GESIS Leibniz Institute for the Social Sciences

PIAAC

Funded by:
Federal Ministry for Education, Family Affairs, Senior Citizens, Women and Youth

Meet the Experts @GESIS

Meet the Experts - GESIS online talks

Introducing the Scientific Use File for PIAAC 2023 Germany

Leibniz Association

November 20, 2025

Anouk Zabal, Natascha Massing & Silke Martin

Presenters/authors

Anouk Zabal

- National Project Manager PIAAC Cycle 2 Germany
- Survey methodology, international large-scale assessments, translation of measurement instruments
- Contact: anouk.zabal@gesis.org

Natascha Massing

- Lead for background questionnaire, National Project Management PIAAC Cycle 2 Germany
- International large-scale assessments, adaptation of questionnaires, education & training
- Contact: natascha.massing@gesis.org

Silke Martin

- Data and Sampling Manager PIAAC Cycle 2 Germany
- Survey methodology, international large-scale surveys
- Contact: silke.martin@gesis.org

GESIS Leibniz Institute for the Social Sciences

Part 1. Introduction to PIAAC (Anouk Zabal)

Part 2. The PIAAC Background Questionnaire (Natascha Massing)

Part 3. The data set, available tools, accompanying documentation (Silke Martin)

Part 1: Introduction to PIAAC

GESIS Leibniz Institute for the Social Sciences

PIAAC in a Nutshell

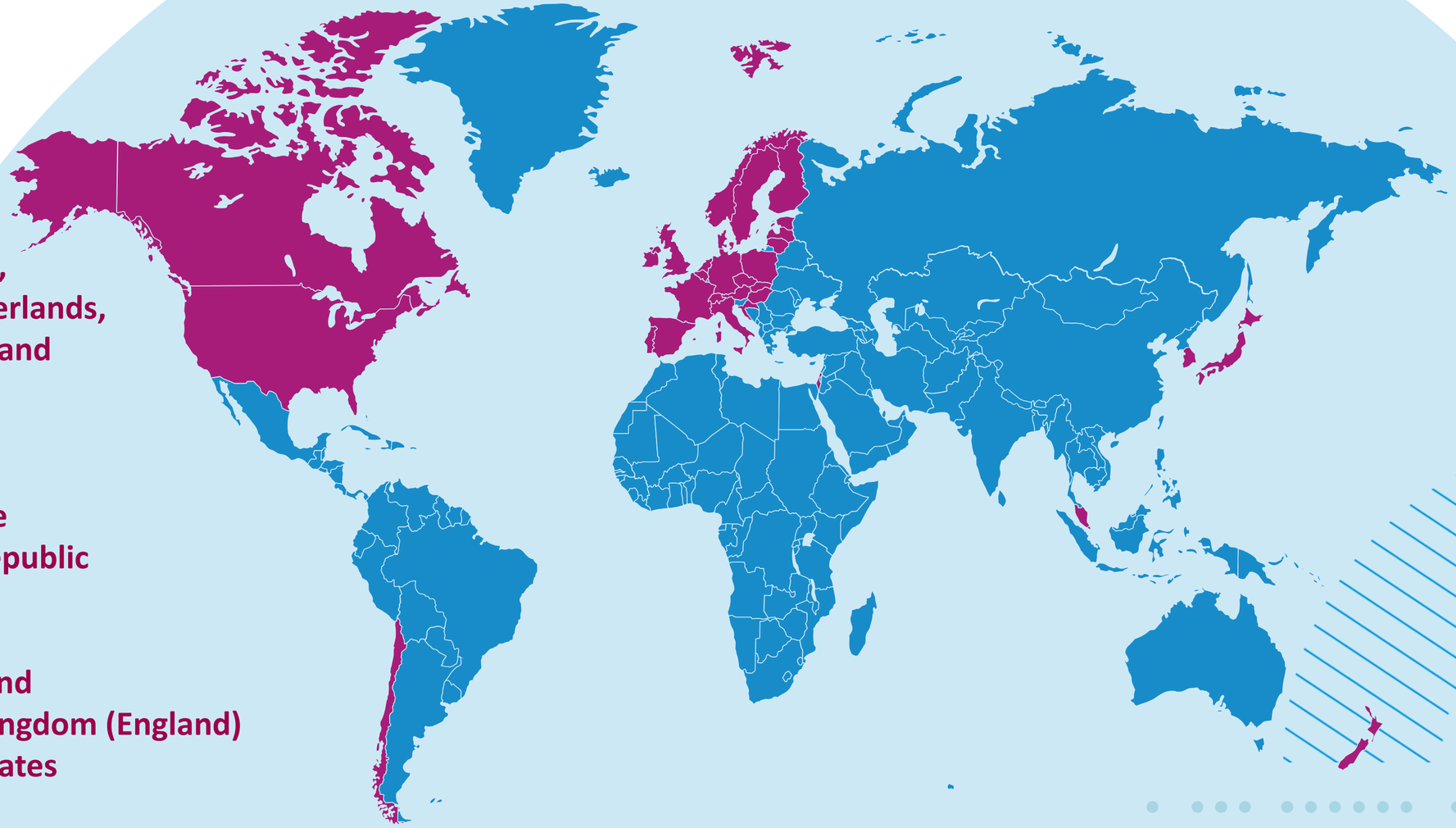
- PIAAC: Programme for the International Assessment of Adult Competencies
- Initiated by the Organisation of Economic Cooperation and Development (OECD)
- Measures key skills of adult population 16 to 65 years: literacy, numeracy, and problem solving
- Provides high-quality data
- Multi-cycle international program carried out every 10 years with cross-sectional design
  - Data collection for Germany: Cycle 1 2011/2012; Cycle 2 2022/2023
- PIAAC in Germany is funded by the Federal Ministry for Education, Family Affairs, Senior Citizens, Women and Youth, with the participation of the Federal Ministry of Labour and Social Affairs

PIAAC Cycle 2

GESIS Leibniz Institute for the Social Sciences

Cycle 2: 31 Countries Collected Data in 2021/2022

Austria
Belgium (Flanders)
Canada
Chile
Croatia
Czech Republic
Denmark
Estonia
Finland
France
Germany
Hungary
Ireland
Israel
Italy
Japan
Korea
Latvia
Lithuania,
the Netherlands,
New Zealand
Norway
Poland,
Portugal
Singapore
Slovak Republic
Spain
Sweden
Switzerland
United Kingdom (England)
United States



GESIS Leibniz Institute for the Social Sciences

PIAAC Cycle 2 Design

Sample Design Standards

- Target population
  - Non-institutionalized adults aged 16-65, residing in country at time of data collection
- Sampling
  - Probability-based sample
- Sample size
  - 4000-5000 (depending on sample design)
- Response rates
  - 70%, at least 50%

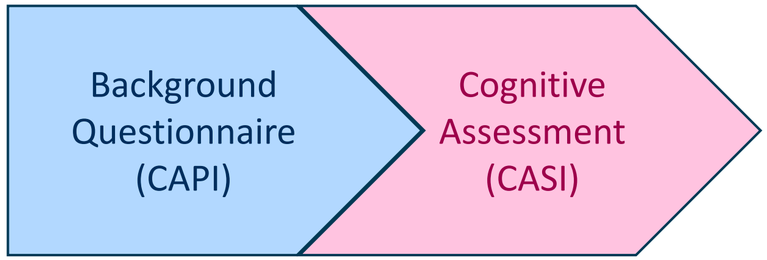
Quality Assurance and Quality Control

- Comprehensive international quality assurance: PIAAC Standards and Guidelines
- Continuous monitoring and quality control at international and national level
- Field study to test instrumentation and as dress rehearsal of all survey operations
- Data adjudication: Final evaluation of each national data set with respect to its *fitness-for-use*

GESIS Leibniz Institute for the Social Sciences

PIAAC Interview

- Administered face-to-face by trained interviewers using a PIAAC tablet
- In official country language(s)
- Consists of two parts:



- Cognitive assessment: self-completed, tablet-based, monitored by interviewer, no timing restriction
- For persons with language barriers: doorstep interview (self-completed on tablet)

Skill Domains

Literacy (incl. components)

Numeracy (incl. components)

Adaptive Problem Solving

GESIS Leibniz Institute for the Social Sciences

Definitions

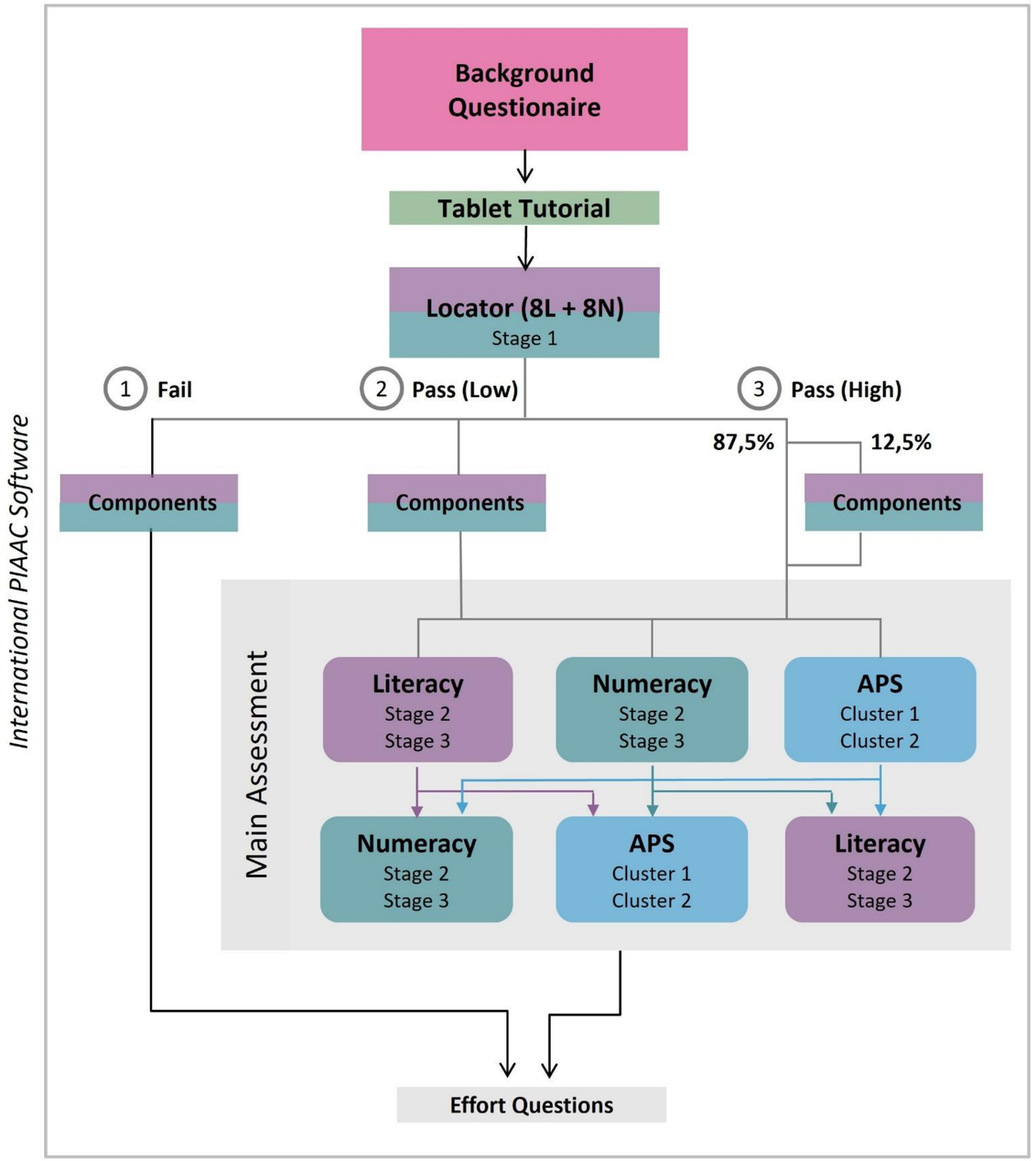
„accessing, understanding, evaluating and reflecting on written texts" (Rouet et al., 2021, p. 42)

"accessing, using and reasoning critically with mathematical content, information and ideas" (Tout et al., 2021, p. 93)

„capacity to achieve one's goals in a dynamic situation, in which a method for solution is not immediately available." (Greiff et al., 2021, p. 159)

Assessment Design

- Three possible paths (based on locator result)
- Main assessment: only two domains per respondent; Respondents only work on a subset of the assessment items
- Adaptative algorithm for literacy and numeracy
- Design allows an estimation of proficiencies at population level, not exact measures of individual performance



PIAAC Cycle 2: Germany

GESIS Leibniz Institute for the Social Sciences

PIAAC Germany 2023 – Implementation

National Design

- PIAAC interview administered in German
- Registry-based, two-staged sampling design
  - First stage: selection of municipalities
  - Second stage: selection of individuals
- Minimal target sample size for national sampling design: 4500 cases

Data Collection

- September 2022 to May 2023
- Fieldwork agency: Kantar Public (now Verian)
- 100 interviewers; 5-day in-person interviewer training

Fieldwork Results

- Response rate: 45%
- n=4.793
- 118 doorstep cases

GESIS Leibniz Institute for the Social Sciences

PIAAC Germany 2023 – Data Quality

Results of Data Adjudication

- Sampling: A *pass* was given for all indicators (sampling plan, sample selection, sample weighting).
- Coverage and nonresponse bias: A *pass* was given for population coverage and for the basic NRBAs (Nonresponse Bias Analysis). Extended NRBAs showed good results for the German data, but a *low-level caution* was assigned due to RR<50% indicating that some potential for nonresponse bias exists.
- Data collection: A *pass* was assigned for all indicators (interviewer training, monitoring and validation of interviewers' work).
- Instrument data quality: A *pass* was awarded for all indicators (translation, cognitive assessment data, coding, background questionnaire, item nonresponse).

PIAAC Cycle 1 versus Cycle 2

GESIS Leibniz Institute for the Social Sciences

Cycle 1 versus Cycle 2 – Cognitive Assessment

Cycle 1

- Per default computer-based, paper-based optional
- Literacy
  - Reading Components paper-based only, not integrated in literacy scale
- Numeracy
- Problem solving in technology-rich environments

Cycle 2

- Tablet-based only
- Literacy
  - Extended conceptual framework and item development, but linked to Cycle 1
  - Reading Components tablet-based and integrated in literacy scale
- Numeracy
  - Extended conceptual framework and item development, but linked to Cycle 1
  - New: Numeracy Components
- Adaptive problem solving
  - Newly developed for Cycle 2

GESIS Leibniz Institute for the Social Sciences

Cycle 1 versus Cycle 2 – Other

Cycle 1

- Background Questionnaire

- Literacy-related nonrespondents
  - No proficiency scores

Cycle 2

- Based on Cycle 1 background questionnaire, but with some changes and innovations
  - (see Part 2 of this session)

- Doorstep respondents
  - Proficiency scores were estimated for this group

- PIAAC design and standards for sampling, instrument translation, survey planning, field management and data collection, weighting, estimation are the same or very similar in both cycles!

Part 2: The Background Questionnaire

GESIS Leibniz Institute for the Social Sciences

The Background Questionnaire

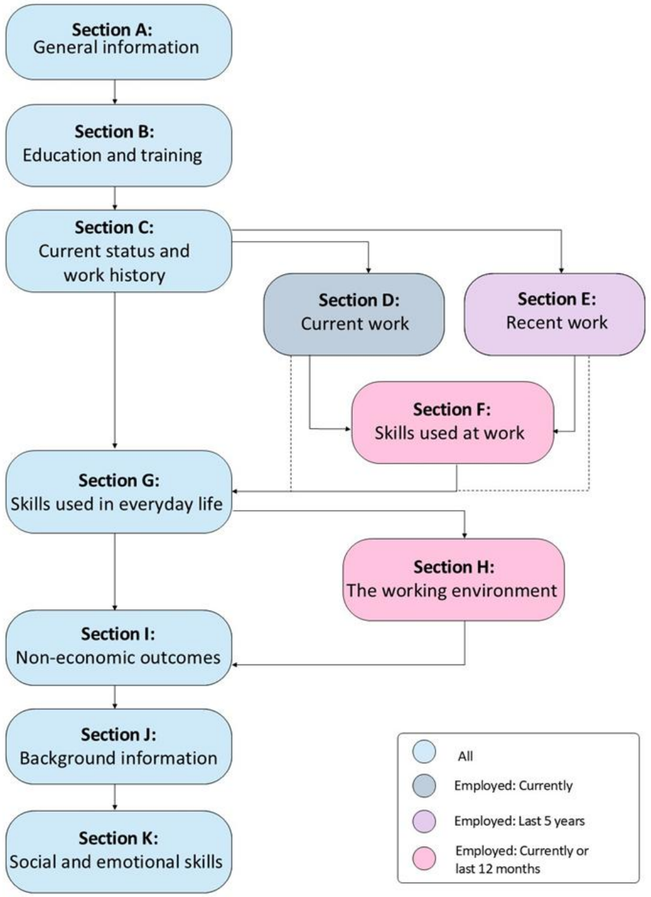
- The background questionnaire (BQ) was designed to collect comprehensive contextual information, enabling analyses of the relationship between cognitive skills and social, educational, as well as economic an non-economic outcomes

- The analytic potential from PIAAC stems from the wide range of background information collected through the BQ

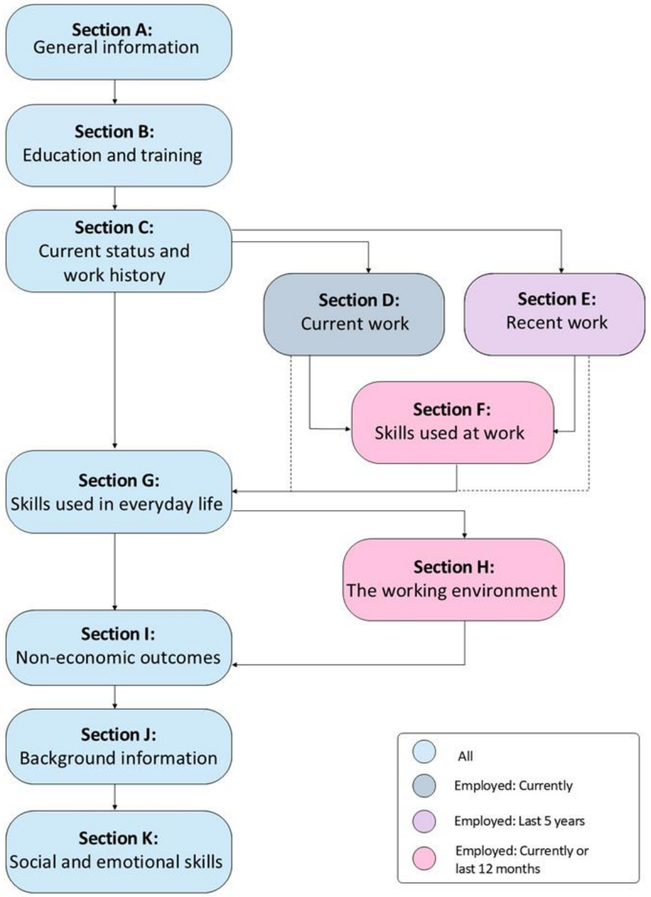
- Development guided by a conceptual framework (OECD, 2018)

Content of the Background Questionnaire

Content of the Background Questionnaire

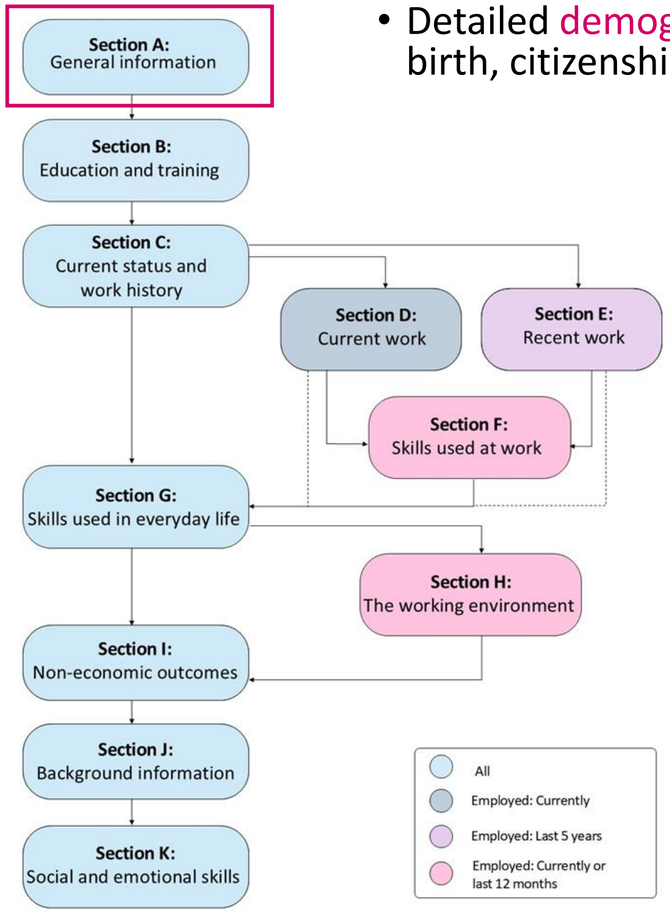


Content of the Background Questionnaire



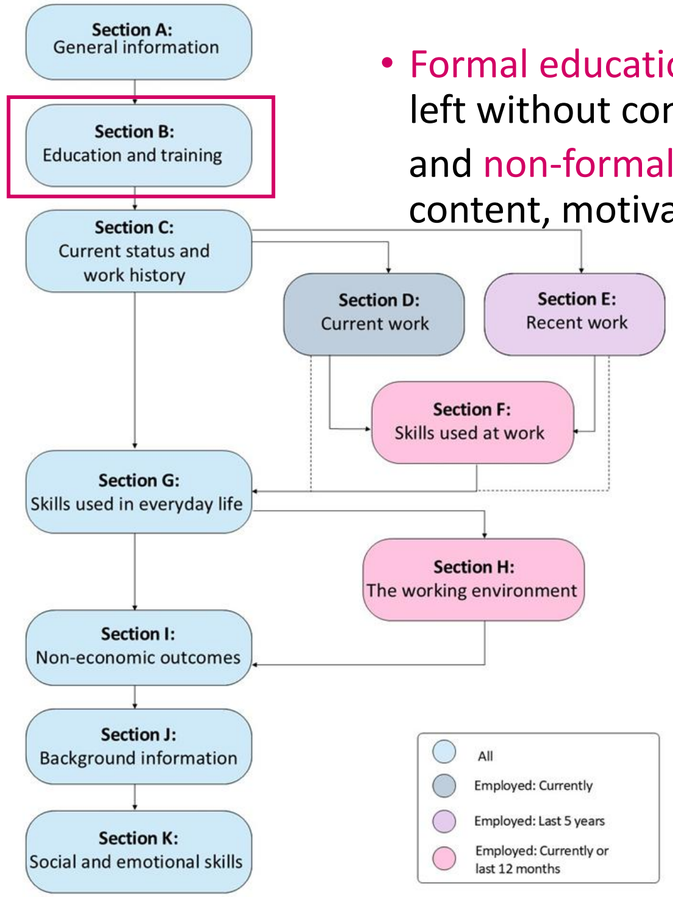
- Not every respondent gets every section, depends on previous answer
  - Section D: only for currently working
  - Section E: only for respondents who have worked in last 5 years
  - Section F/H: for current or recent work experience (last 12 months)

Content of the Background Questionnaire



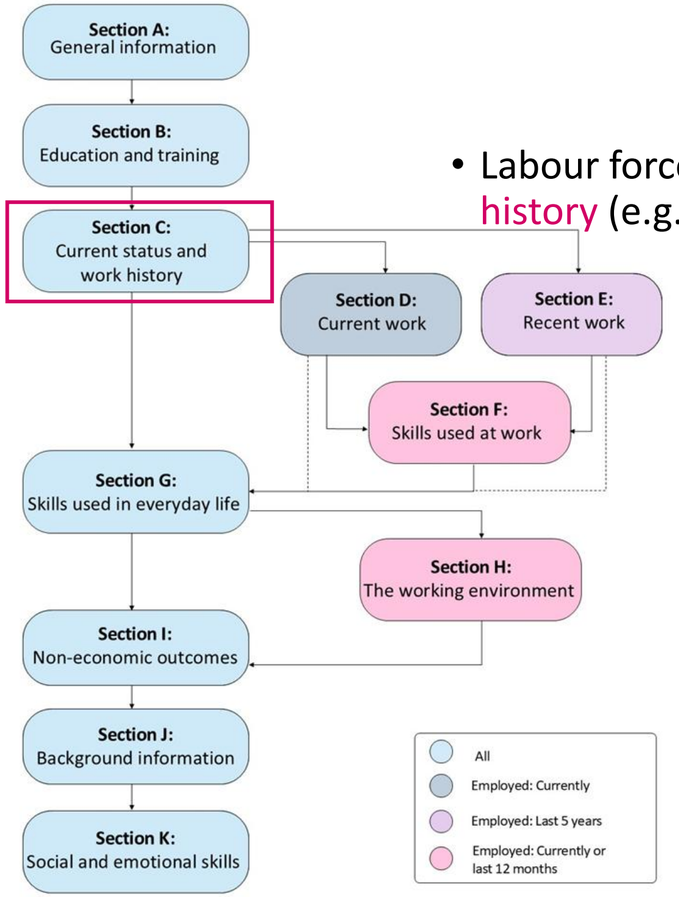
- Detailed demographic information (age, gender, country of birth, citizenship, languages)

Content of the Background Questionnaire



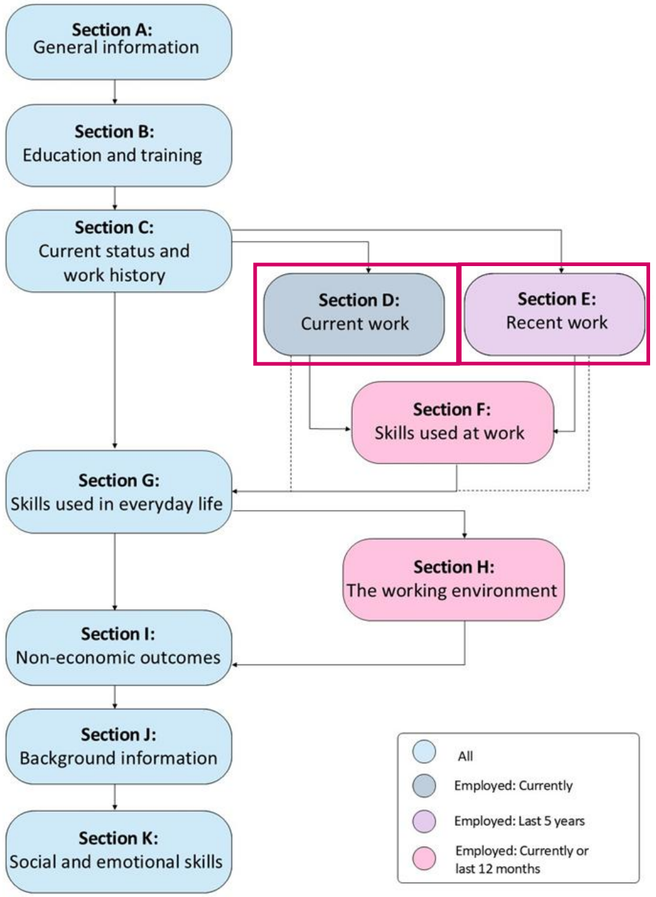
- Formal education: highest attainment, current education, education left without completion, educational pathways
  and non-formal training: incidence, intensity, costs, content, motivation, and barriers to participation

Content of the Background Questionnaire



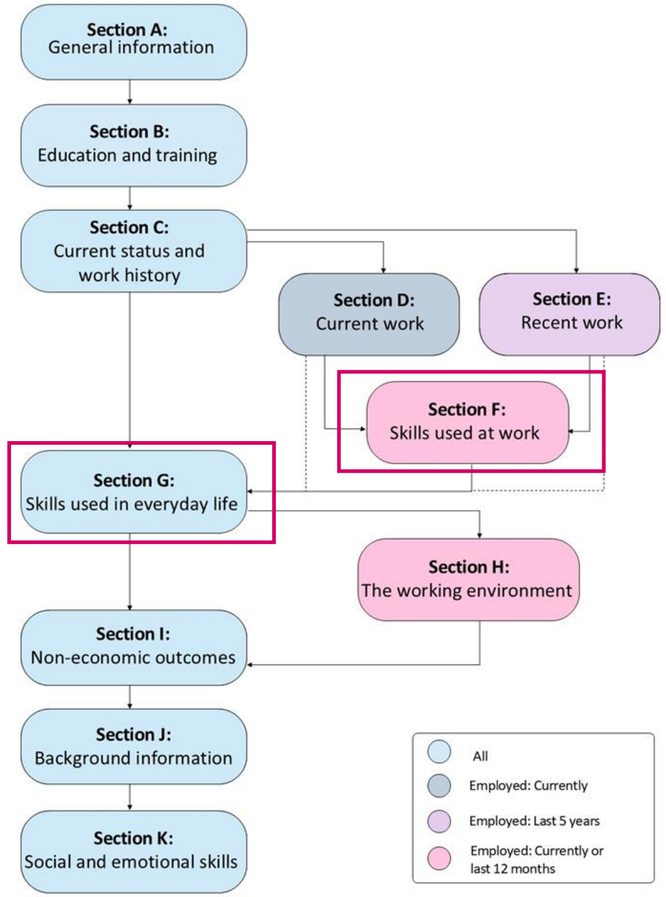
- Labour force status and limited information about work history (e.g. length of employment)

Content of the Background Questionnaire



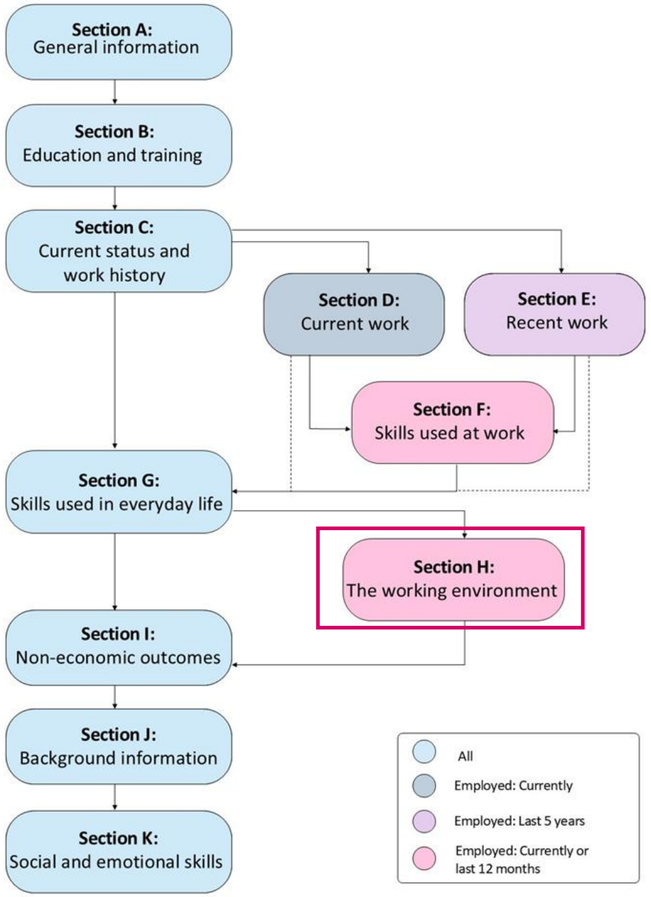
- Detailed information about current or last job: key characteristics of the job (occupation, sector of industry, tenure; only for current job: working hours, job satisfaction, and earnings)

Content of the Background Questionnaire



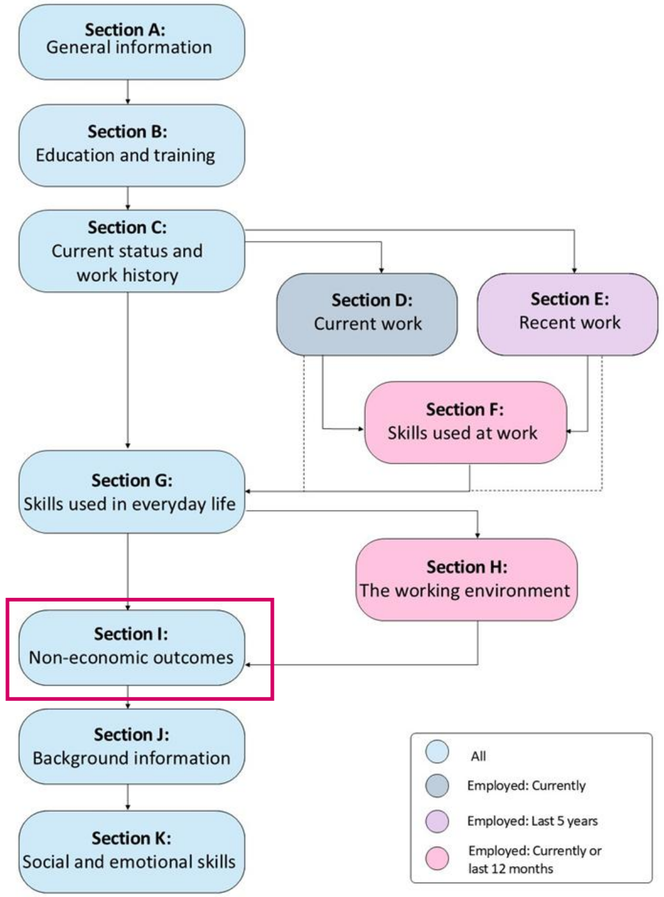
- Skill-use scales related to work and everyday life (reading, writing, numeracy and ICT)

Content of the Background Questionnaire



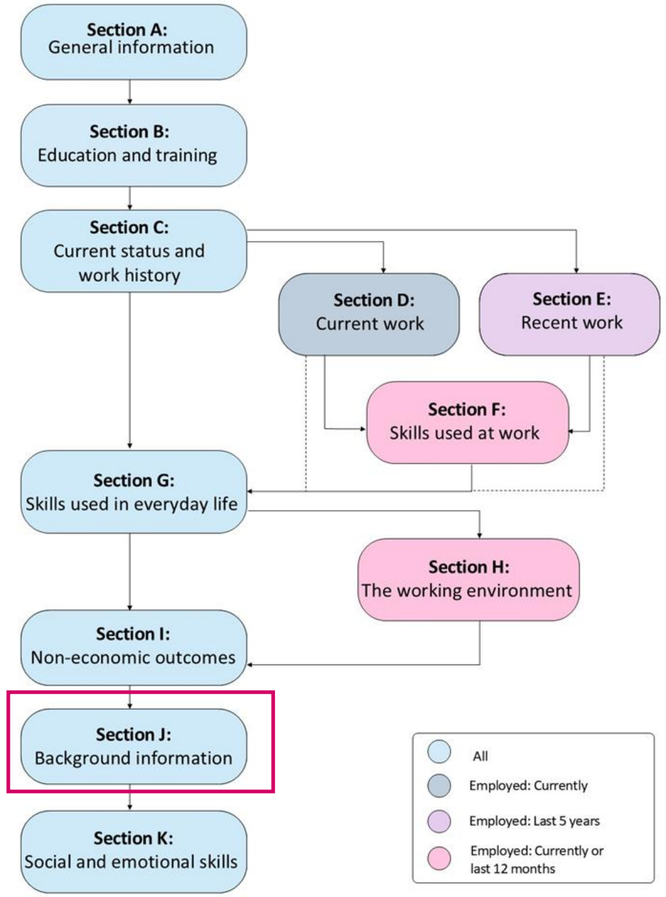
- The working environment (skills used at work, e.g. problem solving and manual skills, skill mismatch, organisation of work)

Content of the Background Questionnaire



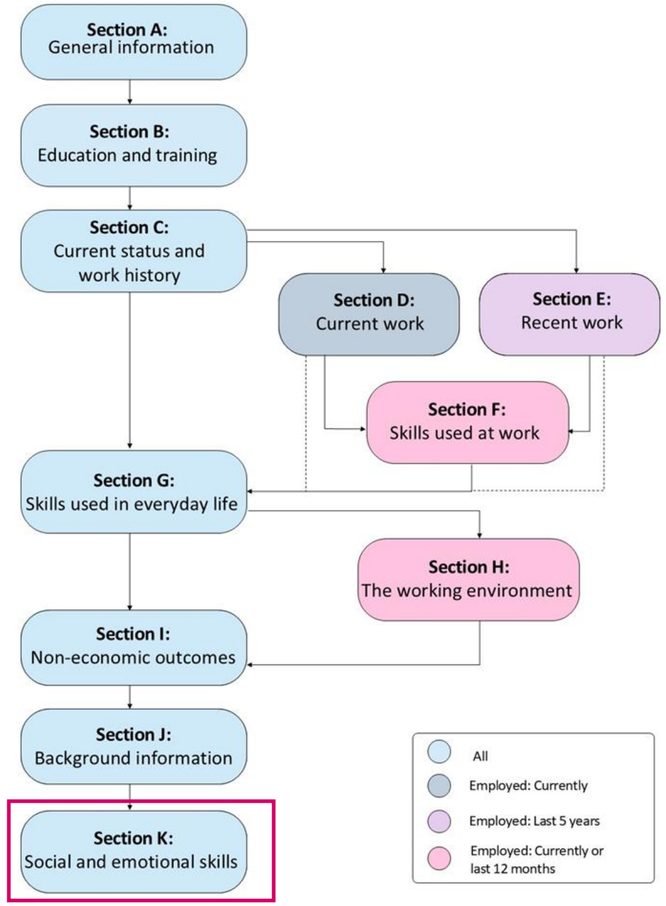
- Non-economic outcomes (volunteering, social trust, subjective health, life satisfaction)

Content of the Background Questionnaire



- Background information (children, partner, parental education and occupation, living situation at age 14)

Content of the Background Questionnaire



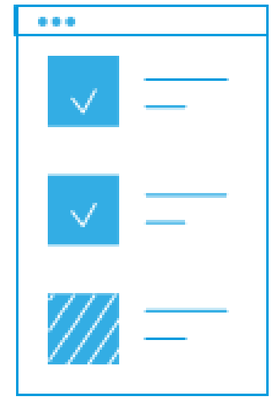
- Social and emotional skills (non-cognitive skills; Big-Five inventory BFI-XS/BFI-S; Soto & John, 2017)

Internationally Comparable Data

GESIS Leibniz Institute for the Social Sciences

Internationally Comparable Data in the Background Questionnaire

- Comparable data can be achieved through a process called harmonization
- Some questions need to be structurally adapted
- Questions asked in a way that works best in Germany (adaptation) and coded into international variables



- Coding of nationally adapted variables into international variables:
  - Educational qualifications
  - Occupation
  - Industry –
  - Salary
  - Countries
  - Languages

[1]UNESCO Institute for Statistics (2025) [2]International Labour Office (2025) [3]United Nations (2008) [4]United Nations (1999) [5]Library of Congress (2017)

GESIS Leibniz Institute for the Social Sciences

Measurement of Education

- Due to Germany‘s educational system: two main questions asked compared to one in the international BQ
  - First: general school education (*allgemeinbildender Schulabschluss*)
  - Second: professional or university education (*beruflicher Ausbildungsabschluss/Hochschulabschluss*)
- National data coded into scheme based on ISCED-2011
- Parental education also measured in two questions in Germany → more details than international variable

→Scientific Use File contains not only harmonized educational variables but also national variables

Changes between Cycle 1 and Cycle 2

GESIS Leibniz Institute for the Social Sciences

Changes between Cycle 1 and Cycle 2

- Most changes are international
- Variables can be classified as strict trend vs. soft trend but also new and dropped items

- Significant changes in measurement of formal education
  - Scheme based on ISCED 1997 vs. 2011
  - Orientation of educational qualification (vocational vs. general) derived directly in Cycle 2
  - Some German national qualifications classified at a different level in Cycle 1 vs. Cycle 2
  - Derived variables allow comparison between both cycles
- Educational pathways

- Important changes in operationalization of non-formal education
- New section on non-cognitive skills (social and emotional skills)

→ Relevant for data users: some questions changed section, so that the question number is different

GESIS Leibniz Institute for the Social Sciences

Documentation of Changes between Cycle 1 and Cycle 2

Item element	Cycle 2		Cycle 1			
	National BQ (in German)		National BQ (in English)	International (in English)		C1 to C2 major change
Item ID	A2_Q04a1DE	A2_Q04a1DE	A2_Q04a1	J_Q05a1DE	J_Q05a1DE	J_Q05a1	Yes
Question	Was ist Ihre Muttersprache? Das heißt die erste Sprache, die Sie in Ihrer		is the language that you first ed at home in childhood AND STILL ERSTAND?	Was ist Ihre Muttersprache? Das heißt die erste Sprache, die Sie in Ihrer Kindheit zu Hause gesprochen haben und NOCH IMMER VERSTEHEN.	What is your mother tongue? By this we mean the first language which you first spoke as a child and which YOU STILL UNDERSTAND?	What is the language that you first learned at home in childhood AND STILL UNDERSTAND?	No
Instruction	1. Nur eine Antwort eintragen. 2. Wenn die befragte Person spontan ZWEI Sprachen nennt, dann bitte die zweite Sprache in A2_Q04a2DE eintragen. 3. Bitte nur Sprachen und keine Dialekte nennen.		rk only one. he respondent spontaneously ions TWO languages, you can enter second language in A2_Q04a2.	1. Nur eine Antwort auswählen. 2. Wenn die befragte Person spontan ZWEI Sprachen nennt, dann bitte die zweite Sprache in J_Q05a2DE eintragen. 3. Bitte nur Sprachen und keine Dialekte nennen.	1. Mark only one. 2. If the respondent spontaneously mentions TWO languages, please enter the second language in J_Q05a2DE. 3. Please only enter languages, no dialects.	1. Mark only one. 2. If the respondent spontaneously mentions TWO languages, you can enter the second language in J_Q05a2.	No
Help		/	/	/	/	No
Response format		Exclusive choice	Exclusive choice	Exclusive choice	Exclusive choice	No
Responses	<04> Arabisch <05> Polnisch <06> Englisch <07> Italienisch <08> Rumänisch <09> Eine andere Sprache	<01> #Language1 <02> #Language2 <03> #Language3 <04> #Language4 <05> #Language5 <06> #Language6 <07> Other language / /	<01> Deutsch <02> Türkisch <03> Italienisch <04> Polnisch <05> Griechisch <06> Serbisch <07> Kroatisch <08> Russisch <09> Eine andere Sprache	<01> German <02> Turkish <03> Italian <04> Polish <05> Greek <06> Serbian <07> Croatian <08> Russian <09> Another language	<01> #Language1 <02> #Language2 <03> #Language3 <04> #Language4 <05> #Language5 <06> #Language6 <07> Other language / /	Yes

Part 3: The data set, available tools, accompanying documentation

GESIS Leibniz Institute for the Social Sciences

PIAAC Data Files

International: Public Use Files

- Final OECD PIAAC product
- Layout and structure defined by the OECD
  - No flexibility for participating countries
  - No national variables included
- Conservative confidentiality edits
  - National decisions – no harmonization
  - Data “holes” due to suppressed variables
  - Cross-country analyses limited to some extent
- Access via OECD website
  - For a broad user base
  - Without major restrictions

Add-on for Germany: Scientific Use File

- Extended version of German PIAAC dataset by GESIS
- Layout follows the PUF structure
  - Flexibility (to some degree)
  - Expanded set of variables, including national ones
- Less conservative confidentiality edits
  - National decision
  - Access to several suppressed PUF variables
  - More suitable for analyses
- Access via Research Data Center PIAAC at GESIS
  - Available only to researchers
  - With data use agreement

GESIS Leibniz Institute for the Social Sciences

Data Set Structure

- Public Use File
  - Contains 2,483 variables
  - In German PUF: approx. 230 variables suppressed (see piaac-cy2-missing_variables-puf.xlsx at OECD Website)
- German Scientific Use File
  - Contains 2,623 variables
  - Includes over 80 national variables
- Number of cases in German dataset
  - 4,793 net sample cases
  - 118 doorstep interview cases
- Proficiency estimates: Plausible values (PVs)
  - Competence data scaled using Item-Response-Theory (IRT) models, separately for each domain
  - 10 PVs imputed per respondent and domain
  - In analyses: use all 10 PVs (per domain)
  - PVs for group/population-level estimates only

GESIS Leibniz Institute for the Social Sciences

Data Set Information (1)

General Identifiers, flag variables, resolved demographics	– ID variables: e.g., SEQID, CNTRYID – Gender: GENDER_R – Age: AGE_R (cont.), grouped: AGEG10LFS (10-year bands), AGEG5LFS (5-year bands)
Background Questionnaire Originally collected BQ responses	– Variable naming convention: [A-K]2_[Q/D]Qn.No., e.g., A2_Q01a, K2_Q06e – National variables Germany: DE or DEX included in variable name, e.g., B2_Q01DE1a, J2_Q07DEX
Aggregated background variables BQ responses coarsened, top-coded	– Variable names as for original BQ variables extended by suffix *_C
Trend variables Recoded BQ responses	– For trend analyses with PIAAC predecessor surveys (IALS/ALL) – Variable names as for original BQ variables extended by suffices *_T, *_T1, or *_TC1
Doorstep Interview Originally collected DI responses	– Only 6 variables; variables names start with prefix DI_* – To select doorstep interview cases, use variable DOORSTEP = 1

GESIS Leibniz Institute for the Social Sciences

Data Set Information (2)

Coded background variables BQ responses coded into schemes	– Coded values for occupation (ISCO08_*), industry (ISIC4_*), language (LNG_*), and country (CNT_*)
Assessment variables Originally collected cognitive item responses and process information	– Variable naming convention: [Letter][Qn.ID][A/F/R/S/TT/V/VS], e.g., C301C05S, with R = actual response, S = scored response, TT = total time (TT), F = time to first action, A = number of actions, V = visit, and VS = short visit
Derived variables Background information derived from original or coded BQ items	– Around 250 variables derived by OECD – No single naming convention (e.g., BORNLANG, AETPOPC2, YEARLYINCPR) – 5 variables for both BQ and DI cases with suffix *_BQDI
Plausible values	– PVLIT1 to PVLIT10, PVNUM1 to PVNUM10, PVAPS1 to PVAPS10
Weighting / variance estimation	– Full weight and replicate weights: SPFWT0, SPFWT1 to SPFWT80 – Variance estimation: e.g., VEMETHOD, VARSTRAT, VARUNIT

Weighting PIAAC Germany

GESIS Leibniz Institute for the Social Sciences

Purpose

Reduce potential for nonresponse bias

Benchmark to external data

Steps

4 steps, including unknown eligibility adjustment, two nonresponse adjustment steps, and calibration

Benchmarking

Raking (gender, age, region, education, employment status, country of birth)

Change compared to Cycle 1: poststratification (gender, age, region, education)

Final weight

Variable SPFWT0 (for all cases of net sample)

GESIS Leibniz Institute for the Social Sciences

Variance Estimation With Replicate Weights

Sources of variance	– Complex sample designs (esp. clustering) – Imputation of proficiency scores (PVs) – Weighting adjustments
Replication approach	– PIAAC uses replication methods to account for a wide variety of sampling designs – Replicate weights created during weighting process (15-80 subsamples)
Replication methods	– Four options: delete-one jackknife, paired jackknife, balanced repeated replication (BRR), and BRR with Fay's method – Germany: BRR with Fay's method (80 replicates) – Change compared to Cycle 1: delete-one jackknife (80 replicates)
Standard error computation	– Estimate with full sample weight – Estimate with each replicate weight – Compute SE as the square root of the sampling variance based on differences between replicate and full-sample estimates
Computation load	– Without PVs & 80 replicates → 81 estimates – With PVs & 80 replicates → 810 estimates (81 × 10 PVs)

GESIS Leibniz Institute for the Social Sciences

Tools And Supporting Material For PIAAC Data Analyses

- Handle complex data (replicate weights, PVs) & support analyses from basic statistics to advanced regression models
- IEA IDB Analyzer
  - Free tool generating syntax for *SAS*, *SPSS*, and *R*
  - Performs basic and advanced analyses (e.g., means, regressions)
  - Works with Scientific Use File or international PUFs; PUF merge module available
- *Stata* and *R* Modules
  - *Stata: repest / R: rrepest*
  - Free modules for a wide range of statistics and regression analyses
- Support and access
  - All tools available at OECD website
  - GESIS Research Data Center offers online tutorials, scripts, and open-access materials

GESIS Leibniz Institute for the Social Sciences

Accompanying Documentation

In Germany

- SUF Codebook
  - Adapted version of the PUF codebook
  - Excel file with multiple tabs (e.g., list of variables, coding schemes such as ISCO08, ISIC4)
  - Variables tab includes: position, name, label, type, width/decimals, (missing) value scheme, domain, and comments
- German background questionnaire
- Technical report
- National publications with key findings
  - National Report for Germany (Dec. 2024)
  - National Thematic Report on Adaptive Problem Solving (Nov. 2025)

Add-On: International

- International PUF Codebook
- International master questionnaire
- OECD Reader's Companion
  - Non-technical overview of PIAAC content, methodology, and implementation
- OECD International Technical Report
- OECD Data Analysis Manual
  - Supportive documentation for PUF data users
  - Provides practical guidance for analyzing PIAAC data
  - Summarizes available analysis tools
- OECD International Report with key findings (Dec. 2024)

GESIS Leibniz Institute for the Social Sciences

Comparison of Cycle 1 and Cycle 2

- Regarding background questionnaire: variable names have changed – consult documentation
- Comparison allows preliminary assessment of stability or change in adult competencies
- Analyses possible only for literacy and numeracy
- Add internationally determined linking error (3.27 for literacy, 2.95 for numeracy) when computing SEs

$$\sigma(\Delta_{g2-g1}) = \sqrt{\sigma_{g2}^2 + \sigma_{g1}^2 + le_{1,2}^2}$$

- Recommendation: Exclude doorstep interview cases from Cycle 2 data (literacy-related nonrespondents in Cycle 1 have no PVs)
- Limitations regarding interpretation
  - Two data points ≠ trend
  - Changes may be influenced by multiple factors
    - → societal changes (demographics, labor market, education system)
    - → effects of external events
    - → methodological differences between cycles (sample composition, design changes)

GESIS Leibniz-Institut für Sozialwissenschaften

Access The PIAAC Data

German Scientific Use Files via Research Data Center PIAAC

https://www.gesis.org/en/data-on-adult-education/research-data-center-piaac

E-Mail: fdz-piaac@gesis.org

PIAAC Germany 2023 – Scientific Use File

Zabal, A., Martin, S., Massing, N., Gauly, B., Kapidzic, S., & Rammstedt, B. (2025). *Programme for the International Assessment of Adult Competencies, Cycle 2: PIAAC Germany 2023 – Scientific Use File*. Data file version 1.0.0 [ZA9009]. Cologne: GESIS Data Archive. https://doi.org/10.4232/1.14530

PIAAC Germany 2012 – Scientific Use File

Rammstedt, B., Martin, S., Zabal, A., Konradt, I., Maehler, D., Perry, A., Massing, N., Ackermann-Piek, D., & Helmschrott, S. (2016). *Programme for the International Assessment of Adult Competencies (PIAAC), Germany – Reduced version*. Data file version 2.2.0 [ZA5845]. Cologne: GESIS Data Archive. https://doi.org/10.4232/1.12660

Public Use Files of participating countries via OECD website

https://www.oecd.org/en/data/datasets/piaac-2nd-cycle-database.html

References

- Avvisati, F., & Keslair, F. (2022). *Repest: Stata module to run estimations with weighted replicate samples and plausible values* [Computer program]. Boston College Department of Economics. https://gitlab.algobank.oecd.org/edu_data/repest
- Greiff, S., Graesser, A., Iliescu, D., Rouet, J.-F., Scheiter, K., Scherer, R., Gottschling, J., & Dörendal, J. (2021). PIAAC Cycle 2 assessment framework: Adaptive problem solving. In OECD (Ed.), *The assessment frameworks for Cycle 2 of the Programme for the International Assessment of Adult Competencies* (pp. 155–203). OECD Publishing. https://doi.org/10.1787/3a14db8b-en
- Ilizaliturri, R., Avvisati, F., & Keslair, F. (2025). *Rrepest: An analyzer of international large scale assessments in education* (Version 1.5.4) [Computer program]. The Comprehensive R Archive Network. https://doi.org/10.32614/CRAN.package.Rrepest
- International Labour Office. (2025). *International Standard Classification of Occupations: Structure, group definitions and correspondence tables – ISCO-08*. https://isco-ilo.netlify.app/en/isco-08/
- Kapidzic, S., Gauly, B., Greiff, S., Martin, S., Massing, N., Zabal, A., & Rammstedt, B. (2025). *Adaptives Problemlösen Erwachsener im internationalen Vergleich: Ergebnisse von PIAAC 2023*. Waxmann. https://doi.org/10.31244/9783818850784
- Library of Congress. (2017). *Codes for the representation of names of languages: Codes arranged alphabetically by alpha-3/ISO 639-2 Code*. Language Coding Agency. https://www.loc.gov/standards/iso639-2/php/code_list.php
- Maehler, D. B. (2023). Analysis scripts in large-scale assessments in education. GESIS – Leibniz Institute for the Social Sciences. https://doi.org/10.21241/ssoar.85846.v2
- Maehler, D. B., & Rammstedt, B. (2020). Large-scale cognitive assessment: Analyzing PIAAC data. Springer. https://doi.org/10.1007/978-3-030-47515-4
- OECD. (2018). *PIAAC Cycle 2 BQ draft conceptual framework*. OECD Publishing. https://www.oecd.org/content/dam/oecd/en/about/programmes/edu/piaac/background-questionnaire/cycle-2/PIAAC_CY2(2018_11)BQ_Draft_Conceptual_Framework.pdf
- OECD. (2022). *Cycle 2 PIAAC technical standards and guidelines*. OECD Publishing. https://www.oecd.org/content/dam/oecd/en/about/programmes/edu/piaac/technical-standards-and-guidelines/cycle-2/PIAAC_CY2_Technical_Standards_and_Guidelines.pdf
- OECD. (2024). *Do adults have the skills they need to thrive in a changing world? Survey of Adult Skills 2023*. OECD Publishing. https://doi.org/10.1787/b263dc5d-en
- OECD. (2024). *Survey of Adult Skills 2023 reader's companion*. OECD Publishing. https://doi.org/10.1787/3639d1e2-en
- OECD. (2025). *Survey of Adult Skills 2023 data analysis manual.* OECD Publishing. https://doi.org/10.1787/25a87a9d-en
- OECD. (2025). *Survey of Adult Skills 2023 technical report*. OECD Publishing. https://doi.org/10.1787/80d9f692-en
- Rammstedt, B., Gauly, B., Kapidzic, S., Maehler, D. B., Martin, S., Massing, N., Schneider, S. L., & Zabal, A. (2024). *PIAAC 2023. Grundlegende Kompetenzen Erwachsener im internationalen Vergleich*. Waxmann. https://doi.org/10.31244/9783830999652
- Research Data Center PIAAC. (2021). PIAAC data analysis in Stata: A practical guide [Online tutorials]. GESIS – Leibniz Institute for the Social Sciences. https://www.gesis.org/data-on-adult-education/workshops/online-tutorial-piaac-data-analysis-in-stata

References

- Rouet, J.-F., Britt, M. A., Gabrielsen, E., Kaakinen, J., Richter, T., & Lennon, M. (2021). PIAAC Cycle 2 assessment framework: Literacy. In OECD (Ed.), The assessment frameworks for Cycle 2 of the Programme for the International Assessment of Adult Competencies (pp. 39–64). OECD Publishing. https://doi.org/10.1787/7b3bf33b-en
- Soto, C.J., & John, O.P. (2017). Short and extra-short forms of the Big Five Inventory–2: The BFI-2-S and BFI-2-XS, *Journal of Research in Personality*, 68, 69–81. https://doi.org/10.1016/j.jrp.2017.02.004
- Tout, D., Demonty, I., Diez-Palomar, J., Geiger, V., Hoogland, K., & Maguire, T. (2021). PIAAC Cycle 2 assessment framework: Numeracy. In OECD (Ed.), *The assessment frameworks for Cycle 2 of the Programme for the International Assessment of Adult Competencies* (pp. 65–154). OECD Publishing. https://doi.org/10.1787/c4221062-en
- UNESCO Institute for Statistics. (2012). *International Standard Classification of Education: ISCED 2011*. UNESCO Institute for Statistics. https://unesdoc.unesco.org/ark:/48223/pf0000219109
- UNESCO Institute for Statistics. (2025). *ISCED mappings and diagrams*. https://www.uis.unesco.org/en/methods-and-tools/isced/mapping-and-diagrams?hub=12
- United Nations. (1999). *Standard country or area codes for statistical use*. United Nations. https://unstats.un.org/unsd/publication/SeriesM/Series_M49_Rev4(1999)_en.pdf
- United Nations. (2008). *International Standard Industrial Classification of all economic activities (ISIC): Revision 4* (Statistical Papers Series M, Issue 4/Rev.4). Department of Economic and Social Affairs. Statistics Division. https://unstats.un.org/unsd/classifications/Econ/Download/In%20Text/ISIC_Rev_4_publication_English.pdf
- Zabal, A., Martin, S., Massing, N., Kapidzic, S., Gauly, B., & Rammstedt, B. (2025). *PIAAC Germany 2023: Technical report*. Waxmann.

Thank you for your attention and interest

Questions welcome!

Contact:
anouk.zabal@gesis.org
natascha.massing@gesis.org
silke.martin@gesis.org

Leibniz Association