England achieved high literacy and problem solving scores (which were significantly above the OECD average), and the least frequent readers and writers had disproportionally lower literacy, numeracy and problem solving scores compared with the OECD average

Adults in England generally read more often outside of work compared with the OECD average although 21% of adults in England reported never reading books. The time spent on writing outside of work was comparable for England and the OECD countries.

The most common form of writing in everyday life in England was writing letters, memos or emails, with a quarter of adults reportedly doing so on a daily basis.

Frequencies of engagement with numeracy practices differed little between England and the OECD. Up to 60% of adults reported never reading or preparing charts, graphs or tables, or using mathematics (such as formulas or rules), and only between 3% and 8% of adults reported doing so on a daily basis.

A very high proportion of adults in England reported using a computer or digital device for accessing information and online banking or e-commerce at least once a week or even daily, greatly surpassing OECD averages.

Introduction

The previous chapter looked at the relationship between employment and literacy, numeracy and adaptive problem solving in England. It also reported on the relationship between the extent of skills usage in the workplace and proficiency levels.

This chapter looks at the extent to which the use of literacy, numeracy and ICT skills in everyday life was reflected in mean literacy, numeracy and adaptive problem solving scores for England and the OECD[9]. This analysis was undertaken for all adults in the

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[9] Refer to the section on 'Changes over time' in Chapter 1, including Table 1, for an explanation of how OECD averages were calculated for both PIAAC cycles.

sample. Many of the questions were also included in the background questionnaire in Cycle 1, and comparisons are made where possible.

5.1 Reading skills

Participants were asked about the extent to which they used their reading skills outside of work. They were asked how often they usually read 6 text types in everyday life: letters, memos or emails; articles in newspapers, magazines or newsletters; bills, invoices, bank statements or other financial statements; books (fiction or non-fiction); directions or instructions; and manuals or reference materials.

The same 6 items were also used in Cycle 1. In addition to reporting reading activities by categories, where appropriate, the responses to the questions on reading each text type were combined into a single index of reading skills, quantifying the overall reading frequency outside work across all text types.

Table 66 presents the reading practices of adults in England outside of work, split by these different text types. It enables comparisons with England and the OECD average. Table 5.2 shows the frequency of use of reading skills outside of work in England across Cycle 2 and Cycle 1.

By far the most frequent reading skill used by adults in daily life *Every day* in England was *reading letters, memos or emails*. This was also the most frequent skill used on a daily basis across the OECD on average, but the proportion of adults was much lower (71% England, 56% OECD average). *Reading articles in newspapers, magazines or newsletters* was the second most frequent daily reading activity (43% England, 42% OECD average). Adults in England read directions or instructions more frequently than adults across the OECD, for instance, 7% of adults in England reported never reading these types of text and the OECD average was 20%.

There have been changes in reading habits since 2012, as seen in Table 67. The proportions of adults in England who reported reading directions or instructions, and letters, memos or emails every day rose by 5% and 7% respectively. However, reading books and articles in newspapers, magazines or newsletters every day decreased by 6%. The proportion of adults who never read articles in newspapers, magazines or newsletters increased from 6% to 14%, whereas the proportion of adults never reading manuals or reference materials decreased from 31% to 23% for over the same period.

Table 66 Frequency of use of reading skills outside of work in England and internationally

Outside your work, how often do you usually read…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
letters, memos or emails	England	3%	3%	5%	19%	71%
letters, memos or emails	OECD average	8%	5%	8%	22%	56%
articles in newspapers, magazines or newsletters	England	14%	8%	10%	26%	43%
articles in newspapers, magazines or newsletters	OECD average	14%	9%	11%	24%	42%
directions or instructions	England	7%	15%	17%	33%	28%
directions or instructions	OECD average	20%	28%	19%	20%	14%
books, fiction or non-fiction	England	21%	19%	14%	21%	25%
books, fiction or non-fiction	OECD average	27%	20%	15%	20%	18%
bills, invoices, bank statements or other financial statements	England	6%	10%	27%	38%	18%
bills, invoices, bank statements or other financial statements	OECD average	13%	13%	29%	32%	13%
manuals or reference materials	England	23%	31%	21%	18%	7%
manuals or reference materials	OECD average	30%	31%	19%	14%	7%

Source: OECD, PIAAC 2023 database

Table 67 Frequency of use of reading skills outside of work in England over time

Outside your work, how often do you usually read…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
directions or instructions	Cycle 2	7%	15%	17%	33%	28%
directions or instructions	Cycle 1	11%	22%	16%	27%	23%
letters, memos or emails	Cycle 2	3%	3%	5%	19%	71%
letters, memos or emails	Cycle 1	3%	4%	5%	23%	64%
articles in newspapers, magazines or newsletters	Cycle 2	14%	8%	10%	26%	43%
articles in newspapers, magazines or newsletters	Cycle 1	6%	5%	8%	33%	49%
books, fiction or non-fiction	Cycle 2	21%	19%	14%	21%	25%
books, fiction or non-fiction	Cycle 1	18%	18%	11%	22%	31%
manuals or reference materials	Cycle 2	23%	31%	21%	18%	7%
manuals or reference materials	Cycle 1	31%	31%	18%	16%	5%
bills, invoices, bank statements or other financial statements	Cycle 2	6%	10%	27%	38%	18%
bills, invoices, bank statements or other financial statements	Cycle 1	6%	9%	28%	42%	16%

Source: OECD, PIAAC 2023 database

Frequency of reading books is often regarded as a good indicator of literacy skills (Mol and Bus, 2024). To look at the link between frequency of reading in everyday life and attainment, Table 68 reported mean scores for literacy, numeracy and adaptive problem solving, split by quintiles to reflect different levels of frequency of reading all types of text. For example, participants who reported reading some or all of the text types infrequently belong in the quintile *lowest to 20%*, whereas those who reported reading many of the text types frequently were placed in the *more than 80%* quintile.

Table 68 shows that the reading frequency outside of work was positively associated with mean literacy, numeracy, and adaptive problem solving scores in Cycle 2. Adults in England and internationally (reflected in the OECD average) who reported more frequent reading of a range of different text types typically achieved higher mean scores across the 3 skill domains.

Table 68 Average literacy, numeracy and adaptive problem solving scores by the frequency of use of reading skills outside of work

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	216	256	271	*279	*284
Literacy	OECD average	221	254	269	275	274
Numeracy	England	215	252	269	276	281
Numeracy	OECD average	223	257	272	278	278
Adaptive problem solving	England	215	248	259	*267	*267
Adaptive problem solving	OECD average	220	247	258	262	261

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Table 68 also shows that mean literacy and adaptive problem solving scores in England were significantly higher than the OECD average for more frequent readers (the top 2 quintiles). Mean numeracy scores in England were not significantly different from the OECD average. The difference of 68 score points in literacy scores from the least frequent readers (216) to most frequent readers (284) in England was greater than the 53 score points for the OECD on average (221 and 274, respectively). This pattern was replicated across all 3 domains.

Table 69 Average literacy score by the frequency of use of reading skills outside of work over time

Country	Cycle	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
England	Cycle 2	*216	256	271	279	284
England	Cycle 1	232	256	271	283	289
Cycle 1 comparator countries average	Cycle 2	*226	259	274	280	*278
Cycle 1 comparator countries average	Cycle 1	238	262	277	285	289

Asterisks (*) indicates a Cycle 1 score which is significantly different from Cycle 2.

Source: OECD, PIAAC 2023 database

Table 69 and Table 70 show that there was a positive association between literacy and numeracy attainment and reading frequency for adults in England, as well as internationally, which mirrors patterns in Cycle 1. The finding that reading in everyday life was positively linked to literacy and numeracy achievement was stable over time. It is important to note that these findings do not imply direction of causality, however.

Mostly, literacy attainment scores were similar in the 2 cycles for England, but there was a significant drop for the least frequent readers in England (and across the OECD) in Cycle 2.

Table 70 Average numeracy score by the frequency of use of reading skills outside of work over time

Domain	Cycle	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
England	Cycle 2	215	*252	*269	276	281
England	Cycle 1	216	241	259	273	282
Cycle 1 comparator countries average	Cycle 2	228	261	277	282	*282
Cycle 1 comparator countries average	Cycle 1	230	257	273	283	288

Asterisks (*) indicates a Cycle 1 score which is significantly different from Cycle 2.

Source: OECD, PIAAC 2023 database

In Cycle 2, the largest improvement in numeracy attainment was found for adults who belonged to the second and third lowest quintiles in terms of reading frequency outside of work (more than 20% to 40% and more than 40% to 60%) compared with the least frequent readers. This finding was not found in Cycle 1 comparator countries.

To summarise, adults who read texts most frequently outside of work achieved higher scores in literacy, numeracy and adaptive problem solving than the least frequent readers, a pattern that was also found in Cycle 1 and was true both for adults in England and across the OECD. In general, the time adults in England spent reading outside of work was above the OECD average, although 21% of adults in England reported never reading books.

5.2 Writing skills

Participants were asked about the extent to which they used their writing skills outside of their work: how often they usually wrote letters, memos or emails; wrote reports or articles; and filled in forms in their everyday lives. The wording of the questions asking about frequency of writing letters, memos or emails and filling in forms were almost identical across the 2 cycles and could therefore be compared over time. The question on writing reports or articles was a new addition in Cycle 2. Where appropriate, the responses to these 3 writing questions were combined into a single index quantifying the overall writing frequency outside work across all text types. Participants were grouped in quintiles, indicating how often they usually wrote each text type.

Table 71 presents the frequency of different writing practices of adults in England and across the OECD on average outside work.

Table 71 Frequency of use of writing skills outside of work in England and internationally

Outside your work, how often do you usually…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
write letters, memos or emails	England	8%	12%	18%	37%	26%
write letters, memos or emails	OECD average	12%	11%	15%	31%	30%
fill in forms	England	13%	39%	29%	16%	3%
fill in forms	OECD average	32%	37%	20%	9%	2%
write reports or articles	England	69%	15%	7%	6%	2%
write reports or articles	OECD average	67%	15%	8%	7%	3%

Source: OECD, PIAAC 2023 database

Table 72 Frequency of use of writing skills outside of work in England over time

Outside your work, how often do you usually…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
write letters, memos or emails	Cycle 2	8%	12%	18%	37%	26%
write letters, memos or emails	Cycle 1	11%	13%	14%	33%	29%
fill in forms	Cycle 2	13%	39%	29%	16%	3%
fill in forms	Cycle 1	14%	45%	27%	13%	1%

Source: OECD, PIAAC 2023 database

The most frequent form of writing was writing letters, memos or emails, which is done every day by 26% of adults in England and 30% across the OECD on average. Adults reported engaging in other forms of writing activities considerably less frequently. For example, 52% of adults said they fill in forms less than once a month or never, which was lower than the proportion reporting this across the OECD on average (69%).

Table 72 shows that, in terms of the frequency of use of writing skills outside of work in England across Cycle 2 and Cycle 1, there has been little change.

Table 73 shows how writing frequency outside work related to attainment by presenting the mean literacy, numeracy and adaptive problem solving scores in by quintiles of writing frequency. For example, adults who reported writing certain texts outside of work least frequently belong in the quintile called *lowest to 20%*, whereas those who reported reading many of the text types frequently were placed in the *more than 80%* quintile.

Table 73 Average literacy, numeracy and adaptive problem solving scores by the frequency of use of writing skills outside of work

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	221	*258	*276	*285	*280
Literacy	OECD average	229	251	271	277	271
Numeracy	England	218	254	272	282	278
Numeracy	OECD average	231	254	274	280	275
Adaptive problem solving	England	218	*250	*263	*268	*264
Adaptive problem solving	OECD average	226	244	259	264	259

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Adults in England and across the OECD, on average, who reported writing more frequently outside of work tended to achieve higher mean scores for all 3 domains of literacy, numeracy and adaptive problem solving. An exception to this positive relationship was seen for those writing outside of work most frequently (*more than 80%* quintile) achieving lower attainment scores than those writing a little less often (*more than*

60%-80% quintile). This was evident across literacy, numeracy and adaptive problem solving, and was also a pattern seen internationally.

Table 73 also shows that almost all writing frequency quintiles in England achieved significantly higher literacy and adaptive problem solving mean scores than seen internationally, with the exception of the least frequent readers. Mean numeracy scores in England were similar to the OECD average across the quintiles.

In summary, those who reported writing more frequently outside of work tended to gain higher mean scores in literacy, numeracy and adaptive problem solving. Compared with the OECD average, the least frequent writers also had disproportionally lower numeracy and literacy scores, highlighting the importance of literacy practices in everyday life for the most disadvantaged adults in England.

5.3 Numeracy skills

Participants were asked the extent to which they used their numeracy skills outside of work. The questions concerned six types of numeracy activities in everyday life: making calculations such as on prices, costs or quantities; using mathematics, such as formulas or mathematical rules; reading and preparing charts, graphs or tables; undertaking measurements (for instance, when cooking, gardening, making clothes or undertaking repairs); using information to make financial decisions (such as household budgets, insurance, loans). In addition to reporting numeracy activities by categories, where appropriate, the responses to the questions on each type of activity were combined into a single index of numeracy skills, quantifying the overall frequency of use of numeracy skills outside work across all activities. Participants were grouped in quintiles, indicating how often they usually undertook each numeracy activity.

Table 74 presents the numeracy practices of adults in England outside of work in split by these different activities. It enables comparisons between England and the OECD average. Table 75 shows the frequency of use of numeracy skills outside of work in England across Cycle 2 and Cycle 1, although most differ substantially from those used in Cycle 1 and only one is comparable.

Table 74 Frequency of use of numeracy skills outside of work in England and internationally

Outside your work, how often do you usually…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
undertake measurements (e.g. when you cook, garden, make clothes or undertake repairs)	England	13%	13%	18%	33%	24%
undertake measurements (e.g. when you cook, garden, make clothes or undertake repairs)	OECD average	18%	16%	18%	28%	20%
make calculations such as on prices, costs or quantities	England	12%	14%	17%	36%	21%
make calculations such as on prices, costs or quantities	OECD average	17%	16%	18%	30%	19%
use information to make financial decisions (e.g. household budgets, insurance, loans)	England	12%	16%	25%	32%	16%
use information to make financial decisions (e.g. household budgets, insurance, loans)	OECD average	18%	22%	26%	23%	10%
use mathematics, such as formulas or mathematical rules	England	55%	18%	10%	10%	7%
use mathematics, such as formulas or mathematical rules	OECD average	54%	17%	10%	12%	8%
read and prepare charts, graphs or tables	England	59%	20%	11%	8%	3%
read and prepare charts, graphs or tables	OECD average	60%	19%	10%	8%	3%

Source: OECD, PIAAC 2023 database

Table 75 Frequency of use of numeracy skills outside of work in England over time

Outside your work, how often do you usually…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
read and prepare charts, graphs or tables	Cycle 2	59%	20%	11%	8%	3%
read and prepare charts, graphs or tables	Cycle 1	78%	13%	5%	3%	#

# indicates rounded to 0.

Table 74 shows a similarity in the pattern of engagement with numeracy practices in England and internationally. For examples, most adults in England and internationally reported making measurements at least once a week. A majority of adults in England and across the OECD on average also reported never using mathematical formulas or rules, or reading and preparing charts, graphs or tables. The proportion of adults involved in these numeracy practices decreased as the frequency of involvement with the practices went up. Ultimately, only about 7% to 8% of adults use mathematics (with formulas or mathematical rules) on a daily basis, and 3% of them read and prepare charts, graphs or tables every day.

Table 76 Average literacy, numeracy and adaptive problem scores by the frequency of use of numeracy skills outside of work

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	236	*268	*278	*283	280
Literacy	OECD average	235	257	264	273	277
Numeracy	England	229	263	*273	281	280
Numeracy	OECD average	236	259	267	277	284
Adaptive problem solving	England	229	*256	*266	*268	265
Adaptive problem solving	OECD average	229	247	254	261	266

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Table 76 shows that adults in England and across the OECD, on average, who reported more frequently performing various numeracy practices typically achieved higher mean scores in literacy, numeracy and adaptive problem solving. Table 76 also shows that mean literacy and adaptive problem solving scores in England were significantly higher than the OECD averages for the central 3 quintiles. The numeracy score for the 3rd quintile (*more than 40% to 60%*) was also significantly higher in England than the OECD.

5.4 ICT skills

Participants were asked the extent to which they used their ICT skills outside of work. The questions were concerned with how often they used a computer or digital device such as a tablet or smartphone for online banking or e-commerce (such as buying or selling of goods or services); for entertainment or leisure (for example, playing video games, listening to music, watching or editing videos or photos); to manage their personal life (for instance, tracking health information, managing household budget, or navigating via GPS); to access information (for example, using a search engine, finding information, or reading documents); to communicate with others (such as via emails, social networking sites, or internet calls and excluding normal phone calls using a mobile phone); and how often they used a smartphone; a tablet; and a laptop or desktop computer. In addition to reporting ICT activities by categories, where appropriate, the responses to the questions on each type of ICT activity were combined into a single index of ICT skills use, quantifying the overall frequency of use of ICT skills outside work across all text types.

Table 77 presents the ICT practices of adults in England outside of work, split by the ICT activities. It enables comparisons with England and the OECD average. Table 78 shows the frequency of use of ICT skills use outside of work in England across Cycle 2 and Cycle 1 although most questions differ substantially from those used in Cycle 1 and are not comparable.

Table 77 Frequency of use of ICT skills outside of work in England and internationally

Outside your work, how often do you use a computer or digital device…	Country	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
to access information (e.g. use a search engine, find information or read documents)	England	1%	1%	2%	9%	87%
to access information (e.g. use a search engine, find information or read documents)	OECD average	3%	2%	4%	15%	76%
to communicate with others	England	2%	1%	2%	8%	87%
to communicate with others	OECD average	3%	2%	3%	11%	82%
for entertainment or leisure	England	4%	2%	2%	12%	79%
for entertainment or leisure	OECD average	6%	4%	5%	17%	69%
to manage your personal life	England	10%	5%	10%	29%	46%
to manage your personal life	OECD average	14%	11%	17%	28%	29%
for online banking or e-commerce	England	7%	3%	9%	36%	45%
for online banking or e-commerce	OECD average	12%	7%	17%	38%	26%

Source: OECD, PIAAC 2023 database

Table 78 Frequency of use of ICT skills outside of work in England across cycles

Outside your work, how often do you use a computer or digital device…	Cycle	Never	Less than once a month	Less than once a week but at least once a month	At least once a week but not every day	Every day
to access information (e.g. use a search engine, find information or read documents)	Cycle 2	1%	1%	2%	9%	87%
to access information (e.g. use a search engine, find information or read documents)	Cycle 1	6%	11%	16%	33%	34%
for online banking or e-commerce	Cycle 2	7%	3%	9%	36%	45%
for online banking or e-commerce	Cycle 1	14%	13%	23%	40%	11%

Source: OECD, PIAAC 2023 database

Table 77 shows that England had a higher proportion of adults than internationally reporting that they engaged in the different ICT practices every day. For instance, 87% of adults in England reported accessing information and 46% managing their personal lives using computers or digital devices every day while these percentages were 76% and 29% across the OECD on average. Other large differences observed included the use of computers or digital devices for online banking or e-commerce every day.

As seen in Table 78, the proportions of adults who reported using a computer or digital device such as a tablet or smartphone for *accessing information* or *online banking or e-commerce* was very high in England. A total of 97%[10] of adults accessed information at least once a week: 87% every day, and 9% at least once a week though not daily. This is much higher than in Cycle 1 (67%, 34% and 33% respectively). Online banking or e-commerce was reported to be used at least once a week by 82%[11] of England's adults: 45% every day, and 36% at least once a week (but not every day). The corresponding Cycle 1 averages were 51%, 11% and 40%. These findings point to an overall substantially higher use of computers or digital devices for these 2 purposes in Cycle 2 for England than in Cycle 1.

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[10] after taking into account the rounding of figures
[11] after taking into account the rounding of figures

Table 79 Average literacy, numeracy and adaptive problem scores by the frequency of use of ICT skills outside of work

Domain	Country	Lowest to 20%	More than 20% to 40%	More than 40% to 60%	More than 60% to 80%	More than 80%
Literacy	England	230	263	*277	282	*282
Literacy	OECD average	229	258	272	279	274
Numeracy	England	225	259	274	281	278
Numeracy	OECD average	233	262	276	282	277
Adaptive problem solving	England	221	*255	263	266	*268
Adaptive problem solving	OECD average	224	249	260	267	262

Asterisk (*) indicates the difference between England and OECD mean scores is statistically significant at the 5% level.

Source: OECD, PIAAC 2023 database

Table 79 shows a positive association between mean literacy, numeracy and adaptive problem solving scores and the frequency of use of ICT skills in England outside of work. Adults in England and internationally who reported a more frequent involvement with a range of ICT practices tended to achieve higher mean scores across the 3 skill domains. Exceptions to this trend happened from the 4th to the 5th quintiles though, at which point most mean scores decreased or were not different as the frequency of use of ICT skills increased to the *more than 80%* quintile. For the 5th quintile (*more than 80%)* the literacy scores and adaptive problem solving scores for adults in England were significantly higher than the corresponding scores for adults across the OECD on average. They were also significantly higher for literacy for the 3rd quintile (*more than 40% to 60%*) and for adaptive problem solving for the 2nd quintile (*more than 20% to 40%*).

6 Adult socio-emotional skills and wider non-economic outcomes

Key findings

Adults' levels of socio-emotional skills (agreeableness, conscientiousness, emotional stability, extraversion and open mindedness) in England mirror patterns seen across the OECD countries.

Demographics are important, for example, men in England scored lower on agreeableness than women. The oldest participants had the highest scores in each of the 5 socio-emotional skills.

In line with recent literature, self-reported health declined between 2012 and 2023 in England.

Life satisfaction in England was largely comparable with the OECD average. Participants' life satisfaction showed no clear association with attainment. Some countries that performed better than England also had more participants that were satisfied with their lives (for instance, Netherlands and Finland), whereas other high performing countries were on average less satisfied with their lives than England (Estonia and Japan).

Trusting others increased with age, and belief in political efficacy decreased with age. Scores for political efficacy on the whole were noticeably low for England as well as across the OECD.

Higher education levels were linked to a range of positive non-economic outcomes, such as higher socio-emotional skills, greater life satisfaction, better perceived health status as well as increased levels of social trust and political efficacy.

Large-scale international studies increasingly assess individuals on non-economic outcomes. For instance, OECD's Programme for International Student Assessment of 15-year-olds (PISA, OECD, 2024a) contains questions on life satisfaction and OECD has launched a Survey on Social and Emotional Skills 2023 which investigates social and emotional skills of 10- and 15-year-old students; round 1 took place in 2018-2020 in 10 cities around the world (OECD, 2024b).

Collecting data on socio-emotional abilities or other non-economic variables can enable a more holistic understanding of outcomes and how well participants, be they young people or adults, deal with non-academic challenges.

The Survey of Adult Skills Cycle 2 background questionnaire included a range of trend and new variables assessing non-academic outcomes. In this chapter, we report levels of

self-reported socio-emotional skills and wellbeing (life-satisfaction) scores as well as other non-economic outcomes (self-reported health status, job satisfaction, political efficacy and social trust) in England. This is broken down by key demographics such as age, gender and education levels. Where possible, this chapter offers comparisons with OECD averages or data from Cycle 1 (see below for cautionary notes on data interpretation). Further, we will briefly discuss the wider evidence of impact of Covid-19 on young people's wellbeing, as well as a general downward trend of wellbeing which started to decline before the pandemic and appears to continue to decline today.

6.1 Socio-emotional skills

The Survey of Adult Skills background questionnaire includes a novel self-assessment of social and emotional skills based on the Big Five framework (see John and Srivastava, 2001). This is the first time that this measure has been included in the survey, and therefore, no trend analysis is possible. The construct of the Big Five is made up of the following domains: open-mindedness, conscientiousness, extraversion, agreeableness and neuroticism. Items in the Big Five inventory were scored on a response scale from 1 (strongly disagree) to 5 (strongly agree). Table 80 summarises the facets involved within each assessed domain.

Table 80 Domains and facets assessed within the Big Five socio-emotional skills survey

Domains	Facets
Open-mindedness	Intellectual Curiosity, Aesthetic Sensitivity, Creative Imagination
Conscientiousness	Productiveness, Responsibility, Organisation
Extraversion	Energy Level, Sociability, Assertiveness
Agreeableness	Respectfulness, Trust, Compassion
Neuroticism	Anxiety, Emotional Volatility, Depression

Participating countries selected either the BFI-2-S: Short Big Five Inventory 2 (including 30 items; 6 per domain, 2 per facet), or the BFI-2-XS: Extra Short Big Five Inventory 2 (including 15 items; 3 per domain, 1 per facet). The BFI-2-XS version was used in England. For this analysis, we created a new OECD socio-emotional skills average, which includes data on the average skills score based on the BFI-2-XS (available from 26 countries).

The OECD confirmed in extensive analyses (see technical report for further detail (OECD, forthcomingc), that the BFI-2-XS inventory performed largely as expected. However, varying reliability scores across different countries were reported which were largely a consequence of the very short individual scales (3 items). Whilst the measures

generally met all standards for reporting, this chapter reports z-standardised mean scores and not data on individual items. Further, we did not conduct a correlational analysis between socio-emotional skills and established literacy or numeracy components. Because England included the shorter version of the inventory (3 items per domain) this only allowed the measurement of the 5 domains and not a breakdown into the individual facets.

It should be noted that as the Big Five scores are based on z-standardised scores, the overall mean scores for each country are 0, and therefore will not be reported below. Due to the nature of this data, numbers reported in this chapter are relatively small and any changes need to be interpreted with caution. All standard errors for the analysis conducted in the chapter are available in the chapter data tables published alongside this report.

6.1.1. Gender

When looking at gender (Table 81), men (-0.2) appeared to score lower for agreeableness than women (0.2). The opposite was found for emotional stability, with men (0.2) showing higher mean scores than women (-0.2). Both of these effects are small. For conscientiousness, extraversion and open mindedness, little or no obvious gender-specific patterns were detected. This pattern for England mirrored the gender patterns seen more widely across OECD countries[12].

Table 81 Difference in score between men and women in England and OECD countries

Domain	Country	Men	Women
Agreeableness	England	-0.2	0.2
Agreeableness	OECD average	-0.2	0.2
Conscientiousness	England	-0.1	0.1
Conscientiousness	OECD average	-0.1	0.1
Emotional stability	England	0.2	-0.2
Emotional stability	OECD average	0.2	-0.2
Extraversion	England	0.0	0.0
Extraversion	OECD average	0.0	0.0
Open-mindedness	England	0.1	-0.1
Open-mindedness	OECD average	0.0	0.0

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[12] OECD Socio-emotional skills average specifically created for this Chapter 6.1, which includes data on the average socio-emotional skills score-based data from the BFI-2-XS.

6.1.2. Age

When analysing the Big Five domains by age, little variation was noted between England and OECD average scores.

As shown in Figure 23 and Figure 24 , both agreeableness and conscientiousness scores tended to increase in a linear manner with age, levelling around the age of 45-54. This was true for both England and OECD on the whole. For both agreeableness and conscientiousness, the youngest age-group (16-19) scored lower than the OECD on average. Adults in the 2 central age-groups (25-44) in England on the other hand had a slightly higher agreeableness score than the OECD equivalent.

Figure 23 Difference in Agreeableness score according to respondents' age in England and OECD countries
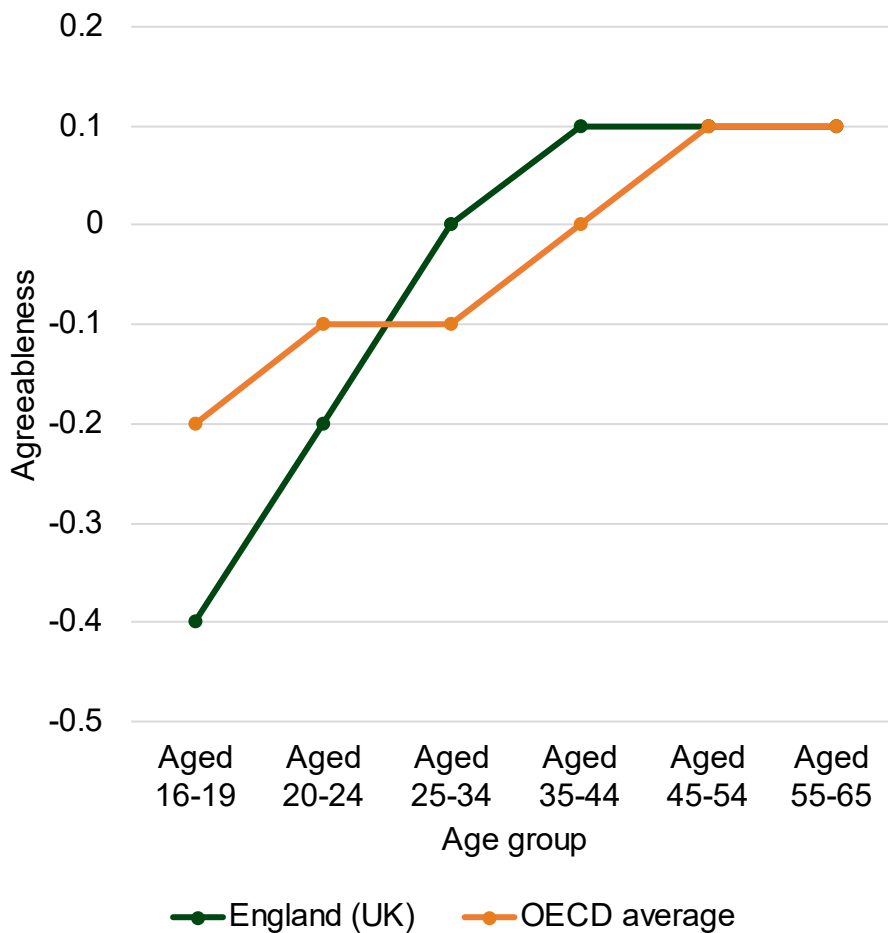
Age group	Agreeableness – England	Agreeableness – OECD average
Aged 16-19	-0.4	-0.2
Aged 20-24	-0.2	-0.1
Aged 25-34	0.0	-0.1
Aged 35-44	0.1	0.0
Aged 45-54	0.1	0.1
Aged 55-65	0.1	0.1

Figure 24 Difference in Conscientiousness score according to respondents' age in England and OECD countries
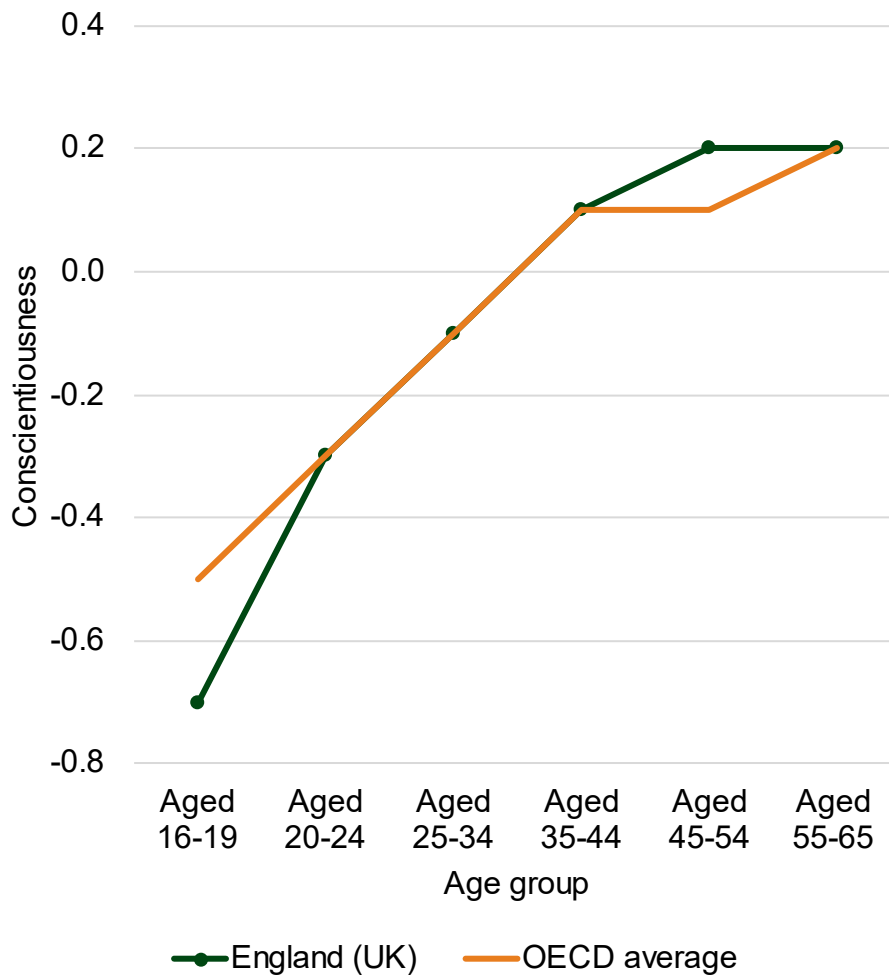
Age group	Conscientiousness – England	Conscientiousness – OECD average
Aged 16-19	-0.7	-0.5
Aged 20-24	-0.3	-0.3
Aged 25-34	-0.1	-0.1
Aged 35-44	0.1	0.1
Aged 45-54	0.2	0.1
Aged 55-65	0.2	0.2

Source: OECD, PIAAC 2023 database

Table 82 Difference in Emotional Stability score according to respondents' age in England and OECD countries

Age group	Emotional Stability – England	Emotional Stability – OECD average
Aged 16-19	0.0	0.0
Aged 20-24	-0.2	-0.1
Aged 25-34	-0.1	0.0
Aged 35-44	0.0	0.0
Aged 45-54	0.1	0.0
Aged 55-65	0.1	0.0

Source: OECD, PIAAC 2023 database

6.1.3. Education levels

Adults with tertiary education in England scored higher across all 5 domains compared with those with lower educational levels, a trend reflected across the OECD (Table 83). For example, scores for extraversion, conscientiousness and open-mindedness in particular increased with education level. Tertiary-educated adults in England had a positive mean score of 0.1 in agreeableness, 0.2 in conscientiousness, 0.1 in emotional stability, 0.1 in extraversion, and 0.2 in open-mindedness, aligning closely with OECD averages. In contrast, those with less than upper secondary education scored lower, especially in open-mindedness, where their average was -0.5 in England, compared with -0.2 across the OECD.

For adults with upper secondary education, the scores in England were close to the OECD averages, with minimal variation. For instance, they scored -0.1 in agreeableness,

conscientiousness, and emotional stability, and open-mindedness, suggesting comparable levels of these traits.

Table 83 Difference in score between respondents by education level in England and OECD countries

Domain and country	Country	Less than upper secondary	Upper secondary	Tertiary
Agreeableness	England	-0.1	-0.1	0.1
Agreeableness	OECD average	-0.1	0.0	0.1
Conscientiousness	England	-0.3	-0.1	0.2
Conscientiousness	OECD average	-0.2	0.0	0.1
Emotional stability	England	-0.3	-0.1	0.1
Emotional stability	OECD average	-0.2	0.0	0.1
Extraversion	England	-0.4	0.0	0.1
Extraversion	OECD average	-0.1	0.0	0.1
Open-mindedness	England	-0.5	-0.1	0.2
Open-mindedness	OECD average	-0.2	-0.1	0.2

Source: OECD, PIAAC 2023 database

6.2 Wellbeing and other non-economic outcomes

Over recent years, a global decline in people's mental health has been reported. Mental health was already on a downward trend before the pandemic, but reports state that the global prevalence of anxiety and depression has increased by 25% following the Covid-19 pandemic (WHO, 2022).

Similarly, research by Raleigh (2024) has reported a drop in healthy life expectancy in England, which was lower in 2020-22 than in 2011-13. According to Raleigh (2024), this is likely a consequence of the Covid-19 pandemic, which resulted in the largest fall in life expectancy since World War 2. Further, the fall is also linked to delays in care for non-Covid-19 conditions and increased long-term sickness conditions following the pandemic. Naturally, this picture is complex and not every person was affected by the pandemic in the same way.

The Survey of Adult Skills collects information relevant to individuals' overall physical and mental wellbeing, including variables such as self-reported health status and a measure of overall life-satisfaction, as well as job-satisfaction. Table 84 summarises the additional non-economic outcomes (single-item measures) that are relevant for all aspects of social

life and relate to being a member of society which have also been included in this analysis.

Table 84 Additional non-academic variables included in the analysis

Domain	Specific questions	Response scale
Self-reported health status	In general, would you say your health is excellent, very good, good, fair, or poor? Health can include both physical and mental health.	From 1 (excellent) to 5 (poor)
Self-reported life-satisfaction*	All things considered, how satisfied are you with your life as a whole these days?	From 0 (extremely dissatisfied) to 10 (extremely satisfied)
Self-reported job-satisfaction	All things considered, how satisfied are you with your current work?	From 1 (extremely satisfied) to 5 (extremely dissatisfied)
Social trust*	Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?	From 0 (you can't be too careful) to 10 (most people can be trusted)
Political efficacy*	How much would you say the political system in Britain allows people like you to have a say in what the government does?	From 0 (not at all) to 10 (completely)

*These 3 variables are new in Cycle 2 and, therefore, no comparison to the previous cycle can be made.

6.2.1. Health status

Table 85 shows that in Cycle 2, 51% of adults in England described their health as excellent or very good, 14% described their health as fair, and 7% described it as poor. In line with other published data (Raleigh, 2024), this pattern has changed since Cycle 1, where 59% of adults reported their health as being excellent or very good, and 10% reported it as fair, or poor (5%).

Table 85 Health status England

Health Status	Cycle 2	Cycle 1
Excellent	18%	23%
Very good	33%	36%
Good	28%	27%
Fair	14%	10%
Poor	7%	5%

Further, self-reported health status varied significantly by education level. For Cycle 2, adults with tertiary education reported higher rates of excellent health (21%), than those with upper secondary education (18%) and less than upper secondary education (11%). A similar trend was observed for adults reporting very good health, with 38% of those with tertiary education reporting this compared with 25% for those with less than upper secondary education. In contrast, those with less than upper secondary education reported higher rates of poor health (13%), than those with upper secondary education (6%) and adults with tertiary education (3%). The pattern mirrored findings from Cycle 1, but with a drop in self-reported health status across all education levels; in Cycle 1, adults with tertiary education reported higher rates of excellent health (27%), compared with those with upper secondary education (22%) and less than upper secondary education (16%). A similar trend was observed for adults reporting very good health, with 39% of those with tertiary education reporting this compared with 29% for those with less than upper secondary education.

Table 86 Health status England by respondents' education level

Health Status	Cycle 2 – Less than upper secondary	Cycle 2 – Upper secondary	Cycle 2 – Tertiary	Cycle 1 – Less than upper secondary	Cycle 1 – Upper secondary	Cycle 1 – Tertiary
Excellent	11%	18%	21%	16%	22%	27%
Very good	25%	33%	38%	29%	38%	39%
Good	29%	29%	27%	30%	27%	24%
Fair	22%	14%	10%	15%	9%	7%
Poor	13%	6%	3%	10%	4%	3%

Across both cycles, these findings reflect a general trend where higher education levels are associated with better perceived health status. It is important to note that measuring self-reported health is complex. It is difficult to understand the relationship between actual and self-reported health, and more research needs to be undertaken to investigate the differences in self-reported health in England over time or by education level in more detail.

6.2.2. Job satisfaction

Job satisfaction has remained relatively stable between Cycle 1 and Cycle 2, with an unchanged 51% of adults reporting satisfaction with their jobs (see Table 87). There was a similar number of adults in Cycle 2 who were extremely satisfied with their jobs compared with Cycle 1 (31% vs 28%).

Table 87 Job Satisfaction

Job Satisfaction	Cycle 2	Cycle 1
Extremely satisfied	31%	28%
Satisfied	51%	51%
Neither satisfied nor dissatisfied	12%	12%
Dissatisfied	5%	7%
Extremely dissatisfied	1%	2%

Source: OECD, PIAAC 2023 database

There were no clear associations between education levels and with job satisfaction.

Table 88 shows that 29% of adults with tertiary education reported being extremely satisfied with their job, which was similar to both those with upper secondary education and those with less than upper secondary education (both 32%). This was similar to findings in Cycle 1, where generally, there was very little variation by education levels.

Table 88 Job Satisfaction England by respondents' education level

Job Satisfaction	Cycle 1 – Less than upper secondary	Cycle 1 – Upper secondary	Cycle 1 – Tertiary	Cycle 2 – Less than upper secondary	Cycle 2 – Upper secondary	Cycle 2 – Tertiary
Extremely satisfied	29%	28%	27%	32%	32%	29%
Satisfied	49%	53%	50%	52%	49%	54%
Neither satisfied nor dissatisfied	14%	11%	13%	11%	13%	11%
Dissatisfied	6%	6%	7%	3%	4%	6%
Extremely dissatisfied	2%	2%	3%	2%	2%	1%

Source: OECD, PIAAC 2023 database

6.2.3. Life satisfaction

Life satisfaction is a new measure in Cycle 2, measured by a single item on a 0-10 scale of self-reported life satisfaction. This item is a common way to measure life satisfaction and wellbeing across many large-scale studies, for example, the annual personal wellbeing survey by Office for National Statistics reported a drop in average ratings of adults' life satisfaction in England between April 2022 and March 2023 (ONS, 2023).

In Cycle 2, the average scores for life satisfaction were on the whole, comparable between England (7.4) and the OECD average (7.4).[13]

When looking at between-country differences, PISA data from 2015 highlighted a negative relationship between attainment and self-reported life satisfaction in 15-year-old pupils around the world (OECD, 2017). The UK and certain countries with above-average attainment levels, such as Japan, Hong Kong and Sweden, appeared to have a low mean level of life satisfaction. Finland and France were an exception, with above-average attainment accompanied by above-average life satisfaction.

To analyse self-reported life satisfaction in the Survey of Adult Skills (single item scale), the distribution of life satisfaction scores for England were compared with the OECD

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[13] For reference, the average life satisfaction ratings in the annual wellbeing survey (ONS, 2023) for March 2023 were 7.45 out of 10 for life satisfaction (7.54 in the previous year) for England, which is below pre-pandemic levels.

average and to countries that outperformed England in literacy and numeracy in Cycle 2: Estonia, Finland, Japan, Netherlands, Norway, Sweden and Flemish Region (Belgium).

The data does not suggest that there is a clear relationship between high-performing countries and self-reported life satisfaction. Figure 25 suggests that patterns for England, Sweden and Norway were comparable to the OECD average (56%) with 57-60% of adults rating their life satisfaction as 8 and above (with 10 being extremely satisfied). Flemish Region (Belgium) and Netherlands were slightly higher with 66% and 65% of adults respectively rating their life satisfaction as 8 and above. In Finland, 75% of adults rated their life satisfaction as 8 and above. Two countries had lower rates of life satisfaction than England: in Estonia, 48% rated their life satisfaction as 8 and above, and in Japan, only 35% of adults did.

Figure 25 Life Satisfaction England, OECD and 7 comparator countries
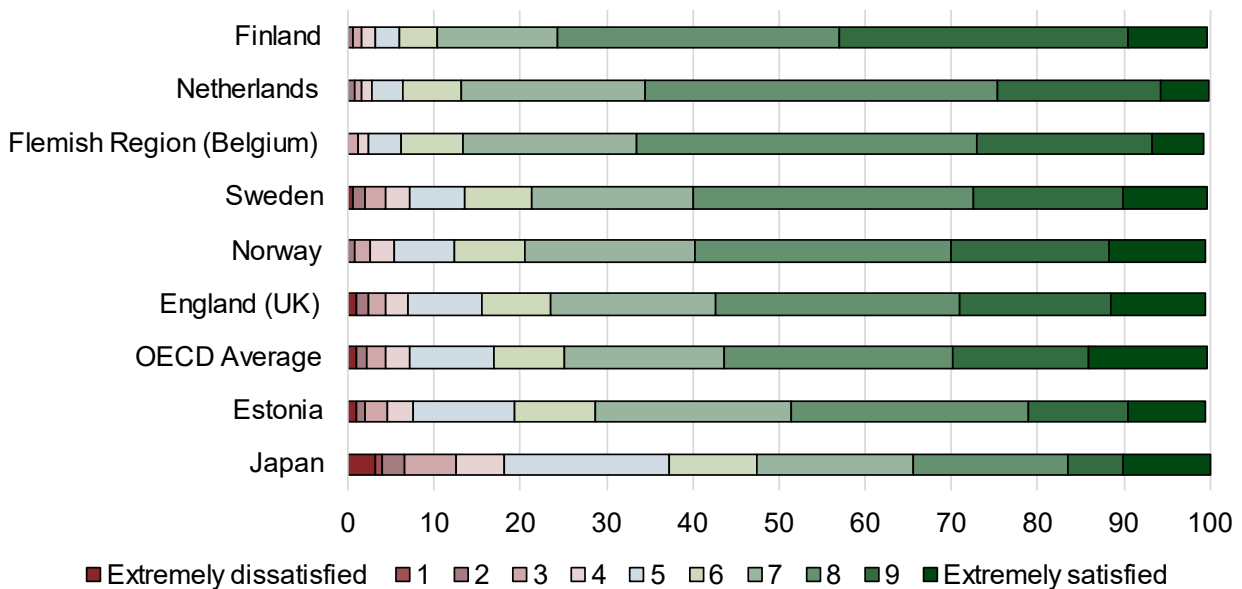
Life Satisfaction	England	OECD average	Estonia	Finland	Japan	Netherlands	Norway	Sweden	Flemish Region (Belgium)
Extremely dissatisfied	1%	1%	1%	#	3%	#	#	1%	#
1	#	#	#	‡	1%	‡	#	#	‡
2	1%	1%	1%	1%	3%	1%	1%	1%	#
3	2%	2%	3%	1%	6%	1%	2%	2%	1%
4	3%	3%	3%	2%	6%	1%	3%	3%	1%
5	8%	9%	12%	3%	19%	4%	7%	7%	4%
6	8%	8%	9%	4%	10%	7%	8%	8%	7%
7	19%	19%	23%	14%	18%	21%	20%	19%	20%
8	28%	27%	27%	33%	18%	41%	30%	33%	39%
9	18%	16%	12%	33%	6%	19%	18%	17%	20%
Extremely satisfied	11%	13%	9%	9%	10%	6%	11%	10%	6%

# indicates rounds to 0. ‡ indicates the reporting standards have not been met.

Source: OECD, PIAAC 2023 database

For England, on average, men (7.5) scored similarly to women (7.3) on life satisfaction (Table 89). This is in line with research that suggests that on a whole, life satisfaction is generally comparable between men and women (Blanchflower and Bryson, 2024). Across the OECD, there were no discernible gender effects for reported life satisfaction.

Table 89 Life Satisfaction by respondents' gender

Life satisfaction	Men Mean	Women Mean
England	7.5	7.3
OECD	7.4	7.4

Source: OECD, PIAAC 2023 database

When looking at age, there was a slight dip in life satisfaction for the age-group 20-24 (7.1) in England but generally, life satisfaction appeared stable across age groups. When looking at the OECD average, the youngest participants appeared to be the ones with the highest self-reported life satisfaction.

Table 90 Life Satisfaction by respondents' age

Age group	England Mean	OECD average
Aged 16-19	7.5	7.6
Aged 20-24	7.1	7.3
Aged 25-34	7.5	7.4
Aged 35-44	7.4	7.5
Aged 45-54	7.5	7.3
Aged 55-65	7.3	7.3

Source: OECD, PIAAC 2023 database

As seen in Table 91, adults with tertiary education reported the highest average life satisfaction mean score at 7.6, followed by those with upper secondary education at 7.3. Those with less than upper secondary education reported the lowest average life satisfaction score at 6.9. This pattern is mirrored in the OECD average and suggests a relationship between education levels and life satisfaction – although note that this may be mediated by additional factors or characteristics. Recently, TASO (2023) commissioned a rapid evidence review looking into the value of higher education; findings suggested that graduates had higher self-reported levels of life satisfaction and happiness than non-graduates.

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Table 91 Life Satisfaction by respondents' education levels

Country	Less than upper secondary Mean	Upper secondary Mean	Tertiary Mean
England	6.9	7.3	7.6
OECD average	7.2	7.3	7.6

Source: OECD, PIAAC 2023 database

6.2.4. Social trust and political efficacy

There were 2 questions on social trust and political efficacy which measured how much adults think that most people can be trusted, and whether adults think that the political system allows people to have a say in what government does. Please see Table 84 for an overview of the specific measures of social trust and political efficacy.

As shown in Table 92, the average score for political efficacy for England was 3.3 and for the OECD 3.7. This is rather low compared with a possible maximum score of 10, suggesting that on average, adults did not think that the political system allows people to have a say in what government does. The overall average for social trust in England was 5.1, which is the same as the OECD average (5.1).

In England, men tended to score slightly higher than women on social trust which reflected the pattern observed in the OECD average (Table 92). This suggests that on a whole, women tend to be more careful about trusting other people than men. The average scores for political efficacy were similar for men and women.

Table 92 Social trust and political efficacy by respondents' gender

Variable	Country	Overall Mean	Men Mean	Women Mean
Social trust	England	5.1	5.3	5.0
Social trust	OECD average	5.1	5.2	5.0
Political efficacy	England	3.3	3.4	3.3
Political efficacy	OECD average	3.7	3.7	3.6

Source: OECD, PIAAC 2023 database

Table 93 shows that social trust and political efficacy did not change much with age. Scores of social trust appeared to be slightly higher in the older age-groups. Scores for the variable measuring political efficacy appeared to decrease with age on the whole.

Table 93 Social trust and political efficacy by respondents' age

Age group	Social trust – England Mean	Social trust – OECD average	Political efficacy – England Mean	Political efficacy – OECD average
Aged 16-19	4.6	4.9	3.8	4.2
Aged 20-24	4.9	4.9	3.9	4.3
Aged 25-34	5.0	5.1	3.4	3.8
Aged 35-44	5.3	5.2	3.5	3.6
Aged 45-54	5.3	5.2	3.1	3.5
Aged 55-65	5.2	5.1	3.0	3.4

Source: OECD, PIAAC 2023 database

Social trust also showed notable variation by education level (Table 94). In England, adults with tertiary education reported the highest levels of trusting others (5.8), compared with those with upper secondary education (4.8) and those with less than upper secondary education (4.2). This trend was also consistently seen in the OECD average, where trust in others also increased with higher education levels.

Table 94 Social trust and political efficacy by education levels

Education level	Social trust – England Mean	Social trust– OECD average	Political efficacy – England Mean	Political efficacy – OECD average
Less than upper secondary	4.2	4.5	2.8	3.3
Upper secondary	4.8	4.9	3.3	3.5
Tertiary	5.8	5.7	3.6	4.1

Source: OECD, PIAAC 2023 database

In England, political efficacy similarly reflected an educational divide. Those with tertiary education reported the highest levels of belief in political efficacy (3.6), compared with 3.3 for those with upper secondary education and 2.8 for those with less than upper secondary education. These findings support research that argues for the importance of higher education beyond monetary outcomes, for example, by considering the wider contribution to society and political processes (Mishra, Klein and Müller, 2023).

In conclusion, this chapter has reported on adults' levels of socio-emotional skills in England and across OECD as well as additional non-economic outcomes of self-reported health, life satisfaction, social trust and political efficiency. Findings can help to facilitate a more holistic understanding of outcomes and how well young people and adults deal with non-academic challenges.

7 Characteristics of people with low proficiency in literacy, numeracy or adaptive problem solving

> **Key findings**
>
> - There are 6 characteristics which have significant associations with low proficiency common to all 3 domains: having a low level of education, belonging to particular ethnic groups, being born outside the UK, having parents who have low levels of education, not having computer experience in everyday life and working in certain occupations.
>
> - The characteristics that were most strongly associated with increased likelihood of low proficiency across the 3 domains were having less than secondary school education, being from Black or Asian ethnic groups, being born outside the UK, and having no computer experience. The characteristics most strongly associated with decreased likelihood of low proficiency across all domains was having a professional occupation, and for numeracy, also being educated above secondary school level.
>
> - The characteristics associated with low proficiency are generally very consistent between Cycles 1 and 2. However, health was not found to be significantly associated with proficiency for literacy and only moderately so for numeracy in Cycle 2 and this is a notable difference from Cycle 1 findings.

This chapter explores the socio-demographic characteristics associated with low proficiency in literacy, numeracy or adaptive problem solving for adults in England. It is of social and economic interest to identify which groups in society may need assistance in achieving higher levels of proficiency in skills which are important for participating in society, including employment.

For all domains, adults with low proficiency were those achieving at Level 1 or below Level 1 in the Survey of Adult Skills. A similar regression was carried out with England's data in Cycle 1 (see Wheater *et al.*, 2013, including Appendix G for a comparison of PIAAC literacy and numeracy levels with National Qualification Framework levels).The proportion of adults with low proficiency is shown in Table 95 .

Table 95 Percentage of adults at or below Level 1 proficiency levels in each domain in England and the OECD average

Domain	Country	Below Level 1	At Level 1	Low proficiency
Literacy	England	6%	12%	18%
Literacy	OECD	9%	17%	26%
Numeracy	England	7%	14%	21%
Numeracy	OECD	9%	16%	25%
Adaptive problem solving	England	6%	15%	21%
Adaptive problem solving	OECD	8%	22%	29%

Source: OECD, PIAAC 2023 database

Regression analysis was conducted to determine which socio-demographic characteristics (such as gender, age, ethnicity, education level, employment status) were associated with low proficiency in each domain for adults in England. It is important to remember that our analysis is not causal. Whilst our models control for differences in an extensive range of factors related to low proficiency in literacy, numeracy and problem solving, there are likely to be other unmeasured yet important individual characteristics that are correlated with the measured ones and which may be driving the associations that we present. Moreover, we do not take into account simultaneity. For example, there may be a relationship between employment status and literacy scores. However, we do not know whether it is being in employment that could lead to higher literacy scores, or if it is higher literacy scores that could lead to being in employment, or even whether 1 leads to the other. There could also be some other underlying factor, such as family background, which is significantly associated with both employment status and literacy scores. However, controlling for the effects of a large array of individual differences is likely to mean the conditional relationships we present provide important clues as to where the policy response should focus, as well as what the most promising avenues are for further research.

7.1 Rationale for using regression

A logistic regression approach was used to identify a set of characteristics which are associated with the probability of having low proficiency, while holding other characteristics fixed. Proficiency was collapsed into a binary variable of low versus not low. This was done separately for each domain. The regression approach is preferable to a series of tabulations because, for a given characteristic (for instance, being 1 year older), it estimates the associations between the odds of having low proficiency and that characteristic, after controlling for the effect of other variables. The dependent variable is dichotomous (that is, it has only 2 outcomes: low proficiency or not low proficiency), and hence a logistic regression model was estimated, taking into consideration the plausible

values present in the data as well as the methods appropriate for the Survey of Adult Skills database to correctly estimate the variance. In the following sections, we report the increased or decreased likelihood of low proficiency as a percentage compared with the reference group.

7.2 Variables included in the regression

The variables included in the analysis replicate the variables included in the Cycle 1 analysis with 1 exception: English as an Additional Language (EAL) was not included in the Cycle 2 regression. Having 2 or more independent variables in a regression model that are highly correlated can bias estimates. We found EAL was highly correlated with the variable *being born in the UK or not* and prioritised the inclusion of the latter variable. The following variables were included in the Cycle 2 analysis:

- gender

- age

- level of education

- employment status

- ethnicity

- born in the UK or not

- general health

- disability status

- mother and father's level of education

- computer experience in everyday life

- having children or not

- job industry

- occupation.

Some categories of the job industry variable (for example, *armed forces, skilled agricultural workers*) were collapsed into an unknown/missing category due to very small numbers of cases.

Since industry and occupational level were only measured for employed respondents, we ran 2 sets of regressions for each domain: (a) 1 that included only employed respondents, included the industry and occupational level variables but excluded the

employment status variable and (b) 1 for all respondents regardless of employment status which included the employment status variable but excluded industry and occupational level. The results presented here combine results obtained from these 2 sets of regression models. When we discuss the significance of occupation and industry, we make use of (a) and when we discuss all other variables (such as gender, age, academic level), we make use of (b). Consequently, it is important to be aware that not all covariates were entered into 1 model jointly and thus the statistical control of each model is only partial in reference to the full list of covariates.

We chose not to include measures of social and emotional skills (discussed in Chapter 6). Although social and emotional skills may be related to low attainment, particular scores cannot be used to identify groups of adults, and it is difficult to see how they could be used for policy intervention. In addition, there is a strong body of evidence that socio-emotional and cognitive outcomes are correlated and evolve jointly together over time and hence each should be regarded as an outcome measure itself rather than a predictor.

See Appendix D; for the full list of categories in the logistic regression, with the coefficients and significance tests for each.

7.2.1 Literacy

For adults in England, there are 8 variables that have significant associations with low proficiency in literacy. These are level of education, employment status, ethnicity, country of birth, parental level of education, computer experience, occupation and job industry. Occupation and job industry are discussed together.

Figure 26 Characteristics associated with changes in the probability of achieving Level 1 or below in literacy
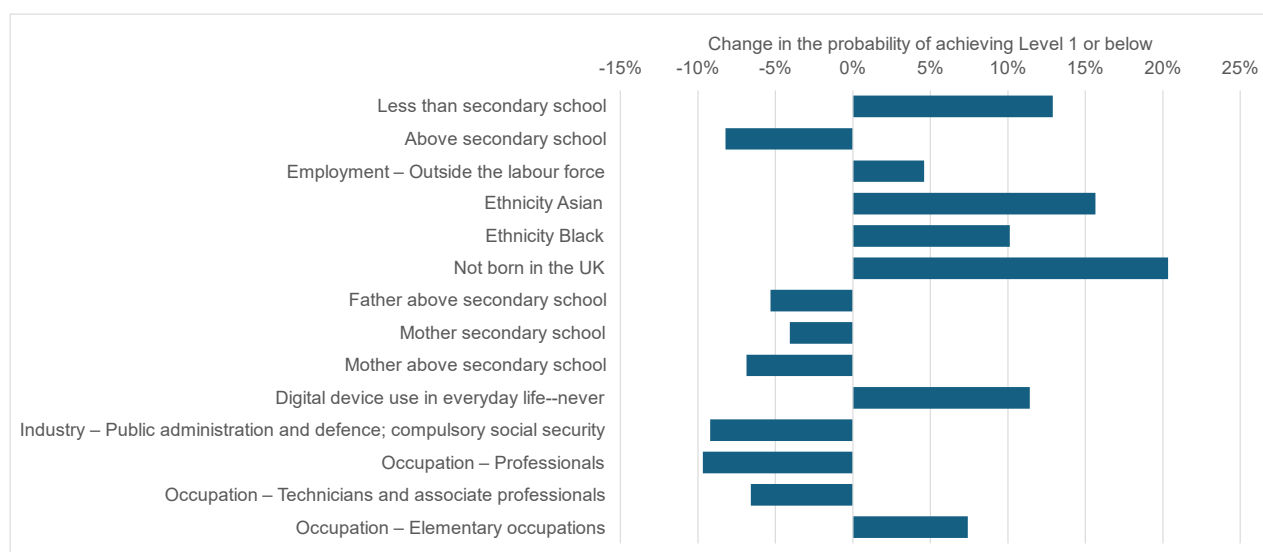
Variable	Change in the probability of achieving Level 1 or below
Less than secondary school education	13%
Above secondary school education	-8%
Employment – Outside the labour force	5%
Ethnicity Asian	16%
Ethnicity Black	10%
Not born in the UK	20%
Father above secondary school education	-5%
Mother secondary school education	-4%
Mother above secondary school education	-7%
Digital device use in everyday life--never	11%
Industry – Public administration and defence; compulsory social security	-9%
Occupation – Professionals	-10%
Occupation – Technicians and associate professionals	-7%
Occupation – Elementary occupations	7%

Level of education (reference category: secondary school)

Compared with those who were educated to secondary school level, adults in England who had an education level of less than secondary school were more likely to have low literacy proficiency (by 13%). Adults whose education level was above secondary school were less likely to have low proficiency in literacy (by 8%); this effect was smaller but still significant.

Employment status (reference category: employed or self-employed)

Adults who were outside the labour force were more likely (by 5%) to have low proficiency in literacy than those who were employed or self-employed.

Ethnicity (reference category: White ethnic group)

Adults from Asian and Black ethnic backgrounds were more likely to have low proficiency in literacy than White adults (by 16% and 10%, respectively).

Born in the UK or not (reference category: born in UK)

Adults who were not born in the UK were more likely (by 20%) to have low proficiency in literacy than adults born in the UK. It is possible that the first language spoken by participants may be a factor in this association as the analysis did not control for language spoken by participants.

Mother and father's level of education (reference category: less than secondary school)

Compared with adults whose level of parental education was less than secondary school, those whose parents completed secondary school education or above were less likely to have low proficiency in literacy skills. Those whose mothers completed secondary school education were 4% less likely to have low proficiency in literacy skills and 7% less likely to have low proficiency if their mother completed above secondary school education. Those whose father completed above secondary school were 5% less likely to have low proficiency in literacy skills. This indicates that lower levels of parental education were associated with lower literacy proficiency.

Computer experience in everyday life (reference category: has computer experience)

Adults in England who had no computer experience in everyday life were more likely to have low proficiency in literacy than those who had computer experience (by 11%).

Job industry and occupation (reference category: services and shop and market sales)

Professionals, technicians and those working in public administration and defence and compulsory social security were less likely than those working in services, shop and market sales to have low proficiency in literacy skills (by 10%, 7% and 9% and respectively). Adults working in elementary occupations were more likely than those working in services, shop and market sales to have low proficiency in literacy skills (by 7%).

Characteristics that had no significant association with low proficiency in literacy

The following characteristics did not have significant associations with either an increased or decreased likelihood of achieving low proficiency in literacy, when compared with the reference category (given in brackets):

- gender (male)

- age (35-44 years)

- general health (very good)

- disability status (no disability)

- having children or not (does not have children).

7.2.2 Numeracy

For adults in England, there are 9 variables that have significant associations with numeracy proficiency at Level 1 or below. These are gender, *level of education, employment status, ethnicity, country of birth, general health, parental level of education, computer experience* and *occupation.*

Figure 27 Characteristics associated with changes in the probability of achieving Level 1 or below in numeracy
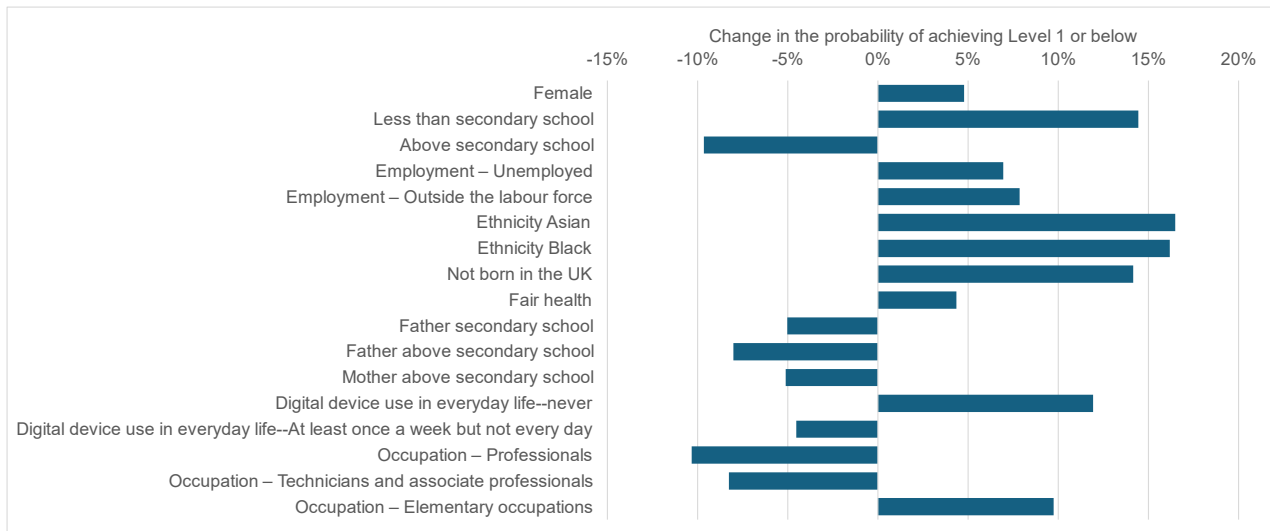
Variable	Change in the probability of achieving Level 1 or below
Female	5%
Less than secondary school education	14%
Above secondary school education	-10%
Employment – Unemployed	7%
Employment – Outside the labour force	8%
Ethnicity Asian	16%
Ethnicity Black	16%
Not born in the UK	14%
Fair health	4%
Father secondary school education	-5%
Father above secondary school education	-8%
Mother above secondary school education	-5%
Digital device use in everyday life--never	12%
Digital device use in everyday life--At least once a week but not every day	-5%
Occupation – Professionals	-10%
Occupation – Technicians and associate professionals	-8%
Occupation – Elementary occupations	10%

Source: OECD, PIAAC 2023 England database

Gender (reference category: male)

Women in England have an increased probability (by 5%) of having low numeracy proficiency compared with men. Numeracy was the only domain for which proficiency was significantly associated with gender.

Level of education (reference category: secondary school)

Compared with those who were educated to secondary school level, adults in England who had an education level of less than secondary school were more likely (by 14%) to have low numeracy proficiency. Correspondingly, adults whose education level was above secondary school were less likely (by 10%) to have low proficiency in numeracy.

Employment status (reference category: employed or self-employed)

Adults who were unemployed or otherwise outside the labour force were more likely (by 7% and 8% respectively) to have low proficiency in numeracy than those who were employed or self-employed.

Ethnicity (reference category: White ethnic group)

Adults from Black and Asian ethnic groups in England were more likely to have low proficiency in numeracy than White adults (by 16% and 16% respectively).

Born in the UK or not (reference category: born in the UK)

Adults who were not born in the UK were more likely (by 14%) to have low proficiency in numeracy than adults born in the UK.

General health (reference category: very good)

Compared with adults who rated their general health as very good, those who rated their health as only fair were more likely to have low numeracy proficiency (by 4%).

Mother and father's level of education (reference category: less than secondary school)

Compared with adults whose level of parental education was less than secondary school, those whose fathers completed secondary school education or above were less likely to have low proficiency in numeracy skills (by 5% and 8%, respectively). This trend also appeared between mother's education level and adult numeracy proficiency, although only at a statistically significant level where the mother's education was above secondary school (reducing the likelihood of low numeracy proficiency by 5%), indicating a slightly stronger influence of fathers' education level.

Computer experience in everyday life (reference category: has computer experience)

Similar to the findings for literacy, adults in England who reported having no computer experience in everyday life were more likely (by 12%) to have low proficiency in numeracy than those who had computer experience. Correspondingly, using computers at least once a week was associated with a slight decreased likelihood of having low proficiency in numeracy (by 5%).

Occupation (reference category: services and shop and market sales)

Adults working in services, shop and market sales were more likely than professionals and technicians to have low proficiency in numeracy (by 10% and 8% respectively). Conversely, adults working in elementary occupations were more likely than adults working in services, shop and market sales to have low numeracy proficiency (by 10%).

Characteristics that had no significant association with low proficiency in numeracy

The following characteristics did not have significant associations with either an increased or decreased probability of achieving Level 1 or below in numeracy, when compared with the reference category (given in brackets):

- age (35-44 years)

- disability status (no disability)

- having children or not (does not have children).

- job industry.

7.2.3 Adaptive problem solving

For adults in England, there are 7 variables that have significant associations with low proficiency in adaptive problem solving. These are *level of education, ethnicity, country of birth, disability status, parental level of education, computer experience* and *occupation*.

Figure 28 Characteristics associated with changes in the probability of achieving Level 1 or below in adaptive problem solving
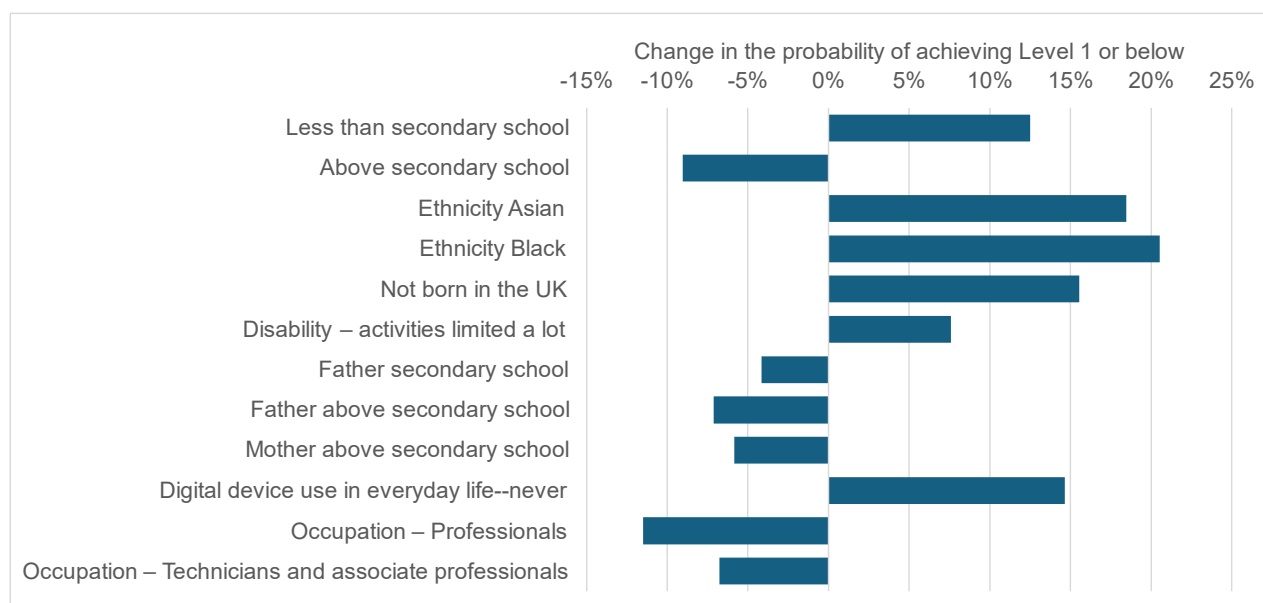
Variable	Change in the probability of achieving Level 1 or below
Less than secondary school education	13%
Above secondary school education	-9%
Ethnicity Asian	18%
Ethnicity Black	21%
Not born in the UK	16%
Disability – activities limited a lot	8%
Father secondary school education	-4%
Father above secondary school education	-7%
Mother above secondary school education	-6%
Digital device use in everyday life--never	15%
Occupation – Professionals	-11%
Occupation – Technicians and associate professionals	-7%

Source: OECD, PIAAC 2023 England database

Level of education (reference category: secondary school)

Compared with those who were educated to secondary school level, adults in England who had an education level of less than secondary school had an increased probability (by 13%) of low proficiency in the problem solving assessment. Correspondingly, adults who were educated above secondary school level had a reduced risk of low proficiency in adaptive problem solving (by 9%). This trend was also found for literacy and numeracy, suggesting lower levels of education are associated with greater risk of low proficiency across domains.

Ethnicity (reference category: White ethnic group)

As for literacy and numeracy, adults from Black and Asian ethnic groups in England were more likely to have low proficiency in adaptive problem solving than White adults (by 21% and 18%, respectively).

Born in the UK or not (reference category: born in the UK)

As for literacy and numeracy, adults who were not born in the UK were more likely (by 16%) to have low proficiency in adaptive problem solving than adults born in the UK.

Disability status (no disability)

Adults with a self-reported disability that limits their activities a lot were more likely (by 8%) to have low proficiency in problem solving than adults with no self-reported disability.

Mother and father's level of education (reference category: less than secondary school)

Adults whose father's level of education was secondary school level or above were less likely (by 4% and 7% respectively) to have low proficiency in adaptive problem solving than adults whose father's level of education was less than secondary school. Similarly, adults whose mother's level of education was above secondary school were less likely (by 6%) to have low proficiency in adaptive problem solving.

Computer experience in everyday life (reference category: has computer experience)

Adults in England who had no computer experience in everyday life were more likely to have low proficiency in problem solving than those who had computer experience (by 15%).

Occupation (reference category: services and shop and market sales)

Adults working in services, shop and market sales were more likely than those working as professionals and technicians to have low proficiency in problem solving (by 11% and 7%, respectively).

Characteristics that had no significant association with low proficiency in problem solving

The following characteristics did not have significant associations with either an increased or decreased probability of low proficiency in adaptive problem solving, when compared with the reference category (given in brackets):

- gender (male)

- age (35-44 years)

- employment status (employed or self-employed)

- general health (very good)

- having children or not (does not have children).

- job industry.

7.3 Conclusions

For all 3 domains, low proficiency is defined as achieving Level 1 or below. By this definition around one fifth of adults in England had low proficiency in each of the 3

domains (21% in adaptive problem solving and numeracy, 18% in literacy). Table 96 summarises the characteristics associated with low proficiency in each of the 3 domains, for adults in England.

Table 96 Characteristics significantly associated with low proficiency in each domain

Literacy	Numeracy	Problem solving
-	Being a woman	-
Lower levels of education	Lower levels of education	Lower levels of education
Employment status - outside the labour force	Employment status – unemployed or otherwise outside the labour force	-
Ethnicity (i.e. Black, Asian)	Ethnicity (i.e. Black, Asian)	Ethnicity (i.e. Black, Asian)
Not born in the UK	Not born in the UK	Not born in the UK
	General health (i.e. fair)	
-	-	Having a disability that limits activities 'a lot'
Lower parental level of education (i.e. father and mother)	Lower parental level of education (i.e. father and mother)	Lower parental level of education (i.e. father and mother)
No computer experience in everyday life	No computer experience in everyday life	No computer experience in everyday life
Occupation (i.e. services, shop and market sales, elementary occupations)	Occupation (i.e. services, shop and market sales, elementary occupations)	Occupation (i.e. services, shop and market sales)

There are 6 characteristics which have significant associations with low proficiency common to all 3 domains. The results from the regression indicate that the characteristics most likely to predict low proficiency across all 3 domains are having a low level of education, belonging to particular ethnic groups, being born outside of the UK, having parents who have low levels of education, not having computer experience in everyday life and working in certain occupations.

Characteristics that are particularly strongly associated with low proficiency are those that increase or decrease the probability of low proficiency by 10% or more. The characteristics that were most strongly associated with having low proficiency across the 3 domains were *having less than secondary school education, being Black or Asian, being born outside the UK,* and *having no computer experience*. Having a professional occupation was strongly associated with a decreased likelihood of low proficiency across

all domains, as was being educated above secondary level for numeracy proficiency. It is not possible to infer causation from the logistic regression; we can only identify an association between characteristics and low proficiency.

The socio-demographic characteristics associated with low proficiency in literacy and numeracy in Cycle 2 are largely consistent with those in Cycle 1. Notable differences were associations between low proficiency in literacy and the following characteristics in Cycle 2 which were not significant in Cycle 1: *employment status and born in the UK or not*. In Cycle 2 we found only 1 significant but small effect of general health (fair as opposed to very good) on low proficiency in numeracy but not for literacy, which is contrary to significant associations found for both domains in Cycle 1. Hence, general health appears to have become a slightly less important factor in influencing low performance in literacy and numeracy over the last 10 years. However, the regression was carried out differently in Cycle 1 and no statistical comparisons have been undertaken, so any changes should be regarded with caution.

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Appendix A

This appendix gives further details on the design and administration of Cycle 2 of the Survey of Adult Skills in England. Additional information is available in the 2023 Survey of Adult Skills international report (OECD, forthcoming a), and the Technical Report of the Survey of Adult Skills 2023 (OECD, forthcoming c).

A1 Survey design overview

The survey aimed to interview a representative sample of non-institutionalised adults between the ages of 16 and 65 who reside in England. Even though many adults above 65 years of age remain in work, this age range was specified by the international consortium as the workforce population and follows previous practice in PIAAC Cycle 1 and other similar types of household survey.

The survey was completed using a CAPI (Computer Assisted Personal Interviewing) methodology, whereby interviewers visited the sampled addresses and administered the respondent selection and interview processes in person. Interviews were typically conducted in the respondent's home but could also be completed in other suitable locations where it was possible for the interview to be completed without undue distraction.

At each selected address, 1 eligible respondent was randomly selected to participate. Each respondent was asked to provide a range of details about themselves and their households, and to complete a set of cognitive assessments. In contrast to Cycle 1, where respondents were given the option to complete the assessments using paper booklets, all cognitive assessments in Cycle 2 were administered using a touchscreen tablet computer.

A field trial was conducted ahead of the main survey. The primary purpose of the field trial was to test the design and processes that were planned for the main survey. An incentive experiment was also carried out during the field trial in England – this aimed to provide data on the impact of different levels of incentivisation on response rates.

A2 Data collection

Timings for the field trial and main survey were delayed by a year as a result of the Covid-19 pandemic. This means that there is an 11-year span (rather than the planned 10-year span) in the data for England collected in Cycles 1 and 2 of the survey.

The field trial data collection period for England ran from August to November 2021.

The main data collection period for England ran from September 2022 to June 2023.

The survey was administered using a laptop computer that could be flipped into a tablet configuration. Interviewers entered answers into the machine using the laptop keyboard for any interviewer-administered sections. For any self-completion sections, respondents worked with the machine in its tablet configuration and answers were entered using a touchscreen interface rather than the keyboard.

The interview consisted of several sections, as follows:

- Screening and respondent selection

  - The interviewer selects a household for participation, identifies whether there are any eligible persons in that household and, if so, selects 1 of those persons at random.

- Case initialisation

  - The interviewer confirms basic details about the selected respondent which were collected during the screening.

- Doorstep interview

  - If the respondent does not speak English and a household translator is not available, the respondent self-completes a short questionnaire in their preferred language, collecting basic information about their demographics, qualifications and migration background.

- Background questionnaire

  - The interviewer collects detailed information about the respondent's personal characteristics, education and training, current status and work history, skills use, working environment, background, and social and emotional skills.

- Tablet tutorial

  - The respondent works through a tutorial showing them how to input answers using the touchscreen interface on the survey tablet. The interviewer supports them as necessary if they have questions.

- Locator

  - The respondent self-completes 8 literacy and 8 numeracy questions. These determine the skill level of the respondent, which then impacts on the route the respondent takes through the remaining sections (and the difficulty of those sections).

- Components

  - The respondent self-completes basic questions on literacy and numeracy.

- Main assessment

    - The respondent self-completes a longer sequence of assessment items in 2 of the 3 domains (literacy, numeracy and adaptive problem solving).

- Effort and performance

    - The respondent self-assesses the amount of effort they put into the assessment and their performance in the assessment.

More information is available in the Technical Report of the Survey of Adult Skills 2023 (OECD, forthcomingc).

A3 Field trial

The field trial was conducted in highly challenging circumstances as fieldwork in England was carried out between August and November 2021. Although Covid-19 restrictions in England had been lifted at this time, infection rates remained high throughout the fieldwork period. Shortly after fieldwork was completed, the Omicron variant began to spread rapidly, and some restrictions were reintroduced in December 2021.

It was necessary to implement safety protocols relating to Covid-19. These included:

- Screening to ensure that neither interviewers nor responding households were showing signs of infection

- Mask wearing

- Requesting windows be opened to improve ventilation

- Sanitising hands and equipment

- Social distancing

- Reducing the amount of survey materials passed between interviewers and respondents

- Taking a break outside halfway through the interview

- Delivering interviewer training online rather than in person

It proved impossible to complete the full target of 1,500 field trial interviews in the time available. Nevertheless, the achieved sample of 978 was sufficient to address the main aims of the field trial.

The overall response rate for the field trial was 33.5% and the incentive experiment suggested that a £50 incentive yielded a significantly higher response rate than a £30 incentive.

A4 Sample design

The key OECD requirements for each country sample were as follows:

- a high-quality probability sample representing the adult non-institutional civilian population aged 16 to 65 years;[14]

- an achieved country sample in the main survey of 5,000[15];

- and an achieved country sample in the field trial of at least 1,500.

As described in Section A3, the Covid-19 pandemic meant that it was not possible for most participating countries to achieve the target field trial sample of 1,500.

Global declines in face-to-face survey response rates following the pandemic also impacted on the number of achieved main survey interviews for many countries. Following analysis of assessment item-level response, the OECD agreed that the minimum main survey sample for each country could be reduced to 75% of the original target. For England this meant that the final minimum target sample size for the main survey was reduced to 3,750.

A4.1 Sample frame

The filtered version of the November 2021 edition of the Postcode Address File (PAF) was used as the sample frame. PAF is a database owned by the Royal Mail which contains all known postal delivery points in the United Kingdom. The filtered version (the Small User File) excludes almost all business addresses, while retaining almost all residential addresses, thereby covering more than 98% of the non-institutional adult population.

The PAF is structured hierarchically, is available in electronic form and can be linked to Census and other local area data. It therefore allowed considerable control over the sampling process. Medium layer super output areas (MSOAs), as defined in 2011, were used as Primary Sampling Units (PSUs). These PSUs have an average of around 3,600 addresses, which provides a good compromise between the need for an economic sample design and the need to limit cluster effects. The PSUs were stratified by (i) region

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[14] The target population excludes adults in institutional collective dwelling units (or group quarters) such as prisons, hospitals and nursing homes, as well as adults residing in military barracks and military bases. Collective dwelling units were defined as ones in which unrelated residents live in a communal arrangement or in a building that is of an institutional or commercial nature. It is a building where the occupants live collectively for disciplinary, health, custodial work or other reasons.
[15] A smaller minimum sample size was permitted for countries adopting alternative sampling methods.

and (ii) deciles of the 2011 proportion of those aged 16+ with a degree-level qualification. Within each stratum, a systematic sample of MSOAs was sampled (MSOAs were sorted by local authority and then by the geographic coordinates of the centroid point to ensure sufficient geographic dispersion within each stratum).

A4.2 Summary of the sample design

The main sample design was a conventional multi-stage clustered sample design, whereby the MSOAs were sampled with probability proportional to a size measure (the number of addresses in the sample frame). Given uncertainties around post-pandemic response rates, reserve PSUs were included in the sampling process and a total of 598 PSUs were drawn. Of those 598 sampled PSUs, 558 were issued into the field.

A sample of 39 or 40 addresses was selected within each PSU. At each address, 1 household was randomly selected where more than 1 was present. At each household, 1 individual aged 16-65 was randomly selected from among those resident in the household.

Again, due to the uncertainty around post-pandemic response rates, the main survey sample was issued in 4 batches. These were sized with a view to ensuring that close to the original target of 5,000 interviews was achieved, while also ensuring that response rates were not unnecessarily lowered through the issuing of too many addresses. Response rates from each batch were used to determine the size of each subsequent batch.

In total, 22,297 addresses were issued to interviewers. From these, 4,941 valid interviews were achieved (compared with the original target of 5,000 interviews and the reduced minimum target of 3,750).

A5 Sampling in the field

The sample design required a response from 1 adult aged 16-65 at each sampled address. When an interviewer found that there was more than 1 household at an address, the interviewer would record an identifier for each household on their survey laptop (e.g. 'Flat A', 'Flat B') and the survey software would randomly select 1 of those recorded households for interview.

The interviewer also collected and recorded details about the number of people of different ages within the selected household. The interviewer recorded an identifier for each eligible household member aged 16-65 (typically their first name) and the survey software randomly selected 1 of those people for interview. Any household member aged 16-65 who was away at boarding school, college or university, and living in a hall of residence or school, and likely to return home for at least a week during the interviewer's assignment period, was considered to be resident for the purposes of the selection.

Further information about survey administration is included in Chapter 1 (section 1.8) of the main report.

A6 Response to the survey

The overall response rate for the main survey was calculated as a product of the response rates for the screener questionnaire (53.7%), the background questionnaire (71.7%) and the assessment (99.3%). As such, the overall main survey response rate for England was 38.2% (and 38.7% per cent coverage). Reflecting the post-pandemic declines in response rates, which impacted on most participating countries, this was lower than the 50% response rate expected when the survey was commissioned in 2018.

In particular, it was found that refusals tended to come more quickly in the interview process than would have been expected pre-pandemic (that is, the screener response was lower than anticipated).

The causes of declining response rates are still being investigated, but it appears likely that multiple factors are involved. These may include (but are not limited to):

- Declining trust in government and institutions

- Growing concern about 'scams'

- Changes in working practices

- Social isolation during the pandemic resulting in lower comfort with social interactions

- Health concerns

- Wider prevalence of video doorbells which allow householders to vet visitors without speaking to them

- Societal trends towards valuing opinion over fact

- Some experienced interviewers leaving the profession

- A growing habituation to virtual rather than in-person interactions

In spite of this lower response rate, the England data were approved for inclusion in the international comparisons with a middle-level cautionary note (based on detailed non-response bias analysis). England's data has been adjudicated by OECD as of suitable quality to be reported and included in international averages. More information is available in the technical report (OECD, forthcoming c).

Table 97 shows the response rate for all participating countries and outcome of the extended non-response bias analysis conducted by OECD. The table is ordered by the outcome of the bias analysis and the country response rate.

Table 97 Response rates for participating countries

Country	Response rate	Outcome of the non-response bias analysis
Korea	73%	Not applicable
Slovak Republic	70%	Pass
Singapore	62%	Pass
Israel	61%	Pass
Spain	61%	Pass
Estonia	50%	Pass
France	55%	Pass
Hungary	59%	Low caution
Poland	57%	Low caution
Chile	56%	Low caution
New Zealand	48%	Low caution
Ireland	47%	Low caution
Germany	45%	Low caution
Lithuania	44%	Low caution
Norway	41%	Low caution
Czechia	40%	Low caution
Austria	39%	Low caution
Finland	34%	Low caution
Sweden	31%	Low caution
Denmark	27%	Low caution
Japan	41%	Medium caution
Netherlands	40%	Medium caution
Portugal	39%	Medium caution
England	**38%**	**Medium caution**
Croatia	36%	Medium caution
Flemish Community (Belgium)	35%	Medium caution
Switzerland	30%	Medium caution

| Country	Response rate	Outcome of the non-response bias analysis
United States	28%	Medium caution
Canada	28%	Medium caution
Italy	29%	High caution
Latvia	28%	High caution

Note: The extended non-response rate bias analysis (NRBA) was not required for countries with response rates above 70%. For this reason, results of the NRBA are not available for Korea. The extended NRBA was conducted for the Slovak Republic, despite a response rate of 70%, because the country did not fully meet the sampling standards.

Source: OECD Cycle 2 technical report (OECD, 2024a)

A7 Assessment design

As described in Section A2, the interview comprises several sections. Figure 29 shows the overall design of the International Survey of Adult Skills assessment and demonstrates how respondents were routed through the assessment based on their ability.

Figure 29 Survey of Adult Skills assessment design
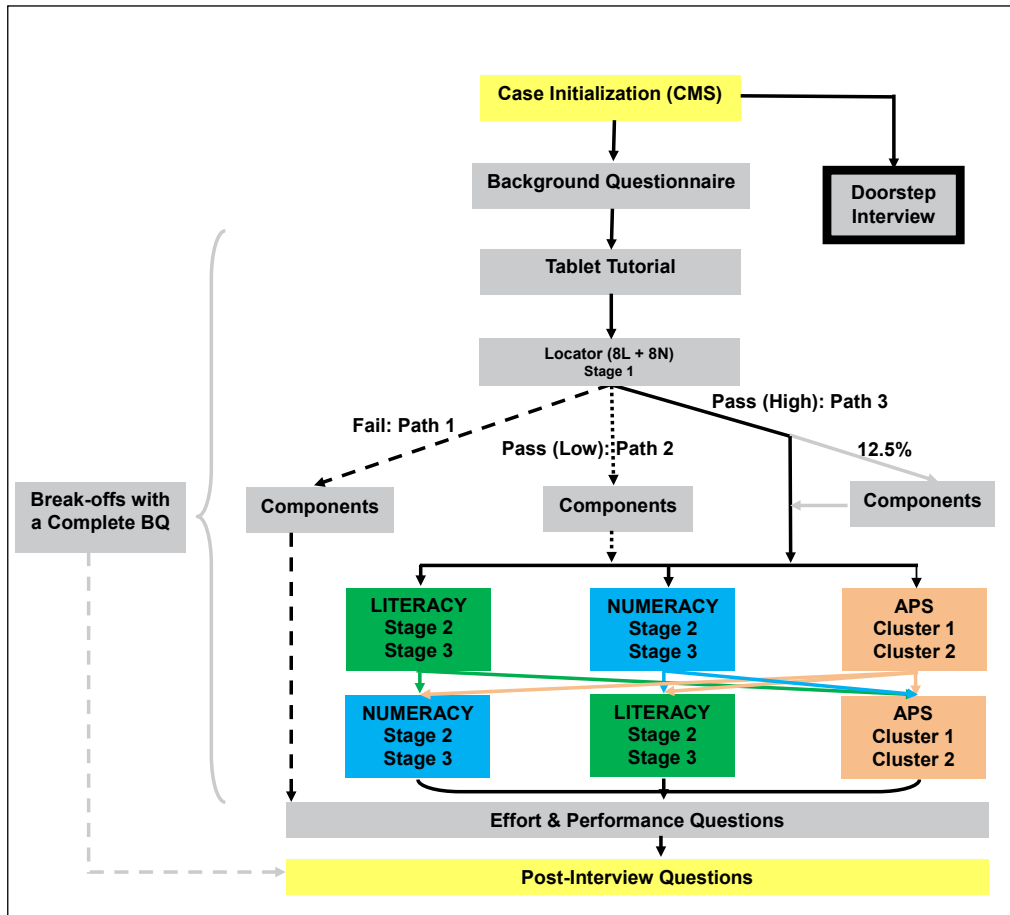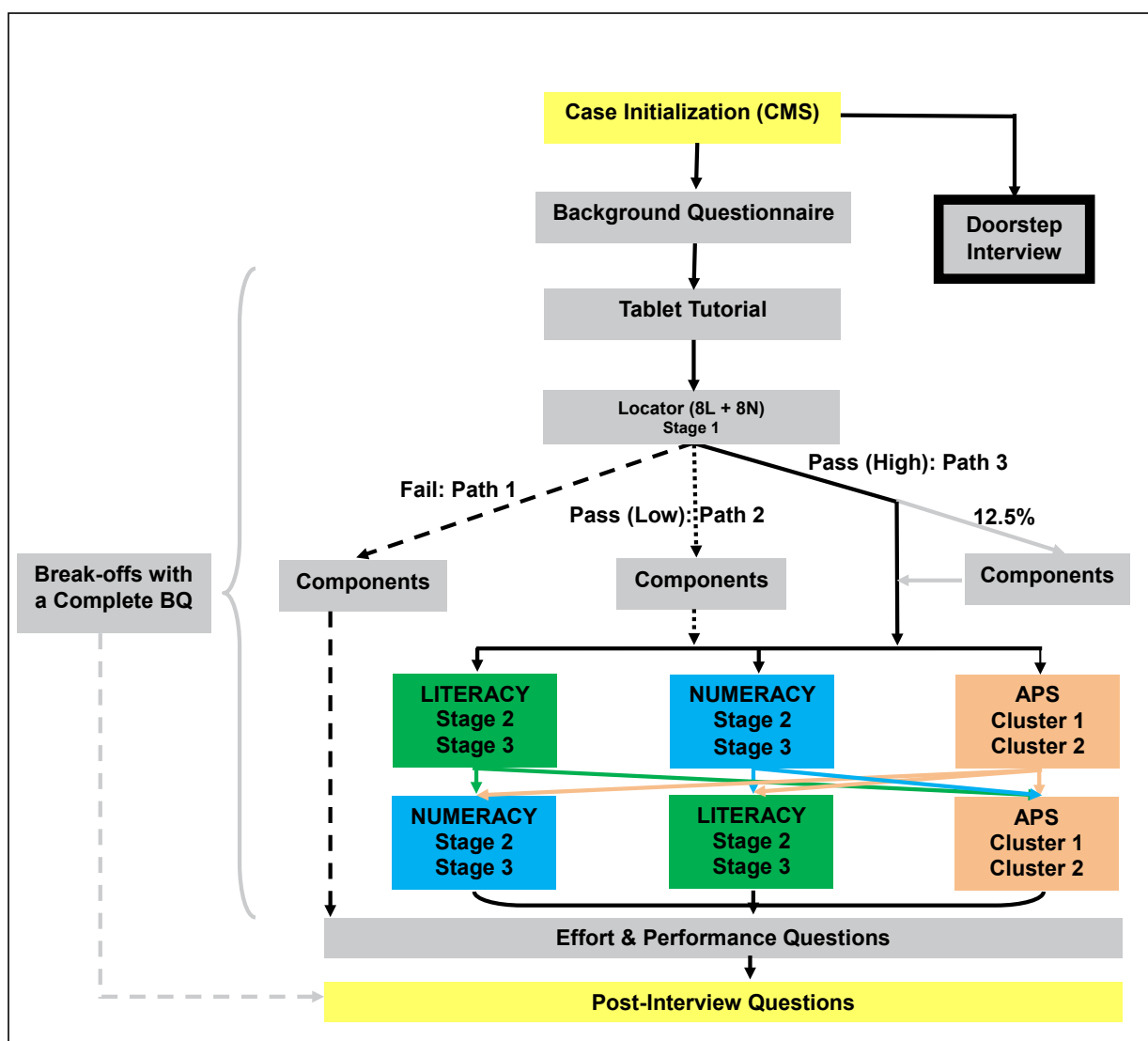
Those who failed the locator section were routed to the components section which consisted of low-level questions relating to literacy and numeracy (and these respondents were not asked to complete the more challenging 'main' assessment section). Those who passed the locator section with a low score were asked to complete both the basic components section and the more challenging main assessment section. Those who passed the locator section with a high score generally skipped the components section and were only asked to complete the main section[16].

The main assessment section covered 3 domains – literacy, numeracy and adaptive problem solving. Each respondent who completed the main assessment section was asked questions relating to only 2 of the 3 domains. The selection of domains for each respondent was conducted randomly by the survey software.

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[16] A minority (12.5%) of those who achieved a high passing score in the locator section were asked to complete the components section as well as the main section. This process was handled randomly within the interviewing software and was necessary for the assessment scaling process.

All assessment items were automatically scored by the survey software.

More information is available in the technical report (OECD, forthcoming c).

A8 Weighting and imputation

A8.1 Plausible values

In the Survey of Adult Skills, the computation of group-level reporting statistics is based on 10 independently drawn plausible values for each of them. Plausible values are based on information from the test items (the literacy, numeracy, and adaptive problem solving assessments) and information provided by the respondent in the background questionnaire or doorstep interview. Full details are available in the technical report (OECD, forthcoming c).

A8.2 Weighting

Sampling weights were applied to the data to account for differential sampling rates, differential response rates and undercoverage. These were calibrated to population control totals and ensure that the estimates represent each country's target population and reduce the potential for bias due to nonresponse.

Replicate weights were also created to capture the variation due to the sample design and selection, as well as weighting adjustments. The replicate weights also account for measurement error through the processing of plausible values for the assessments.

Weighting targets for the England data were drawn from the Census 2021 and the Annual Population Survey 2022.

Sampling weights were applied to the following dimensions:

- Age interlocked with sex (20 categories)

- Region (9 categories)

- Whether hold Level 6+ qualifications, crossed by age group (10 categories)

- Economic activity status (5 categories)

- Ethnic group (7 categories)

- Whether born in UK (2 categories)

The weighting of the data was conducted by Westat.

A9 Proficiency levels

Table 98 Literacy proficiency levels

Level	What adults can do at this level
Below Level 1 (0 to 175 points)	Most adults at Below Level 1 are able to process meaning at the sentence level. Given a series of sentences that increase in complexity, they can tell if a sentence does or does not make sense either in terms of plausibility in the real world (i.e. sentences describing events that can vs. cannot happen), or in terms of the internal logic of the sentence (i.e. sentences that are meaningful vs. not). Most adults at this level are also able to read short, simple paragraphs and, at certain points in text, tell which word among 2 makes the sentence meaningful and consistent with the rest of the passage. Finally, they can access single words or numbers in very short texts in order to answer simple and explicit questions. The texts at Below Level 1 are very short and include no or just a few familiar structuring devices such as titles or paragraph headers. They do not include any distracting information or navigation devices specific to digital texts (e.g., menus, links or tabs). Tasks Below Level 1 are simple and very explicit regarding what to do and how to do it. These tasks only require understanding at the sentence level or across 2 simple adjacent sentences. When the text involves more than 1 sentence, the task merely requires dealing with target information in the form of a single word or phrase.
Level 1 (176 to 225 points)	Adults at Level 1 are able to locate information on a text page, find a relevant link from a website, and identify relevant text among multiple options when the relevant information is explicitly cued. They can understand the meaning of short texts, as well as the organisation of lists or multiple sections within a single page. The texts at Level 1 may be continuous, noncontinuous, or mixed and pertain to printed or digital environments. They typically include a single page with up to a few hundred words and little or no distracting information. Noncontinuous texts may have a list structure (such as a web search engine results page) or include a small number of independent sections, possibly with pictorial illustrations or simple diagrams. Tasks at Level 1 involve simple questions providing some guidance as to what needs to be done and a single processing step. There is a direct, fairly obvious match between the question and target information in the text, although some tasks may require the examination of more than 1 piece of information.

Level	What adults can do at this level
Level 2 (226 to 275 points)	At Level 2, adults are able to access and understand information in longer texts with some distracting information. They can navigate within simple multi-page digital texts to access and identify target information from various parts of the text. They can understand by paraphrasing or making inferences, based on single or adjacent pieces of information. Adults at Level 2 can consider more than 1 criterion or constraint in selecting or generating a response. The texts at this level can include multiple paragraphs distributed over 1 long or a few short pages, including simple websites. Noncontinuous texts may feature a 2-dimension table or a simple flow diagram. Access to target information may require the use of signalling or navigation devices typical of longer print or digital texts. The texts may include some distracting information. Tasks and texts at this level sometimes deal with specific, possibly unfamiliar situations. Tasks require respondents to perform indirect matches between the text and content information, sometimes based on lengthy instructions. Some tasks statements provide little guidance regarding how to perform the task. Task achievement often requires the test taker to either reason about 1 piece of information or to gather information across multiple processing cycles.
Level 3 (276 to 325 points)	Adults at Level 3 are able to construct meaning across larger chunks of text or perform multi-step operations in order to identify and formulate responses. They can identify, interpret or evaluate 1 or more pieces of information, often employing varying levels of inferencing. They can combine various processes (accessing, understanding and evaluating) if required by the task. Adults at this level can compare and evaluate multiple pieces of information from the text(s) based on their relevance or credibility. Texts at this level are often dense or lengthy, including continuous, noncontinuous and mixed texts. Information may be distributed across multiple pages, sometimes arising from multiple sources that provide discrepant information. Understanding rhetorical structures and text signals becomes more central to successfully completing tasks, especially when dealing with complex digital texts that require navigation. The texts may include specific, possibly unfamiliar vocabulary and argumentative structures. Competing information is often present and sometimes salient, though no more than the target information. Tasks require the respondent to identify, interpret, or evaluate 1 or more pieces of information, and often require varying levels of inferencing. Tasks at Level 3 also often demand that the respondent disregard irrelevant or inappropriate text content to answer accurately. The most complex tasks at this level include lengthy or complex questions requiring the identification of multiple criteria, without clear guidance regarding what has to be done.

Level	What adults can do at this level
Level 4 (326 to 375 points)	At Level 4, adults can read long and dense texts presented on multiple pages in order to complete tasks that involve access, understanding, evaluation and reflection about the text(s) contents and sources across multiple processing cycles. Adults at this level can infer what the task is asking based on complex or implicit statements. Successful task completion often requires the production of knowledge-based inferences. Texts and tasks at Level 4 may deal with abstract and unfamiliar situations. They often feature both lengthy contents and a large amount of distracting information, which is sometimes as prominent as the information required to complete the task. At this level, adults are able to reason based on intrinsically complex questions that share only indirect matches with the text contents, and/or require taking into consideration several pieces of information dispersed throughout the materials. Tasks may require evaluating subtle evidence claims or persuasive discourse relationships. Conditional information is frequently present in tasks at this level and must be taken into consideration by the respondent. Response modes may involve assessing or sorting complex assertions.
Level 5 (376 to 500 points)	At Level 5, the assessment provides no direct information on what adults can do. This is mostly because feasibility concerns (especially with respect to testing time) precluded the inclusion of highly complex tasks involving complex interrelated goal structures, very long or complex document sets, or advanced access devices such as intact catalogues, deep menu structures or search engines. These tasks, however, form part of the construct of literacy in today's world, and future assessments aiming at a better coverage of the upper end of the proficiency scale may seek to include testing units drawing on literacy skills at Level 5. From the characteristics of the most difficult tasks at Level 4, some suggestions regarding what constitutes proficiency at Level 5 may be offered. Adults at Level 5 may be able to reason about the task itself, setting up reading goals based on complex and implicit requests. They can presumably search for and integrate information across multiple, dense texts containing distracting information in prominent positions. They are able to construct syntheses of similar and contrasting ideas or points of view; or evaluate evidence-based arguments and the reliability of unfamiliar information sources. Tasks at Level 5 may also require the application and evaluation of abstract ideas and relationships. Evaluating reliability of evidentiary sources and selecting not just topically relevant but also trustworthy information may be key to achievement.

Table 99 Numeracy proficiency levels

Level	What adults can do at this level
Below Level 1 (0 to 175 points)	Adults performing Below Level 1 demonstrate elementary whole number sense and can access and use mathematical knowledge to solve single-step problems, where the information is presented using images or simple structured information set in authentic, commonplace contexts with little or no text or distracting information. The mathematical content is non-formal and explicit. Adults at this level can: • count up to 20 objects that are displayed with varying degrees of organisation (i.e. randomly arranged, separated into groups, or in an array) • sort events by chronological order • compare unordered lists of numbers to identify the largest number based on the whole-number component • locate data directly from a graph perform addition and subtraction with small whole numbers.
Level 1 (176 to 225 points)	Adults at Level 1 demonstrate number sense involving whole numbers, decimals, and common fractions and percentages. They can access, act on and use mathematical information located in slightly more complex representations set in authentic contexts where the mathematical content is explicit and uses informal mathematical terminology with little text and minimal distracting information. They can devise simple strategies using 1 or 2 steps to determine the solution. Adults at this level can: • interpret simple spatial representations or a scale on a map • identify and extract information from a table or graphical representation or complete a simple whole-number bar chart • identify the largest value in an unordered list, including comparing the decimal part of the number interpret and perform basic arithmetic operations, including multiplication and division, with whole numbers, money, and common whole number percentages, such as 25% and 50%.

Level	What adults can do at this level
Level 2 (226 to 275 points)	Adults at Level 2 can access, act on and use mathematical information, and evaluate simple claims, in tasks set in a variety of authentic contexts. They are able to interpret and use information presented in slightly more complex forms (e.g. 'doughnut' charts, stacked bar graphs or linear scales) that include more formal terminology and more distracting information. Adults at this level can carry out multi-step mathematical processes. Adults at this level can: • use dynamic applications to perform simple measurements, and access and sort data given in tables or interactive charts • apply simple proportional reasoning or solve problems satisfying up to 2 conditions • formulate processes and expressions to represent situations mathematically, including combining and linking information • use mathematical reasoning when reviewing and evaluating the validity of statements • estimate or perform calculations involving fractions, decimals, time, measurements, and less common percentages or perform routine algorithms such as that used to generate the mean • substitute into and evaluate contexts involving authentic algebraic formulas identify patterns within 2-dimensional geometric representations.
Level 3 (276 to 325 points)	Adults at Level 3 can access, act on, use, reflect on and evaluate authentic mathematical contexts. This requires making judgements about how to use the given information when developing a solution to a problem. The mathematical information may be less explicit, embedded in contexts that are not always commonplace, and use representations and terminology that are more formal and involve greater complexity. Adults at this level can complete tasks where mathematical processes require the application of 2 or more steps and where multiple conditions need to be satisfied. Tasks may also require the use, integration or manipulation of multiple data sources in order to undertake the mathematical analyses necessary for the specific task. Adults at this level can:

Level	What adults can do at this level
	• estimate or perform calculations with a wide range of whole numbers, decimals, percentages, fractions, and measurements, including the application of proportional reasoning • determine a missing value from a data set given the mean • recognise and use patterns (visual and numerical) to estimate values • reflect on and use mathematical reasoning when reviewing and evaluating the validity of conclusions drawn from data, including a limited set of related conditions or statements • evaluate claims and stated relationships using a variety of data sources • recognise a formulation using non-standard notation use spatial-visualisation ability to analyse figures, including moving from 3- to 2- dimensional representations.
Level 4 (326 to 375 points)	Adults at Level 4 can use and apply a range of problem solving strategies to access, analyse, reason, and critically reflect on and evaluate a broad range of mathematical information that is often presented in unfamiliar contexts. Such information may not be presented in an explicit manner. Adults at this level can devise and implement strategies to solve multi-step problems. This may involve reasoning about how to integrate concepts from different mathematical content areas or applying more complex and formal mathematical procedures. Adults at this level can: • calculate and interpret rates and ratios • devise a strategy to compare large data sets • read and interpret multi-variate data presented in a single graph • analyse complex, authentic algebraic formulae to understand relationships between variables • reflect and reason mathematically to review and evaluate the validity of statistical or mathematical conclusions, claims or arguments while accommodating relevant conditions
Level	What adults can do at this level

Level	What adults can do at this level
	formulate a problem so that the result will be at the required level of specificity to the context of the situation.
Level 5 (376 to 500 points)	Adults at Level 5 can use and apply problem solving strategies to analyse, evaluate, reason and critically reflect on complex and formal mathematical information, including dynamic representations. They demonstrate an understanding of statistical concepts and can critically reflect on whether a data set can be used to support or refute a claim. Adults at this level can determine the most appropriate graphical representation for relational data sets.

Table 100 Adaptive problem solving proficiency levels

Level	What adults can do at this level
Below Level 1 (0 to 175 points)	Adults at this level understand very simple static problems situated within a clearly structured environment. Problems contain no invisible elements, no irrelevant information that might distract from the core of the problem, and typically only require a single step solution. Adults at this proficiency level are able to engage in basic cognitive processes required to solve problems if explicit support is given and if they are prompted to do so.
Level 1 (176 to 225 points)	Adults at this level are able to understand simple problems and develop and implement solutions to solve them. Problems contain a limited number of elements and little to no irrelevant information. Solutions at this level are simple and consist of a limited number of steps. Problems are embedded in a context that includes 1 or 2 sources of information and presents a single, explicitly defined goal. Adults at Level 1 engage in the following cognitive processes: • develop mental models of simple and clearly structured problems • understand connections between tasks and stimuli that are explicit and embedded in a well-structured environment solve problems that do not change and thereby do not require adaptivity.
Level 2 (226 to 275 points)	Adults at this level can identify and apply solutions that consist of several steps in problems that require considering 1 target variable to judge whether the problem has been solved. In dynamic problems that exhibit change, adults at this level can identify relevant information if they are prompted to specific aspects of the change or if changes are transparent, occur only 1 at a time, relate to a single problem feature, and are easily accessible. Problems at this level are presented in well-structured environments and contain only a few information elements with direct relevance to the problem. Minor impasses may be introduced but these can be resolved easily by adjusting the initial problem solving procedure. Adults at Level 2 engage in the following cognitive processes: • develop mental models for simple to moderately difficult problems and adapt these as needed, adequately react to changes that are presented in visible increments • adapt resolution strategies to changes in the problem statement and the environment if these changes are of low or moderate cognitive complexity. Adults at this level engage in the following metacognitive processes:

Level	What adults can do at this level
	• monitor progress towards a solution that consists of 1 specific goal
	• search for optimal solutions by evaluating alternative solution paths within a given problem environment of low to moderate complexity
	reflect on the chosen solution strategy if an impasse occurs and when explicitly prompted to adapt.
Level 3 (276 to 325 points)	Adults at this level understand problems that are either more complex static problems or problems that have an average to high level of dynamics. They can solve problems with multiple constraints or problems that require the attainment of several goals in parallel. In problems that change and require adaptivity, adults deal with frequent and, to some extent, continuous changes. They discriminate between changes that are relevant and those that are less relevant or unrelated to the problem.
	Adults at this level can identify and apply multi-step solutions that integrate several important variables simultaneously and consider the impact of several problem elements on each other. In dynamically changing problems, they predict future developments in the problem situation based on information collected from past developments. They adapt their behaviour according to the predicted change.
	Adults at Level 3 engage in the following cognitive processes:
	• generate mental models for moderately to highly complex problems
	• actively search for solutions by continuously evaluating the information provided in the problem environment
	• distinguish between relevant and irrelevant information.
	Adults at this level engage in the following metacognitive processes:
	• monitor comprehension of the problem and the changes in the problem
	• monitor and evaluate progress towards the goal of the problem
	• search for solutions by setting sub-goals and evaluating alternative solutions to the problem
	reflect on their approach to solving the problem and, if necessary, revise their strategy.
Level 4 (326 to 500 points)	Adults at this level are able to define the nature of problems in ill-structured and information-rich contexts. They integrate multiple sources of information and their interactions, identify and disregard irrelevant information, and formulate relevant cues.
	Adults identify and apply multi-step solutions towards 1 or more complex goals. They adapt the problem-solving process to changes even if these

Level	What adults can do at this level
	changes are not obvious, occur unexpectedly, or require a major re-evaluation of the problem. Adults are able to distinguish between relevant and irrelevant changes, predict future developments of the problem situation, and consider multiple criteria simultaneously to judge whether the solution process is likely to lead to success.
	Adults at Level 4 engage in the following cognitive processes:
	• develop complex mental models of problems by integrating information from multiple sources
	• establish connections between tasks and stimuli even if these connections are difficult to detect or contain complex interactions
	• develop strategies to reach several goals in parallel and implement multi-step solutions, and continuously update their mental model, search strategies, and solutions during problem solving.
	Adults at this level engage in the following metacognitive processes:
	• continuously reflect and monitor the problem-solving process even if the environment is complex and changes unexpectedly
	• constantly revisit and reevaluate their mental model, the available information, and goal attainment
	• show adequate and immediate reactions to change
	cope with frequent and unpredictable change and adapt their solution strategy accordingly.

Source: OECD international report (OECD, forthcominga)

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