PIAAC-L 2014, 2015, and 2016: Notes to the User

PIAAC-L Project
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Content

These *Notes to the User* provide some basic introductory information to users of the PIAAC-L database, specifically for the releases of data from wave 1 (2014), wave 2 (2015), and wave 3 (2016). Additional and more detailed information on each wave can be found in a number of technical reports produced as a part of the PIAAC-L project, as well as fieldwork reports produced by the survey organization:

- Technical reports:
  → PIAAC-L Data Collection 2014: Technical Report (Zabal, Martin, & Rammstedt, 2016)
  → PIAAC-L Data Collection 2015: Technical Report (Zabal, Martin, & Rammstedt, 2017)
  → PIAAC-L Data Collection 2016: Technical Report (Martin, Zabal, & Rammstedt, 2017)
  → Weighting in PIAAC-L 2014: Weighting Report (Bartsch, Poschmann, & Burkhardt, 2017)
  → Weighting in PIAAC-L 2015: Weighting Report (Burkhardt & Bartsch, 2017a)
  → Weighting in PIAAC-L 2016: Weighting Report (Burkhardt & Bartsch, 2017b)
  → Scaling PIAAC-L Cognitive Data: Technical Report (Carstensen, Gaasch, & Rothaug, 2017)
  → Number Series Study (DIPF) – Technical Report (Engelhardt & Goldhammer, 2017)
- Fieldwork reports (in German):
  → Wave 1, 2014 (Steinacker, Schmidt, Wolfert, & Schneekloth, 2016)
  → Wave 2, 2015 (Steinacker & Wolfert, 2017)
  → Wave 3, 2016 (Steinacker, Wolfert, & Thümmel, 2017)

Introduction to PIAAC-L

In 2011/2012, key adult competencies were assessed in 24 countries (including Germany) as a part of the OECD Programme for the International Assessment of Adult Competencies (PIAAC). The German PIAAC-Longitudinal Project (PIAAC-L) follows up the German PIAAC sample with three additional waves of data collection (in 2014, 2015, and 2016), each with a somewhat different focus. The objective of the PIAAC-L project is to significantly expand the German PIAAC database by adding a longitudinal dimension and by enriching the depth and breadth of information available on the German PIAAC respondents. This approach extends the analytical potential of the German PIAAC data and allows a myriad of additional research questions to be addressed. PIAAC-L is a collaborative effort undertaken by GESIS – Leibniz Institute for the Social Sciences (lead) together with the German Socio-Economic Panel (SOEP) at the German Institute for Economic Research (DIW Berlin) and the Leibniz Institute for Educational Trajectories (LIfBi).

The German PIAAC 2012 respondents that had given their consent to being re-contacted for a potential follow-up survey (*anchor persons*) form the starting point for PIAAC-L. In order to obtain further information on the context of these anchor persons, the PIAAC-L approach additionally includes household members ages 18+ as well as the administration of a comprehensive household questionnaire (waves 1

and 3). Wave 2 also addresses the spouses or partners of the anchor persons, if these live in the same household.

The PIAAC-L questionnaires are largely based on core instruments from the German Socio-Economic Panel (SOEP), but sometimes also include parts of the PIAAC background questionnaire and various other additional questions and modules on the respondent's background (adopted from other surveys as well as a number of new questions). In addition, assessment instruments from PIAAC and NEPS (National Educational Panel Study) measuring key competencies are implemented.

The 2014 data collection (wave 1) implemented core SOEP questionnaires (for persons[1] and households). For the 2015 data collection (wave 2), we developed an extensive background questionnaire (including items from PIAAC, NEPS, SOEP, as well as a number of other surveys). This questionnaire, followed by an assessment of literacy and numeracy using PIAAC and NEPS measurement instruments, was administered to anchor persons and their partners (if the latter lived in the same household as the anchor). The 2016 data collection again collected interviews from all adults living in the anchor person's household using core SOEP questionnaires. The SOEP person questionnaire was extended to include new questions and modules (for example on adult education). Respondents were also administered the SOEP short scales that assess cognitive performance: the Animal Naming Test, the Multiple-Choice Vocabulary Intelligence Test, and the Symbol-Digit Test; these are also included in the SOEP (Richter et al. 2017). These SOEP scales were administered to all wave 3 respondents. In addition, some anchor persons also worked on number series tasks. These tasks were a part of the Number Series Study carried out by the German Institute for International Educational Research (DIPF), and were administered as an add-on module to the PIAAC wave 3 interview. For more information on this study see Engelhardt and Goldhammer (2017).

Accessing and Downloading the Data

The PIAAC-L database is released for scientific research only. Researchers interested in using the PIAAC-L data should contact the Research Data Centre PIAAC (FDZ PIAAC)[2] at GESIS. After registering and signing the PIAAC-L Data Use Agreement, the data can subsequently be downloaded from the GESIS Data Catalogue for scientific use.

The latest release of the PIAAC-L database in December 2017 includes new data from the third and last PIAAC-L data collection (2016), with five new data sets (ZA5989_Persons_16, ZA5989_Cognit_16, ZA5989_Household_16, ZA5989_Weights_16, and ZA5989_Number Series_16). The longitudinal data sets containing the registry data (ZA5989_Registry) and the calendar data (ZA5989_Calendar) were extended and updated. Furthermore, ZA5989_Persons_15 was extended and now includes weighted likelihood estimates (WLEs) for PIAAC literacy and PIAAC numeracy assessed in 2015 in addition to the already released plausible values (PVs). The final PIAAC-L database consists of twelve separate data sets:

[1] Note to users familiar with the SOEP: The biographical questionnaire, which is standard for first-wave respondents in the SOEP, was incorporated in the person questionnaire.

[2] www.gesis.org/en/piaac/rdc/daten/piaac-longitudinal/

- ZA5989_Persons_14
  → Units: all PIAAC-L 2014 respondents (anchor persons and household members 18+ with participation in data collection 2014)
  → Content: data from person questionnaire, including derived variables
- ZA5989_Household_14
  → Units: all PIAAC-L 2014 households
  → Content: data from household questionnaire, including derived variables
- ZA5989_Weights_14
  → Units: anchor persons 2014
  → Content: weighting factors
- ZA5989_Persons_15
  → Units: all PIAAC-L 2015 respondents (anchor persons and partners living in the same household with participation in data collection 2015)
  → Content: questionnaire data, derived variables, cognitive assessment data, proficiency measures (PVs for PIAAC literacy and PIAAC numeracy; WLEs for NEPS reading and NEPS mathematics; WLEs for PIAAC literacy and PIAAC numeracy assessed in 2015)
- ZA5989_Weights_15
  → Units: anchor persons 2015
  → Content: weighting factors
- ZA5989_Persons_16
  → Units: all PIAAC-L 2016 respondents (anchor persons and household members 18+ with participation in data collection 2016)
  → Content: data from person questionnaire, including derived variables
- ZA5989_Cognit_16
  → Units: all PIAAC-L 2016 respondents (anchor persons and household members 18+ with participation in data collection 2016)
  → Content: data from three short tests of cognitive ability
- ZA5989_NumberSeries_16
  → Units: pre-selected anchor persons in 2016
  → Content: data from an add-on module for the Number Series Study (DIPF)
- ZA5989_Household_16
  → Units: all PIAAC-L 2016 households
  → Content: data from household questionnaire, including derived variables
- ZA5989_Weights_16
  → Units: anchor persons 2016
  → Content: weighting factors
- ZA5989_Calendar
  → Units: all PIAAC-L 2014 and 2016 respondents (anchor persons, household members 18+ with participation in data collection 2014 and/or 2016)
  → Content: data from biographical calendar, spell data; this data set is incremental
- ZA5989_Registry
  → Units: all persons ever registered in PIAAC-L
  → Content: basic information on participation in the different waves of data collection; this data set is incremental and was updated for each wave

Each of the twelve PIAAC-L data sets described above is tailored for a specific purpose and therefore the number of cases per data set varies. The data are available in SPSS and Stata (Version 11/12) formats. Documentation of the questionnaires for all three waves as well as codebooks for all data sets are publicly accessible (i.e. without registering or signing a data use agreement).[3]

Please note that in 2015 and 2016, some information was only collected from new participants: In these cases, corresponding variables only contain the data for the new participants. Users can combine the data collected from participants in previous waves with the data collected for the new participants in subsequent waves, and create their own variable with information for all cases. Note that sometimes the questions are not identical over the waves and users will have to decide how best to bring together the different pieces of information.

Although the SOEP core instruments form the backbone of the questionnaire in the data collection of waves 1 and 3, the PIAAC-L project has produced somewhat different data sets due to the specific PIAAC-L design and objectives. Users familiar with the SOEP data are referred to Annex A which gives an overview of SOEP data sets and indicates where the corresponding data can be found in the PIAAC-L data sets.

There are three basic identifiers in the PIAAC-L data sets: pnrfestid, hnrid, seqid. The **pnrfestid** is the permanent identifier for all individuals ever registered in PIAAC-L. As PIAAC-L follows a general household concept, **hnrid** is the permanent identifier for the households. It can be used to link information to the household-based data sets, for example ZA5989_Household_14 and ZA5989_Household_16. To link the PIAAC-L data sets with the PIAAC 2012 database, please use the **seqid** (see below). The anchor person can be identified using either the identifier seqid or by selecting cases with pnrfestid ending in 01.

[3] https://www.gesis.org/piaac/fdz/daten/langzeitstudie-piaac-l/
Data labels and codebooks are in English only. The questionnaire documentation provides the full set of questionnaire questions as implemented in the field and is thus available in German only.

Overview of Released Versions

These *Notes to the User* refer to the release of PIAAC-L data from wave 1 (2014), wave 2 (2015), and wave 3 (2016). The following listings provide an overview of all releases and a brief description of the updates or revisions to the data.

Version 1.0.0, doi: 10.4232/1.12487, release 31.03.2016:

Data file	Status	Annotations
ZA5989_Persons_14	New	n/a
ZA5989_Household_14	New	n/a
ZA5989_Calendar	New	n/a
ZA5989_Registry	New	n/a
ZA5989_Weights_14	New	n/a

Version 1.1.0, doi: 10.4232/1.12576, release 20.07.2016:

Data file	Status	Annotations
ZA5989_Persons_14	Updated	Corrections: • pzu01_14, pzu02_14, pzu03_14, pzu04_14, pzu05_14, pzu06_14, pzu07_14, pzu08_14, pzu09_14, pzu10_14: data errors fixed • piq01_14, piq02_14, piq03_14, piq04_14, piq05_14, piq06_14, piq07_14, lv07_ISCO08_14, lm07_ISCO08_14, l1ber_ISCO08_14, pber_ISCO08_14: labels modified • pbbil03_14, pbbilo_14, isced_soep_nat_14 und isced_soep_for_14: data errors fixed (these derived variables were slightly modified)
ZA5989_Household_14	Unchanged	n/a
ZA5989_Calendar	Unchanged	n/a
ZA5989_Registry	Unchanged	n/a
ZA5989_Weights_14	Unchanged	n/a

Version 2.0.0, doi: 10.4232/1.12707, release 21.12.2016:

Data file	Status	Annotations
ZA5989_Persons_14	Updated	Corrections: • pbefr1_14: label errors fixed • PVLit1_14-PVLit10_14, PVNum1_14-PVNum10_14, PVPSL1_14-PVPSL10_14: Plausible values updated due to changes in the computation of the survey weights and in the selection of background variables
ZA5989_Household_14	Unchanged	n/a
ZA5989_Calendar	Unchanged	n/a
ZA5989_Weights_14	Updated	Correction: hrf_14: calculation of the cross-sectional weight (hrf_14) was modified
ZA5989_Persons_15	New	n/a
ZA5989_Registry	Updated	New cases added (partners living in household of anchor persons in 2015); variables from 2014 were updated, new variables for 2015 added
ZA5989_Weights_15	New	n/a

Version 2.1.0, doi: 10.4232/1.12734, release 22.02.2017:

Data file	Status	Annotations
ZA5989_Persons_14	Updated (only SPSS data set)	Corrections: • lgebnr_14_C, gebland_14_C: label error fixed • LITSTATUS_14, NUMSTATUS_14, PSLSTATUS_14: labels for missing values removed (variable has no missing values)
ZA5989_Household_14	Unchanged	n/a
ZA5989_Calendar	Unchanged	n/a
ZA5989_Weights_14	Unchanged	n/a
ZA5989_Persons_15	Updated (only Stata data set)	In previous data set version of 21 December 2016 the missing scheme (-1 to -9) was erroneously not applied. The updated version includes the PIAAC-L missing scheme.
ZA5989_Registry	Unchanged	n/a
ZA5989_Weights_15	Unchanged	n/a

Version 3.0.0, doi: 10.4232/1.12925, release 14.12.2017:

Data file	Status	Annotations
ZA5989_Persons_14	Updated	Corrections: • lfs_14: value label error fixed • pfs113_14_C, pfs112_14_C: updated
ZA5989_Household_14	Updated	Corrections: • hwohn08_14: value label error fixed
ZA5989_Weights_14	Unchanged	n/a
ZA5989_Persons_15	Addition	Weighted likelihood estimates for PIAAC literacy and PIAAC numeracy assessed in 2015
ZA5989_Weights_15	Unchanged	n/a
ZA5989_Persons_16	New	n/a
ZA5989_Cognit_16	New	n/a
ZA5989_Household_16	New	n/a
ZA5989_Weights_16	New	n/a
ZA5989_Calendar	Updated	New cases added (participating household members in 2016); variables were updated, including new information from 2014 and 2015
ZA5989_Registry	Updated	New cases added (household members of anchor persons in 2016); variables from 2014 and 2015 were updated, new variables for 2016 added
ZA5989_NumberSeries_16	New	n/a

Merging With the German PIAAC Scientific Use File or the German PIAAC Public Use File

The PIAAC-L database can be merged with (a) the German PIAAC scientific use file or (b) the PIAAC public use file.[4] The German PIAAC scientific use file (Programme for the International Assessment of Adult Competencies (PIAAC), Germany - Reduced Version [ZA5845]) is automatically provided along with the PIAAC-L data (the PIAAC-L Data Use Agreement refers to both data sets). The German PIAAC public use file is distributed by the OECD and can be downloaded without registration at http://www.oecd.org/site/piaac/publicdataandanalysis.htm.

When merging the PIAAC-L data sets with either the German PIAAC scientific use file or the German PIAAC public use file, use the identification variable **seqid** which is available for all anchor persons in each data set.

[4] Please note that it is not permitted to merge the PIAAC-L database with any other individual-level data except for the PIAAC data (scientific use file or public use file).

Weighting and Variance Estimation

In PIAAC-L two weighting factors are derived for anchor persons only: (a) inverse staying probabilities and (b) poststratification weighting factors. For wave 1 both variables are provided in the data set ZA5989_Weights_14, the weights for wave 2 are in the data set ZA5989_Weights_15, and those for wave 3 in ZA5989_Weights_16. Further information on the weighting process in wave 1 is documented in Bartsch, Poschmann, and Burkhardt (2017), for wave 2 in Burkhardt and Bartsch (2017a), and for wave 3 in Burkhardt and Bartsch (2017b).

As a follow-up study to PIAAC, PIAAC-L addressed German PIAAC respondents that had given their consent to being re-contacted. Thus, the starting point with regard to sampling is the original sample selection in PIAAC. When analyzing the PIAAC-L data, it is therefore necessary to account for the complex sample design of PIAAC. Moreover, when plausible values are included in the analyses, the imputation variance must be taken into account when computing the error variance (see Perry, Helmschrott, Konradt, & Maehler, 2017: 12ff).

Replicate weights for variance estimation, as provided for the PIAAC scientific use file, are not computed for PIAAC-L. Instead, for purposes of variance estimation, users should use variables on sampling and stratification as provided in the PIAAC scientific use file, such as ID_PSU and GKPOL, STRAT_PSU, or Federal_state. Examples of Stata code are provided below illustrating an alternative approach to variance estimation. Sampling variance is accounted for using the Taylor series linearization approach. When plausible values are included in the analysis, the imputation variance is also computed.

Analyses with plausible values (based on ZA5989_Persons_15, anchor persons)

Step 1: Declare multiple imputation of plausible values

```
capture drop PVPSL PVNUM PVLIT
gen PVPSL=.
gen PVNUM=.
gen PVLIT=.
capture mi unset
mi import wide, imputed(PVNUM=PVNUM1-PVNUM10 PVLIT=PVLIT1-PVLIT10) clear drop
```

Step 2: Declare survey design

```
mi svyset ID_PSU [pw=hrf_15], strat(GKPOL)
```

Notes: Use ID_PSU (clustering variable) and GKPOL (stratification information) from the PIAAC scientific use file, and variable hrf_15 from ZA5989_Weights_15. For longitudinal analyses, please use the longitudinal weights (see Section "Usage of Weights for Cross-Sectional and Longitudinal Analysis" below).

Step 3: Run analyses

- Mean level of literacy:

```
mi estimate: svy: mean PVLIT
```

- Mean level of literacy by age group:

```
mi estimate: svy: mean PVLIT, over(agegroup)
```

Note: The variable agegroup can be derived from variable AGE_R_15, for example.

- Regression analysis of education (in years), employment experience, gender, and literacy on income:

```
mi estimate: svy: reg income YRSQUAL_15 C_Q09_15 gender PVLIT
```

Note: The dependent variable income is the logarithm of monthly net houshehold income (hinc_15). Use the variable gender from ZA5989_Registry.

Analyses without plausible values (based on ZA5989_Persons_15, anchor persons)

Step 1: not required

Step 2: Declare survey design

```
svyset ID_PSU [pw=hrf_15], strat(GKPOL)
```

Step 3: Run analyses

- Mean level of monthly net household income:

```
svy: mean hinc_15
```

- Mean level of montly net household income by age group:

```
svy: mean hinc_15, over(agegroup)
```

- Regression analysis of education (in years), eployment experience, and gender on income:

```
svy: reg income YRSQUAL_15 C_Q09_15 gender
```

Usage of Weights for Cross-Sectional and Longitudinal Analysis

Selectivity in PIAAC and PIAAC-L was detected in the area of education among others. The use of weights is thus recommended for analysis.

Each of the three data sets (ZA5989_Weights_14, ZA5989_Weights_15, and ZA5989_ Weights_16) include weighting factors (hrf_*, bleib_*). The factor hrf_* aims at adjusting the figures to the population benchmarks in the year of data collection, at least with regard to the distribution of some central variables. Thus, hrf_14 should be used for cross-sectional analysis with PIAAC-L 2014 data, hrf_15 for the PIAAC-L 2015 data, and hrf_16 for the PIAAC-L 2016 data. The factor bleib_* is the product of

the nonresponse-analysis and should be used for longitudinal analysis (this factor was trimmed for bleib_14).

Users conducting longitudinal analyses using PIAAC 2012 and PIAAC-L data should combine weighting factors as follows:

- **PIAAC 2012 and PIAAC-L 2014**

  For longitudinal analysis of PIAAC 2012 and PIAAC-L 2014, the final full sample weight from PIAAC 2012 (SPFWT0) should be multiplied with the nonresponse weight from PIAAC-L 2014:

  *SPFWT0 * bleib_14*

- **PIAAC 2012 and PIAAC-L 2015, or**

  PIAAC 2012, PIAAC-L 2014, and 2015

  For longitudinal analysis combining PIAAC 2012 and PIAAC-L 2015 – irrespective of whether or not data from PIAAC-L 2014 is included – the final full sample weight from PIAAC 2012 (SPFWT0) should be multiplied with the nonresponse weight from PIAAC-L 2014 and the nonresponse weight from PIAAC-L 2015:

  *SPFWT0 * bleib_14 * bleib_15*

- **PIAAC 2012 and PIAAC-L 2016, or**

  PIAAC 2012, PIAAC-L 2014 and 2016, or

  PIAAC 2012, PIAAC-L 2015 and 2016, or

  PIAAC 2012, PIAAC-L 2014, 2015, and 2016

  For longitudinal analysis combining PIAAC 2012 and PIAAC-L 2016 – irrespective of whether or not data from PIAAC-L 2014 and 2015 is included – the final full sample weight from PIAAC 2012 (SPFWT0) should be multiplied with the nonresponse weights from PIAAC-L 2014, 2015, and 2016:

  *SPFWT0 * bleib_14 * bleib_15 * bleib_16*

- **PIAAC-L 2014 and 2015**

  For longitudinal analysis of PIAAC-L 2014 and 2015, the cross-sectional weight from PIAAC-L 2014 (hrf_14) should be multiplied with the nonresponse weight from PIAAC-L 2015:

  *hrf_14 * bleib_15*

- **PIAAC-L 2014 and 2016, or**

  PIAAC-L 2014, 2015, and 2016

  For longitudinal analysis of PIAAC-L 2014 and 2016 – irrespective of whether or not data from 2015 is included – the cross-sectional weight from PIAAC-L 2014 (hrf_14) should be multiplied with the nonresponse weights from PIAAC-L 2015 and 2016:

  *hrf_14 * bleib_15 * bleib_16*

- **PIAAC-L 2015 and 2016**

  For longitudinal analysis of PIAAC-L 2015 and 2016, the cross-sectional weight from PIAAC-L 2015 (hrf_15) should be multiplied with the nonresponse weight from PIAAC-L 2016:

  *hrf_15 * bleib_16*

- **Special case: temporary drop-outs in PIAAC-L 2015**

  In PIAAC-L 2015 some anchor persons temporarily dropped out of the sample and participated again in PIAAC-L 2016. This so-called temporary unit nonresponse or wave nonresponse can have various reasons (see de Leeuw, 2005; Engel & Schmidt, 2010). These cases are problematic for longitudinal analyses due to the fact that longitudinal weights are calculated as the product of the cross-section weight for the initial wave and *all* nonresponse weighting factors between the intitial and the current wave. The inverse staying probability of these temporary dropouts is zero for PIAAC-L 2015 - the year these persons dropped out temporarily; these cases are by definition not included in the PIAAC-L 2015 weighting dataset. If the temporary dropouts return to the panel in PIAAC-L 2016, they have an inverse staying probability (bleib_16) and a cross-sectional weight (hrf_16) for PIAAC-L 2016. However, the inverse staying probability for PIAAC-L 2015 is still zero. Therefore, these cases cannot be included in longitudinal analyses based on a balanced panel covering the survey year 2015. Thus, they are automatically excluded from the analyses.

  Temporary unit nonresponse is a common problem all panel studies face and which increases over time (see Kalton & Citro, 1993). There are different ways to adjust for temporary unit nonresponse such as weighting and imputation techniques. In PIAAC-L unit nonresponse is addressed by proportionally adjusting the weights of participants (for further details, see Burkhardt & Bartsch, 2017b).

Please keep in mind that the reference population is limited to a certain age group and excludes people who moved to Germany after 2012. Also, only anchor persons, i.e. respondents who participated in PIAAC 2012, have weighting factors. The information of the other persons in the household can be used as context information in the analysis. More detailed information on weighting can be found in Bartsch, Poschmann, and Burkhardt (2017), Burkhardt and Bartsch (2017a, 2017b).

Updated Data Set Weights_14: Cross-Sectional Weighting Factor (hrf_14)

The weighting factor hrf_14 is the result of the calibration process in PIAAC-L 2014 and should be chosen for cross-sectional analyses with PIAAC-L 2014. Calibration aims at bringing the sample in closer alignment with the underlying population, at least with regard to the distribution of some central variables. This is generally done by using data from official statistical sources. In the case of Germany, the Microcensus is the source for the reference data. The variables included in the calibration process are gender, age, and education as well as region, size of household, and size of municipality.

The calibration process was adjusted and updated information for the cross-sectional weighting factor hrf_14 was included as of the December 2016 release (Version 2.0.0; doi: 10.4232/1.12707 release 21.12.2016): Up-to-date information from PIAAC-L 2014 was used for all variables irrespective of the information the respondents had previously given in PIAAC 2012. This was not the case for the cross-sectional weight hrf_14 that was provided in earlier releases (such as Version 1.0.0; doi: 10.4232/1.12487, release 31.03.2016). For the weights delivered in earlier versions, the information on education obtained in PIAAC-L 2014 was compared with that from PIAAC 2012. If the two differed, the highest education information was carried

forward to address the fact that a decline in the level of education is “implausible”. Due to the use of up-to-date-information in the weights update, the categories “low educational level” and “pupil in general school” now consist of a few more cases than in the old release of hrf_14. These groups were therefore given a slightly smaller weight in Version 2.0.0. The aim of using only cross-sectional up-to-date information for the calculation of the cross-sectional weight is to reduce the artificially inflated sample bias in terms of education (towards higher education).

Although the updated cross-sectional weighting factor hrf_14 only marginally differs from the precursor weights, it is recommended to use the updated hrf_14 provided in the PIAAC-L data base (Version 2.0.0 and subsequent versions) for cross-sectional analyses. The weighting decisions for the re-computation of the hrf_14 weights are harmonized with the calculation process for the cross-sectional weight hrf_15 for PIAAC-L 2015. The nonresponse weights bleib_14 and bleib_15 remained unaffected by the December 2016 update.

Coding of Occupation and Industry in PIAAC-L

All person questionnaires in 2014, 2015, and 2016 included questions on occupation and industry. However, the operationalization of these questions was different in each wave.

Coding in 2014

As in PIAAC and SOEP, information on current and past (first and last job) occupation of the respondents and their parents was collected. The open responses on occupation were directly coded into “Classification of Occupations 2010” (KldB-2010). Codes for the “International Classification of Occupations 2008” (ISCO-08) were subsequently obtained using a crosswalk combined with 10% direct coding into ISCO-08. Further scales and classifications, such as ISEI-08, SIOPS-08 and MPS were then derived from ISCO-08.

Information on industry (respondent’s first, last and current job) was also obtained. The open responses on industry were directly coded into the “International Standard Industrial Classification of all Economic Activities” (ISIC Rev.4). Subsequently, the “Statistical Classification of Economic Activities in the European Community” (Nomenclature statistiques des activités économiques dans la Communauté européenne – NACE Rev.2) was derived from ISIC Rev.4.

Coding in 2015

In the 2015 PIAAC-L data collection, many questions from the PIAAC background questionnaire were implemented in the person questionnaire to allow for a direct comparison with the PIAAC 2012 data. This was also the case for the questions on occupation and industry. The same two open questions on occupation as used in PIAAC 2012 were administered. These were designed to obtain the level of detail required for the coding of occupation into the International Standard Classification of Occupations 2008 (ISCO-08). The responses given to the questions on current own occupation and parental occupation were coded directly into ISCO-08 by trained coders. The open responses to the questions on the current industry were coded into ISIC Rev. 4. It should be noted that different organisations carried out the occupation

(and industry) coding in PIAAC 2012 (IEA-DPC) and PIAAC-L 2015 (LIfBi), thus there may be house effects due to their somewhat different coding practices.

Coding in 2016

Coding in 2016 was comparable to 2014, as the corresponding questions were identical in both waves. Thus, open responses on occupation were directly coded into "Classification of Occupations 2010" (KldB-2010). Codes for the "International Classification of Occupations 2008" (ISCO-08) were subsequently obtained using a crosswalk. Further scales and classifications, such as ISEI-08, SIOPS-08 and MPS were then derived from ISCO-08.

Information on industry (respondent's current job) was also obtained. The open responses on industry were directly coded into the "International Standard Industrial Classification of all Economic Activities" (ISIC Rev.4). The "Statistical Classification of Economic Activities in the European Community" (Nomenclature statistiques des activités économiques dans la Communauté européenne – NACE Rev.2) was subsequently derived from ISIC Rev.4.

Missing Values in PIAAC-L

As mentioned above, PIAAC-L is a cooperative undertaking of three institutions, representing three different surveys: GESIS – Leibniz Institute for the Social Sciences with PIAAC, the German Institute for Economic Research (DIW Berlin) with SOEP and the Leibniz Institute for Educational Trajectories (LIfBi) with NEPS. These three surveys have implemented different missing schemes. For PIAAC-L, a new and comprehensive missing scheme was developed, with missing values ranging from -9 to -1. Table 1 summarizes this missing scheme and indicates how the PIAAC-L missing codes relate to the established missing schemes in PIAAC, SOEP, and NEPS.

Please note that in the SPSS data sets the numeric values -9 to -1 were recoded into user-missing values, and thus will be automatically omitted for analyses. In the Stata data sets these values were **not** recoded into extended missings (.a, .b, etc.). For any analyses in Stata without missing values, make sure to exclude cases with negative numeric values.

The dataset ZA5989_Persons_15 also contains cognitive assessment data (using instruments from PIAAC and NEPS). As in PIAAC 2012, a reduced missing scheme was applied to the cognitive items (scores). In PIAAC 2012, missing by design was reflected by a system missing in the data. This is also the case in the PIAAC-L 2015 data. There are two other possible types of missing for the cognitive PIAAC-L data: (a) code -6 for "not reached/not attempted" (corresponds to code 9 in PIAAC 2012), and (b) code -7 for implausible value or not determinable (there is no corresponding code in PIAAC for the cognitive data).

For missing PVs and missing WLEs (data sets ZA5989_Persons_14 and data set ZA5989_Persons_15) only the system missing code was used.

For the cognitive data from the SOEP short cognitive scales (ZA5989_Cognit_16), respondents without valid data in at least one of the three tests were excluded. Respondents without valid data for only one to two tests were assigned the missing code -7 “Implausible value or not determinable” for the respective items.

For the cognitive data from the Number Series Study (ZA5989_NumberSeries_16), the missing codes -4 to -7 were used. The missing code -6 refers only to items that were not reached. Items that were not attempted were coded either as 8 (omitted) or 7 (answer was removed by respondent). For further information please consult the codebook and the technical report for the Number Series Study (Engelhardt & Goldhammer, 2017).

Table 1: Missing Scheme PIAAC-L

PIAAC-L Code	Missing Label (English)	Missing Label (German)	Comments	PIAAC Equivalent	NEPS Equivalent	SOEP Equivalent
-1	Don't know	Weiß nicht	Respondent was administered question/item and answered „I do not know" [item non-response, set at raw data level]	Don't know: 7, 97, 997, …	DK: -98	No equivalent
-2	Refused	Angabe verweigert	Respondent was administered question/item and refused to provide an answer [item non-response, set at raw data level]	Refused: 8, 98, 998, …	RF: -97	No equivalent
-3	Don't know or refused	Weiß nicht oder Angabe verweigert	Don't know / refused (undifferentiated) [item non-response, set at raw data level]	No equivalent	No equivalent	No answer/DK: -1
-4	Valid skip	Filterbedingt fehlend	Part of questionnaire was not administered to respondent due to routing in questionnaire, or erroneously not administered [set at data management level]	Valid skip: 6, 96, 996, …	Missing by design: -54 Question erroneously not asked: -92 Filtered: -99	No equivalent
-5	Not applicable	Trifft nicht zu	Broad missing category: Can refer to valid skips and/or other types of item non-response (e.g. including item not selected for multiple-response items or response category not displayed) without differentiation [item non-response, usually set at raw data level]	No equivalent	Unspecific missing: -90	Trifft nicht zu: -2
SYSMIS	System missing	.	Items missing by design in assessment or no assessment administered	System missing	.	No equivalent / not applicable

PIAAC-L Code	Missing Label (English)	Missing Label (German)	Comments	PIAAC Equivalent	NEPS Equivalent	SOEP Equivalent
-6	Not reached or not attempted	Nicht erreicht oder nicht versucht	Assessment code: Respondents did not reach or did not attempt an item [set at data management level]	Not reached / not attempted: 9, 99, 999, …	Not reached: -94	Not applicable
-7	Implausible value or not determinable	Unplausibler Wert oder nicht ermittelbar	Original value was out of range and could not be derived, or original response was not codable, e.g. verbatim response to occupation not unequivocally codable into occupation scheme [set at data management level]	No direct equivalent, part of "not stated/ available/inferred: 9, 99, 999, …"	Implausible value removed: -52 Implausible value: -95 [e.g. more than one response on a forced-choice cognitive assessment item] Not determinable: -55 Not determinable: -25	Implausible value/after intensive checks a given value was found to be implausible/not valid: -3 Not determinable: no equivalent
-8	Anonymized	Anonymisiert	Suppressed due to data confidentiality issues [set at data management level]	No direct equivalent, included with "not stated/ available/inferred: 9, 99, 999, …"	Anonymized: -53	No equivalent
-9	Longitudinal missing	Nicht an aktueller Welle teilgenommen	Respondent did not participate in corresponding wave of data collection [set at data management level]	No equivalent	Not participated: -56	No equivalent

Competencies From PIAAC 2012 and PIAAC-L 2015

PIAAC-L complements the German PIAAC 2012 data with data from three additional waves. Extensive questionnaires were administered in all waves. Wave two also collected additional competence data. The questionnaires were addressed to the PIAAC anchor persons as well as to adult members of their households. The additional competence data collected in 2015 implemented PIAAC and NEPS competence instruments; these were administered to PIAAC anchor persons. The design of this competence assessment was set up to address the research questions regarding how PIAAC competencies change over time and how PIAAC and NEPS competence tests are related empirically. The domains presented to the PIAAC anchor persons are shown in assessment design depicted in Figure 1. The partners were tested as well, they received NEPS tests in reading and mathematics.

Competence assessment design 2015 - design for PIAAC anchor persons								
instrument	NEPS		PIAAC		Reading/Literacy		Maths./Num.	
	1	2	3	4	5	6	7	8
	Maths	Reading	Literacy	Num.	Reading	Literacy	Maths	Num.
	Reading	Maths	Num.	Literacy	Literacy	Reading	Num.	Maths

Figure 1 2015 Competence Assessment Design PIAAC Anchor Persons

Large-scale assessment studies like PIAAC and PIAAC-L report their results on a population or subpopulation level. Therefore appropriate analyses include an item response model to obtain estimates of latent competencies and latent regression analyses to relate these competence estimates to background variables. The results of these latent regressions are unbiased estimates of the population level regession coefficients. Note that the term regression is used here as a category of analyses and includes hierarchical model structural equation modeling etc.

A common technique to perform latent regressions on the results of an item response model is to provide plausible values (PVs) from a common scaling and regression model in a first step and perform analyses on these PVs in a second step (Mislevy, Beaton, Kaplan, & Sheehan, 1992; Adams, Wu & Carstensen 2007; von Davier, Gonzalez & Mislevy, 2009; Yamamoto, Khorramdel, & von Davier, 2013a).

Plausible Values for Competence Analyses

In order to provide PVs for latent regression analyses, basically two models have to be fitted to the observed data. In a first step an item response model is used to scale the item responses according to the assessment design. The item response model reflects the design of the test, i.e. three correlated domains in PIAAC 2012 or two domains in the repeated measurements from PIAAC-L.

In a second step a latent regression analysis is performed which regresses the competencies, measured by the cognitive items and scaled with the item response model, onto a set of selected predictors. The results of this combined model are made

available through a set of draws from the posterior distributions of each respondent with respect to a selected set of analysis variables, the so-called PVs. The set of selected predictor variables may be called the conditioning variables or the background model. Any following analysis of these posterior draws with one or more of these predictors as analysis variables will reproduce the results of the latent regression analysis already performed and thus reflect the latent regression of the competencies on the selected analysis variables. Thus a user only needs to perform analyses on the PVs and selected analysis variables to obtain unbiased results. Note that your analysis should only use variables that were included in the combined IRT and latent regression model the PVs were drawn from; please see the list of background variables provided in the files:

- **ZA5989_PIAAC_L_Variables_PVs_background_model_14.xlsx,** and
- **ZA5989_PIAAC_L_Variables_PVs_background_model_12_15.xlsx**.

Since the regression coefficients estimated in the combined latent regression model reflect population characteristics, e.g. competence averages for men or women, high or low education groups and correlations with competences, e.g. with social status or income, the latent regression model is estimated applying survey weights.

A restriction applies to the number of variables in the latent regression model. The number of parameters to be estimated may not exceed certain limits imposed by the sample size. For drawing PVs for PIAAC-L, a maximum of background variables applies in order to ensure a reliable parameter estimation. These maxima are around 370 variables for the 2014 sample size and around 320 variables for the 2015 sample size. However the number of background variables available is larger and becomes even larger with each wave of PIAAC-L. In drawing PVs it is common to extract principal components from the background variables and enter these into the latent regression. The principal components extracted as background model for drawing the PVs for the PIAAC-L SUF represent about 35% of the variance of all available background variables. To include a smaller number of analysis variables with 100% representation in the latent regression model, a tailored combined latent regression model with a specific selection of background variables would be appropriate.

In accordance with PIAAC 2012, the PIAAC-L 2015 data set includes ten PVs per domain. Again, the plausible value methodology allows for analyses of structural models at a population or subpopulation level. All inferences drawn from analysis are meaningful at population or sub-population level. Please note that PVs do not provide estimates for individuals. In order to capture the uncertainty associated with the analyses properly, it is necessary to replicate each analysis with all ten PVs. The User Guide for the German PIAAC Scientific Use File (Perry et al., 2017) describes how to combine the results with acknowledgement of the uncertainty across the sets of PVs.

The PIAAC-L Scientific Use Files contain three sets of PVs:

- Set 1: PIAAC 2012 competence assessment with extended background information from PIAAC 2012 and PIAAC-L 2014 (ZA5989_Persons_14)
- Set 2: PIAAC 2012 competence assessment longitudinally scaled with extended background information from PIAAC 2012, and PIAAC-L 2014 and 2015 (ZA5989_Persons_15)
- Set 3: PIAAC-L competence assessment 2015 longitudinally scaled with extended background information from PIAAC 2012, and PIAAC-L 2014 and 2015 (ZA5989_Persons_15)

This will be described in more detail in the following two sections.

More Background Information, New Plausible Values: PIAAC 2012 and Additional PIAAC-L Questionnaire 2014

For PIAAC 2012 the item response model used was a three-dimensional generalized partial credit model (GPCM, Muraki, 1992) reflecting the three domains literacy, numeracy and problem solving in technology-rich environments (see the PIAAC Technical Report, Yamamoto, Khorramdel, & von Davier, 2013a). The variables in the latent regression were basically all additional variables from the questionnaire used in the PIAAC 2012 data collection. With the data collected in the first wave of PIAAC-L in 2014 additional background variables became available for analysis with the PIAAC 2012 competencies. In order to enable such analyses, it is necessary to generate a new set of PVs based on the item responses of the PIAAC cognitive assessments 2012 and all the information from the questionnaires of the PIAAC 2012 data collection and the first wave of PIAAC-L 2014.

Figure 2 shows a simplified combined model used to generate PVs. The blue boxes on the left represent the observed responses from the PIAAC cognitive items. The green box represents the background information collected in PIAAC 2012. The full set of PIAAC items, including both responses to cognitive items (blue boxes) and background questionnaire variables (green box), was used in the PIAAC 2012 scaling process and is described in the PIAAC technical report (Yamamoto, Khorramdel, & von Davier, 2013a). The red boxes indicate the additional background variables from PIAAC-L 2014 added into the 2014 combined model for drawing PVs.

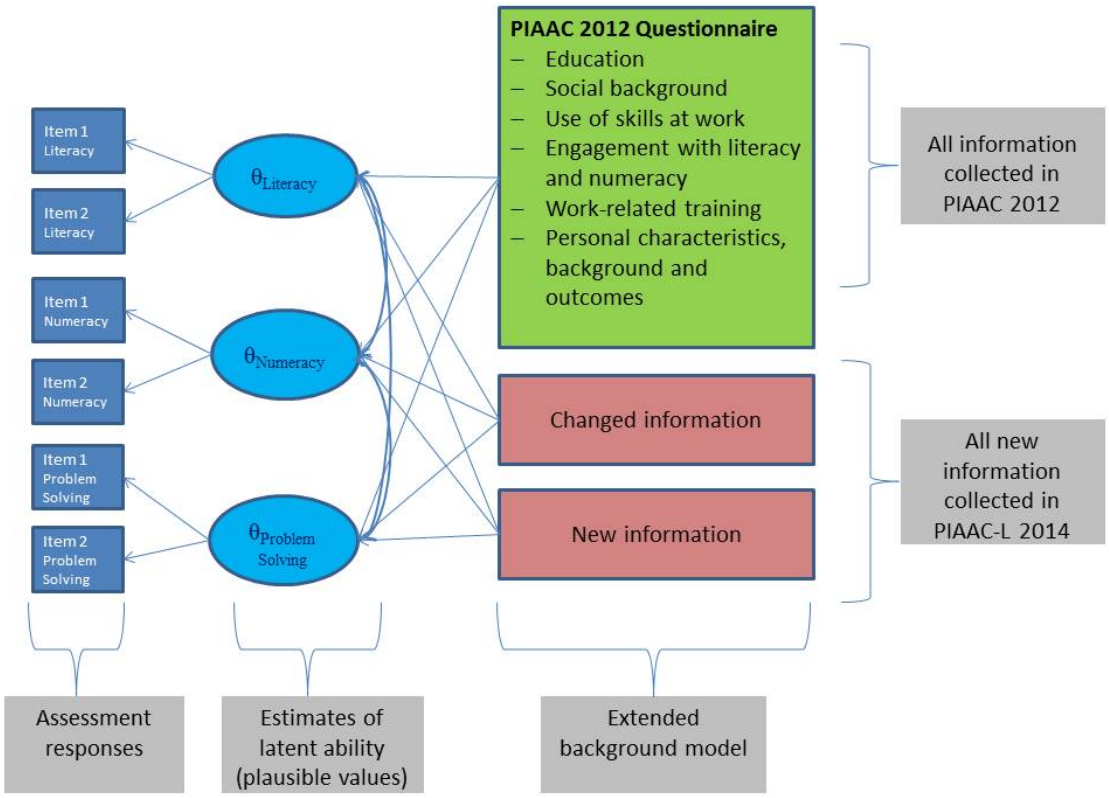

Figure 2: Simplified Scaling Model

Update note:

The PVs in the model were updated in Version 2.0.0 for two reasons. First, there was a change in the computation of survey weights (see section on Updated Data Set Weights_14). Since survey weights are used in generating the PVs, these had to be updated. Secondly there was a change in the selection of background variables for the combined model. This change however hardly alters the results compared to the results of the previously released version. However, make sure you only use files from the December 2016 release or later releases.

The background model was computed from all background variables collected in 2012 and 2014, 155 principal components were included in the latent regression model, these principal components reflect 35% of the variance of all background variables. For the estimation of the regression coefficients the updated weights (hrf_14) provided for PIAAC-L 2014 (Version 2.0.0) were applied.

Please note that differences between PVs released with the PIAAC 2012 data and the PIAAC-L 2014 data within domains reflect a) the extended set of background variables available, b) slight differences in selecting and entering variable into the background model, c) changes in the computation of survey weights, and d) measurement error.

Longitudinal Analyses of Competencies With the PIAAC 2012 and PIAAC-L 2015 Assessments

With the repeated measurement of PIAAC literacy and numeracy, changes in these two domains over time can be analysed. The item response model needs to assure the interpretation of longitudinal changes, i.e. it must set the competence scores from the two measurements onto the same latent scale. This is achieved by setting the item parameters for the repeatedly presented items equal. Figure 3 shows a simplified illustration of the item response model for the domain of literacy. The difficulties of items that are repeated are set equal, slope parameters as well. As a consequence the competence scores are scaled onto the same latent trait and differences between the score for any single person or group can be interpreted as differences between the two measurements.

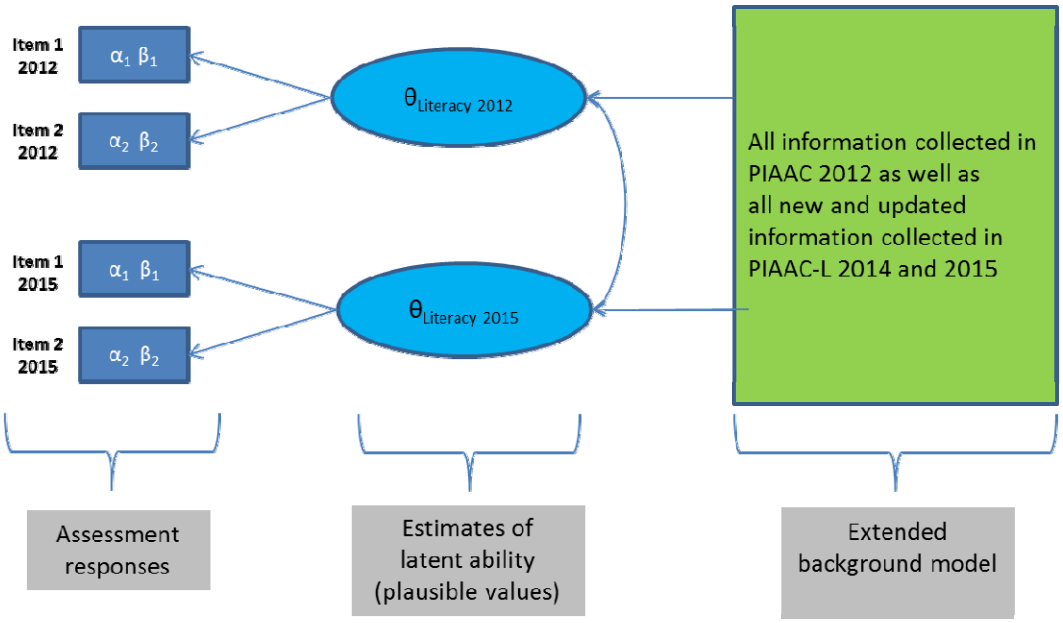

Figure 3: Simplified Longitudinal Item Response Model

The complete model for scaling the 2015 PIAAC-L competence data and generating the PVs is shown in Figure 4. The item response model is four-dimensional with restrictions on the item parameters (see above). Please note that because the cognitive data was processed by the PIAAC-L consortium and not the international PIAAC consortium, it was not possible to replicate the exact same scoring algorithms for computer-based literacy highlighting items as in PIAAC 2012. Therefore the item parameters for these items were re-estimated for the PIAAC-L 2015 data. In consequence the differences between PVs from both measurement points can be evaluated without further constraints for the user.

The background model was computed from all background variables collected in 2012, 2014 and 2015, 163 principal components were included in the latent regression model, these principal components reflect 35% of the variance of all background variables. For

the estimation of the regression coefficients the longitudinal weights provided for PIAAC-L 2015 were applied.

A more detailed description of the scaling models and plausible value generation for the data of all three waves in PIAAC-L can be found in the technical report on scaling Carstensen et al., 2017).

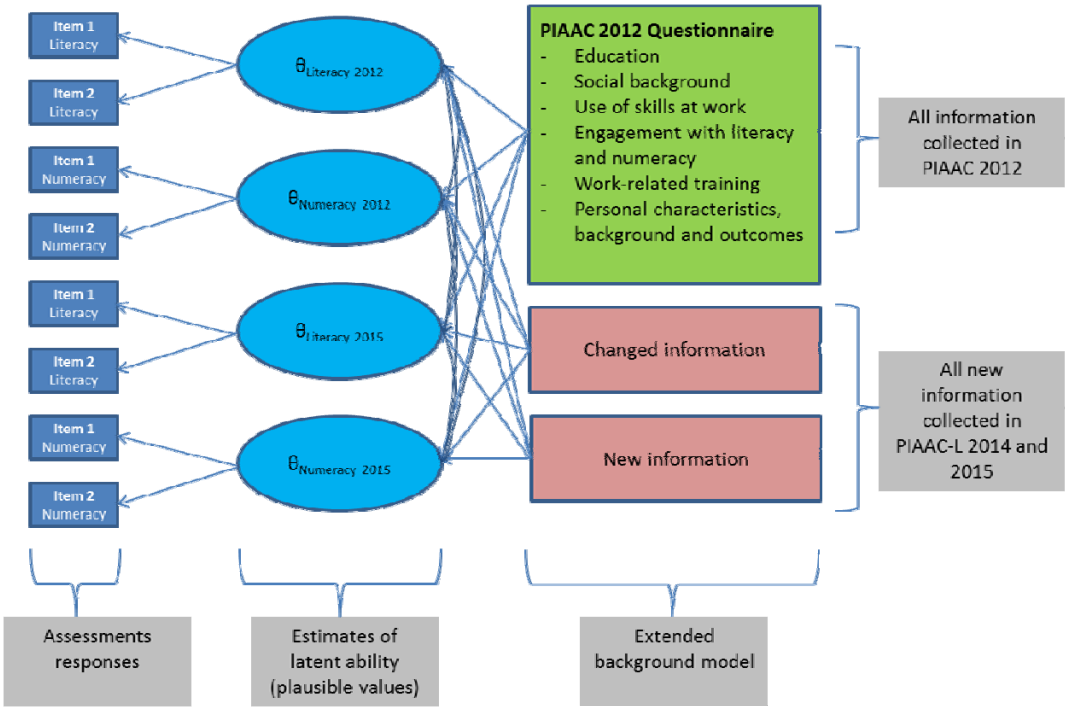

Figure 4: Simplified Combined Model for Longitudinal Analyses

How Should Plausible Values Be Used in PIAAC-L?

To perform analyses with plausibles values it is necessary to repeat the intended analysis with each plausible value and combine the result over the ten analyses. The procedures to combine results and compute standard errors are known as Rubin rules and are reported in guidelines for data analysis (chapter 18.3 in Yamamoto, Khorramdel, & Von Davier, 2013b; von Davier, Gonzalez & Mislevy, 2009).

As mentioned above, the variables used for the background models in PIAAC-L 2014 and 2015 are listed in the two excel files
ZA5989_PIAAC_L_Variables_PVs_background_model_14.xlsx and
ZA5989_PIAAC_L_Variables_PVs_background_model_12_15.xlsx.

Note that context variables from the second wave (data file ZA5989_Persons_15) are not contained in the background model for PIAAC-L 2014 and thus should not be used for cross-sectional analyses with PVs from the first wave. The user has to make sure that the variables they intend to include in their analyses have been included in the background model as well.

Cross-Sectional and Longitudinal Analyses

The PIAAC 2012 proficiencies may be analysed cross-sectionally using either the background model from the original PIAAC scaling, the background model from the PIAAC-L 2014 scaling (with updated PVs as provided in the PIAAC-L SUF released in December 2016 or later) or with the background model from PIAAC-L 2015. For all three options the user has to apply the appropriate survey weight, either the original PIAAC survey weight (SPFWT0), the 2014 survey weight hrf_14 or the 2015 weight for cross-sectional analyses hrf_15.

Longitudinal analyses comparing changes in competences between 2015 and 2012 in the PVs are possible. Analyses could be performed for example by evaluating differences between pairs of PVs for PIAAC literacy or numeracy over time and aggregating the results over the ten pairs of PVs, or by regression of the 2015 values onto the 2012 values and further variables. For all longitudinal analyses the appropriate weight would be the PIAAC 2012 survey weight (SPFWT0) multiplied with the 2015 nonresponse factor (bleib_15). Please note that PVs for PIAAC literacy and numeracy are only available for anchor persons who participated in PIAAC-L.

In addition to competence measures based on the more complex PVs methodology, WLEs (Warm, 1989) are provided to allow the user to perform preliminary analyses (e.g., in terms of frequency distributions or regression analyses). Compared to PVs, WLEs yield unbiased estimates of individual competence scores. WLEs for NEPS reading and mathematics were estimated for each respondent with at least five responses to items, regardless of whether they were correct or incorrect. Because it was not possible to generate PVs with a background model that also includes the PIAAC-L 2016 data, WLEs for the literacy and numeracy measured in PIAAC-L 2015 (with PIAAC instruments) are provided to users for preliminary analyses (these are included in ZA5989_Persons_15 as of Version 3.0.0). These WLEs are available only for a restricted number of anchor persons, since not all anchor persons were administered PIAAC instruments in PIAAC-L 2015 (see the eight different assessment conditions shown in Figure 1). In addition, the minimum number of valid responses was set to fifteen for the generation of WLEs for literacy and numeracy (as measured with PIAAC instruments in PIAAC-L 2015). A detailed description of the sample characteristics and the scaling procedures is provided in the technical report on scaling (Carstensen, Gaasch, & Rothaug, 2017).

Plausible Values Estimation Using R Package ‘PVPIAACL’

The PIAAC-L consortium partner LIfBi developed an R package which implements a Bayesian estimation algorithm that simultaneously generates plausible values and imputes missing values in background variables. In addition to the plausible values released in the PIAAC and PIAAC-L scientific use files, users can estimate plausible values themselves specific to their research question, i.e., users select context variables from the PIAAC-L Scientific Use Files which are suitable for their analysis and directly define the population model during PV estimation. This estimation strategy addresses both item nonresponse in background variables as well as the “curse of dimensionality”

due to the extensively large background information resulting from three waves of data collection in PIAAC-L. Note that the PIAAC-L 2016 data set does not contain a set of PVs that takes context variables from this last data collection into account. Users may, however, generate their own PVs using these context variables via the R package ‘PVPIAACL’.

More information about ‘PVPIAACL’ can be found at the corresponding GitHub repository:

https://github.com/jcgaasch/PVPIAACL

User Notes on Inconsistencies in the Data

Any collected data can be affected by measurement error. The resulting inconsistencies in the data may be more visible in longitudinal than in cross-sectional surveys. It is often not possible to determine the "true" answer because the inconsistencies are only detected quite some time after the actual interview took place. It is our policy to be transparent with regard to known discrepancies, but we make no corrections to the data – we leave it to the discretion of each PIAAC-L data user as to how to deal with inconsistencies.

The following list of key inconsistencies is not exhaustive and will be supplemented as required:

- pnrfestid = 80525602: Relationship status to anchor person inconsistent across waves. In wave 2014 and 2016 the reported status was "sister", whereas in wave 2015 the anchor explicitly reported this person as his "partner". Please note: In wave 2015 only anchor persons and their partners were interviewed.
- pnrfestid = 80281102: Relationship status to anchor person inconsistent across waves. In wave 2014 and 2016 the reported status was "half-sister", whereas in wave 2015 the anchor explicitly reported this person as his "partner". Please note: In wave 2015 only anchor persons and their partners were interviewed.
- The highest school qualification level and the highest professional qualification level were measured with identical questions in PIAAC 2012 (B_Q01aDE1_REC and B_Q01aDE2_REC) and PIAAC-L 2015 (B_Q01aDE1_15 and B_Q01aDE2_15). For some anchor persons responses between the two periods vary. While at least some increases in highest level of education are to be expected, there are also a number of implausible declines in the education level from 2012 to 2015
- pnrfestid = 80167701: Due to a technical problem in wave 2016, no household protocol was administered. As a consequence, it was not possible to interview other members of this household in 2016.
- pnrfestid = 80435601: Change of employment status. During the data cleaning process after fieldwork of wave 3, the employment status (perw_16) of this person was recoded from "employed part-time" to "working in a sheltered workshop" due to information provided by the interviewer at the end of the interview. Since the respondents' answer to perw_16 is relevant for the routing in the questionnaire, this person shows a similar routing to people who stated that they work part-time. The routing of this respondent differs from respondents who stated during the interview that they work in a sheltered workshop.

Annex A: Information on Datasets for Users Familiar With SOEP

Table A1. The SOEP Datasets and Their Equivalent in PIAAC-L

SOEP-Dataset	Description	PIAAC-L 2014 Dataset	Variables
$P	Variables from person questionnaires	ZA5989_Persons_14	pzuf01_14 - pzule1_14
$PGEN**	Generated person-level variables	ZA5989_Persons_14	emplst_14-famstd_14-
$H	Variables from household questionnaires	ZA5989_Household_14	hwm_14-hkind_14
$HGEN**	Generated household-level Variables	ZA5989_Household_14	moveyr_14 - acquis_14
PPFAD	Multi-wave person core information	ZA5989_Registry	gebjahr germborn loc1989_14 migback_14
PHRF	Person weights	ZA5989_Weights_14	
PBIOSPE	Biography calendar (spell data)	ZA5989_Calendar_14	

SOEP-Dataset	Description	PIAAC-L 2016 Dataset	Variables
$P	Variables from person questionnaires	ZA5989_Persons_16	pzuf01_16-pwbtag_16 bwbang_16-pweit_16 pweit18a_16 pweit21_16 p7tag_16 – ppnr_16 psta1_16 – pnatnr_16_C pfs141_16-pzule1_16 lsex_16 – age_r_16
$PGEN**	Generated person-level variables	ZA5989_Persons_16	pber_KldB10_16 - pber_MPS_16 nation_16 emplst_16-famstd_16
$H	Variables from household questionnaires	ZA5989_Household_16	hvj_16 – hkind_16
$HGEN**	Generated household-level Variables	ZA5989_Household_16	moveyr_16 - osubs_16
PPFAD	Multi-wave person core information	ZA5989_Registry	gebjahr germborn loc1989_15 migback_16
PHRF	Person weights	ZA5989_Weights_16	
PBIOSPE	Biography calendar (spell data)	ZA5989_Calendar	
COGNIT	Test of cognitive competencies	ZA5989_Cognit_16	f096item1s- f096t90s; f099e1 - f099s90

Table A2. SOEP Datasets not Generated in PIAAC-L but for Which Some Corresponding Information was Collected in PIAAC-L:

SOEP-Dataset	Description	PIAAC-L 2014 Dataset	Variables
BIOBIRTH	Multi-wave birth biography	ZA5989_Persons_14	lkind_14 - lkwo8_14
BIOBRTHM	Birth biography men	ZA5989_Persons_14	lkind_14 - lkwo8_14
BIOCOUPLM	(Generated biographical information)	ZA5989_Persons_14	lp1a_14 - lehe3d_14
BIOCOUPLY	(Generated biographical information)	ZA5989_Persons_14	lp1a_14 - lehe3d_14
BIOEDU	Biographical data on educational participation and transitions	ZA5989_Persons_14	lsab1_14 - lab26_14
BIOJOB	Biography job activities INFO	ZA5989_Persons_14	l1erw_14 - lwehr3_14
BIOPAREN	Parents data	ZA5989_Persons_14	lvm_14 - lm13_14
BIOSOC	Own youth	ZA5989_Persons_14	lgeb_14 - lkh10_14 lleist_14 - lsp3_14
BIOSIB	Sibling data	ZA5989_Persons_14	lbsanz_14 - lbs15n10_14
$KIND	Generated child variables (person-level)	No corresponding information collected	

SOEP-Dataset	Description	PIAAC-L 2016 Dataset	Variables
BIOBIRTH	Multi-wave birth biography	No corresponding information collected	
BIOBRTHM	Birth biography men		
BIOCOUPLM	(Generated biographical information)		
BIOCOUPLY	(Generated biographical information)		
BIOEDU	Biographical data on educational participation and transitions	ZA5989_Persons_16	lsab1_16 – pab7_16
BIOJOB	Biography job activities INFO	No corresponding information collected	
BIOPAREN	Parents data	ZA5989_Persons_16	lvm_16 - lm12_16
BIOSOC	Own youth	No corresponding information collected	
BIOSIB	Sibling data		
$KIND	Generated child variables (person-level)	No corresponding information collected	

Please note that SOEP data sets not listed in Table A1 and A2 have no correspondence in PIAAC-L.

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