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Contents

1 Introduction

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 (Zabal et al., 2014). The German PIAAC-Longitudinal Project (PIAAC-L)[1] follows up the original German PIAAC respondents and members of their households, ages 18 and over, with three additional waves of data collection (in 2014, 2015, and 2016). This study is a cooperative project of GESIS – Leibniz Institute for the Social Sciences, the National Educational Panel Survey (NEPS) at the Leibniz Institute for Educational Trajectories (LIfBi), and the Socio-Economic Panel (SOEP) at DIW Berlin (Zabal, Martin, & Rammstedt, 2016).

The present paper describes the weighting process for the first of the three PIAAC-L waves and refers to the dataset ZA5989_Weights_14. This dataset is one of five sub-datasets that were released for 2014 as part of the PIAAC-L scientific use file.[2] We start with a short description on the key features of the study design of PIAAC-L that are important for the weighting procedure. Subsequently, we will illustrate the weighting procedure applied in PIAAC-L by describing the two weighting steps nonresponse adjustment and post-stratification or calibration.

One major challenge in wave 1 (2014) of the PIAAC-L project was to harmonize different approaches in PIAAC[3] and the SOEP. Compared to more "regular" panel studies like e.g. the SOEP (Wagner, Frick, & Schupp, 2007; Kroh, Siegers, & Kühne, 2015) that pursue the plan for a panel survey design from scratch on, the recruitment of PIAAC participants–here referred to as PIAAC 2012 anchor persons–into a panel survey (PIAAC-L) had followed a somewhat different path. Hence one consequence is that in PIAAC-L weighting was only performed for PIAAC 2012 anchor persons and not for other household members who participated in PIAAC-L only. There is no data available to calculate the sampling probability of these household members, and thus weighting would have had to follow a different approach for this group, which was not further pursued.[4] As only the PIAAC 2012 anchor person will be followed-up in future waves of PIAAC-L, this is also plausible from an analytical perspective.

1.1 Methodological Aspects of the PIAAC-L Study Design

The PIAAC 2012 survey was designed as a cross-sectional survey with a person-based sampling approach. To enable a possible follow-up survey and thus enrich the analytical power of the data, researchers included the question on further willingness to participate in a survey. This question was posed very generally[5] and it yielded a rate of 98%[6] that declared their willingness to be re-contacted, which was considered as an excellent starting point for a follow-up study. With regard to weighting in PIAAC-L 2014, the group of PIAAC 2012 sample members with a negative answer had to be taken into account separately and thus entailed a separate step in the nonresponse analysis. Another special

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[1] Commissioned by the Federal Ministry of Education and Research, Berlin, Grant number 01 JP 1301 A, B, C

[2] Last update 21.12.2016: GESIS – Leibniz Institute for the Social Sciences, German Socio-Economic Panel (SOEP) at DIW Berlin & LIfBi – Leibniz Institute for Educational Trajectories (2016): PIAAC-Longitudinal (PIAAC-L), Germany. GESIS Data Archive, Cologne. ZA5989 Data file Version 2.0.0, doi: 10.4232/1.12707

[3] Readers not familiar with the PIAAC 2012 weighting procedure are referred to Zabal et al. (2014), pp. 80 and Mohadjer, Krenzke, and Van de Kerckhove (2013) for further information.

[4] See Saßenroth, Kroh, and Wagner (2013) for a weighting approach in which no sampling probability can be calculated.

[5] The question asked was: "Could you imagine participating in a follow-up interview?" ("Könnten Sie sich vorstellen, dann an einer weiteren Befragung teilzunehmen?").

[6] 98 percent refers to the PIAAC 2012 net sample.

group within the PIAAC 2012 survey is comprised of those original PIAAC 2012 sample members who refused the interview due to literacy-related reasons but for whom the information on age and gender was collected (A), and those who did not complete the assessment or–in a very few cases–parts of the background questionnaire (B). These respondents (A+B) were considered as completed cases in PIAAC 2012 and are thus part of the PIAAC 2012 net sample but have not been re-contacted for PIAAC-L. They form another group that is treated separately in the nonresponse analysis.

Another consequence of the somewhat different path from a cross-sectional to a panel study is the duration between first and second field phase. At least about two years had already passed after the last contact between an interviewer and the respondent when the PIAAC-L fieldwork started in 2014. This left a large period of time in which changes may have occurred in the lives of the respondents that could make further participation impossible[7] or less likely.[8] Prior to fieldwork, respondents were contacted by TNS Infratest to thank them for their participation in PIAAC 2012 and introduce the new study PIAAC-L to them (see Zabal et al., 2016, for further information). Some of the respondents took this as an opportunity to tell us that they were not willing to further participate.

Thus, for those interviewees of PIAAC 2012 who were re-contacted there were different points in the transition process to PIAAC-L at which attrition could occur. The group of nonrespondents for PIAAC-L can thus be divided into different groups according to their reasons for nonresponse. Following general concepts of nonresponse (see e.g. Stoop, 2005), these different groups are considered independently and translated into different analytical steps in the PIAAC-L weighting concept.

1.2 The PIAAC-L Weighting Concept

For PIAAC 2012, a cross-sectional weight and replicate weights were calculated. These weights include both the nonresponse analysis and the poststratification. In a panel study like the SOEP, nonresponse weights are calculated separately to account for the panel attrition and also to enable separate analyses of single waves. This weight flows into the calculation of the cross-sectional weight. Since PIAAC-L has transformed into a panel study, the panel approach was applied here as well and both, nonresponse weight (bleib) and cross-sectional weight (hrf), were calculated and delivered. Subject of the next section is the calculation of the nonresponse weight.

Variance Estimation

Since PIAAC-L is a follow-up study to PIAAC 2012, addressing German PIAAC respondents who had consented to being re-contacted, the starting point with regard to sampling is the original sample selection in PIAAC. Thus, for purposes of variance estimation, users should use variables on sampling and stratification as provided in the PIAAC 2012 scientific use file, such as the variables VARSTRAT, VARUNIT, ID_PSU, STRAT_PSU, Federal_state, or GKPOL. Replicate weights for variance estimation, as provided for the PIAAC scientific use file, are not computed for PIAAC-L.

[7] One example is the death of the respondent; further examples are: moving abroad or to an unknown address.

[8] For example when respondents moved within Germany.

2 Modelling Nonresponse and Nonresponse Weights

Nonresponse weights are derived by using the inverse predicted probability from logistic regressions models where the dependent variable is a 0/1-variable (nonresponse/response). As described earlier, there were different groups of nonrespondents en route to the PIAAC-L survey. Thus, the analysis was split into four different models (which entail four different dependent variables) that are described in the next section.

2.1 Dependent Variables and Response Rate

As mentioned earlier, in the special case of the first wave of PIAAC-L, we have two further non-response steps[9] in addition to the regular steps:[10] adjusting for noncontact and nonresponse.

Hence, we needed to adjust for (M1) literacy-related nonresponse (N=86) and (M2) non-completion of assessment or non-consent (N=154). Persons forming group (M1) did not take part in the PIAAC 2012 interview. The second group (M2) consists of those who did not complete the assessment or neglected to take part in a follow-up survey to PIAAC 2012. Both groups were part of the net sample in PIAAC 2012 (N=5,465), but not of the gross sample for PIAAC-L.

Thus, the gross sample for PIAAC-L 2014 (i.e. field phase in 2014) was a total of 5,225 anchor persons. This gross sample was further divided into the last three groups: noncontact (M3) and nonresponse (M4) and of course respondents.

Table 1 describes the result of the fieldwork for PIAAC-L 2014. The response rate was 72.5%, referring to the gross sample for fieldwork and excluding neutral (ineligible) drop-outs (Table 1 and Steinacker, Schmidt, Wolfert, & Schneekloth, 2016).

A nonresponse rate of 27.5% leaves space for nonresponse bias, which should be corrected for (Groves & Peytcheva, 2008). Referring to the net sample of PIAAC 2012, which included 5,465 cases[11] the analysis was undertaken in four steps. This was done to account for the possible different reasons for nonresponse for the four groups of nonrespondents described above and thus to make the models more effective.

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[9] See description of (M1) and (M2) hereafter.

[10] This refers to more "regular" panel surveys such as the SOEP (Kroh, 2014).

[11] Please note that numbers in Table 2 differ, as people who moved abroad or deceased (N=37) were not included in the analyses, following the standard weighting approach of the SOEP (Kroh, Käppner, and Kühne, 2014).

Table 1 Result of Fieldwork for PIAAC-L 2014

Final results	Abs.	%
Interview		
Interview valid - hh-int and pers-int PIAAC anchor	3,737	71.5
Interview valid – pers-int PIAAC anchor, no hh-int.	21	0.4
Ineligible		
Anchor person moved abroad	31	0.6
Anchor person deceased	6	0.1
Anchor person lives in an institution	3	0.1
Noncontact (M3)		
Declined to participate before start of fieldwork	17	0.3
Anchor person moved to unknown address	121	2.3
Anchor person moved to known address	10	0.2
Address no longer exists	8	0.1
Anchor person unknown at given address	33	0.6
No home / does not live at address	2	0.0
No one home	170	3.3
Door not opened	6	0.1
Nonresponse (M4)		
Interview impossible during fieldwork	142	2.7
Anchor person unable to respond due to long-term illness or other reason	46	0.9
Linguistic problems, inadequate German skills	4	0.1
Unwilling to participate in interview	829	15.9
Other reasons, unusual circumstances	4	0.1
Contact established without final result	23	0.4
Interview not suitable for analysis	12	0.2
Gross sample	5,225	100.0

Please note: Different from content-related analyses, modelling of nonresponse aims at consistent estimation of response propensities. There is no focus on an interpretation of the effects (Spieß, 2010). All independent variables–apart from perfect predictors–were included in a full model in each step to reduce the model in a second step to those significant at the 5%-level.

2.2 Independent Variables

The aim of modelling nonresponse is to produce response propensities that can then serve as a basis for weighting factors which are developed to compensate for nonresponse bias. To model nonresponse, variables are needed that are available for both, respondents and nonrespondents. In the case of a panel or follow-up survey like PIAAC-L, characteristics from the initial survey can be used to explain potential selectivity in the following waves. In our case, these were variables from the PIAAC 2012 survey. For step one of the nonresponse model, only a few variables were available and thus all of them were used. For steps two, three, and four, the selection was based on the rationale and assumptions in the field of survey methodology (see also Kroh et al., 2014). For model three and four, a small set of variables from PIAAC-L 2014 was used (namely housing type, housing area, change of interviewer, and whether a household moved between waves) in addition. See Table 2 for details.

Table 2 Summary of Independent Variables

	Model 1: LR* nonresponse	Model 2: no completion of assessment or no consent	Model 3: noncontact	Modell 4: nonresponse
Gender	X	X	X	X
Age (grouped)[12]	X	X	X	X
Size of municipality (grouped)	X	X	X	X
Federal state	X	X	X	X
Migration background (at least one parent born abroad)		X	X	X
German citizenship		X	X	X
Education (highest degree - school)		X	X	X
Education parents		X	X	X
Native language German		X	X	X
Income and employment status		X	X	X
Household size (anchor)		X	X	X
Children in household		X	X	X
Moved (within/outside municipality)			X	X
Housing/building type				X
Housing area				X
Literacy (quartiles)		X	X	X
Numeracy (quartiles)		X	X	X
Problem solving (quartiles)		X	X	X
Interviewer change (from last wave)				X
n	5,428	5,342	5,188	4,821

*LR=literacy-related nonresponse

In PIAAC 2012, for each assessed competency domain, literacy, numeracy and problem solving in technology-rich environments, 10 plausible values were computed (Yamamoto, Khorramdel, & von Davier, 2013). For weighting in PIAAC-L 2014, these proficiency measures were used in the nonresponse adjustment models by first calculating for each domain the mean across all ten plausible values. In a second step, quartiles were calculated. For the competency domain problem solving, an extra category was calculated for cases in which no plausible values were present (n=915).[13]

2.3 Model 1 – Literacy-Related Nonresponse

Model 1 refers to step one of the analysis. Literacy-related nonresponse is already corrected for in the weighting process of PIAAC 2012 (Mohadjer et al., 2013; Zabal et al., 2014). However, since the 86 cases that are classified as literacy-related nonrespondents belong to the PIAAC 2012 net sample

[12] At the time of PIAAC 2012, thus the age range is 16-65. In the poststratification, the actual age is calculated and used.

[13] Those cases did a paper-based assessment in PIAAC 2012 in which the competency domain problem solving was not included. No imputation was performed for these cases (Zabal et al., 2014: 108).

and thus have a weighting factor in 2012, they should be considered in the nonresponse adjustment in PIAAC-L. In PIAAC 2012, only the information on age and gender was collected for the above mentioned 86 cases. In addition with information from the sample selection frame, such as municipality size and federal state, there was only a very limited list of independent variables available. As described, a full model with all of these variables was calculated first and then stepwise routines were run in order to calculate a reduced model with only significant factors. Figure 1 shows the coefficients and the 95%-confidence interval for illustration.[14]

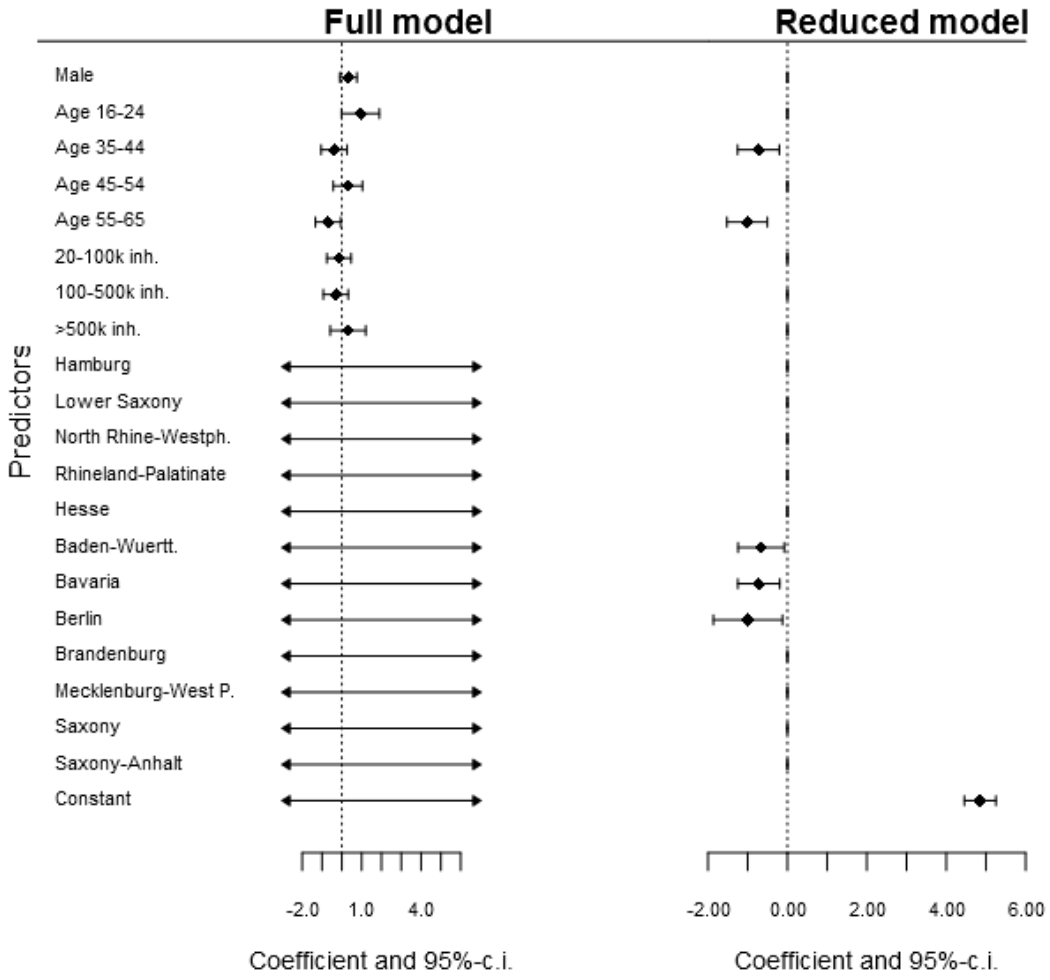

Figure 1 Coefficients and Confidence Intervals for Model 1

[14] Please note that in the case of the federal states in the full model, both the confidence intervals and the coefficients (all <-13) exceed the space limitations and thus are not properly displayed.

Table 3 Fit Values for Estimated Models for Step 1

	Full model	Reduced model
Observations	5,428	5,428
Pseudo-R^2	0.061	0.032
R^2(McFadden)	0.013	0.018

As expected, only few variables remain in the reduced model, which also has a rather low statistical power (see Figure 1 & Table 3). From the perspective of the quality of the longitudinal sample, we find relatively weak empirical evidence for clear selectivity patterns up to that stage.

2.4 Model 2 – Nonresponse due to Assessment Break-Off or Non-Consent

This step of the analysis refers to those who did not finish the PIAAC 2012 interview completely or did not consent to participate in further surveys. For this step of nonresponse adjustment, the full set of PIAAC 2012 variables could be used. Figure 2 and Table 4 show the outcomes of the full and reduced model. The statistical power of the reduced model turned out to be higher and the list of variables that remain in the model is longer, compared to model 1. In this case, we can assume that mechanisms of nonresponse with regard to the topic of the survey are relevant.

Table 4 Fit Values for Estimated Models for Step 2

	Full model	Reduced model
Observations	5,342	5,342
Pseudo-R^2	0.210	0.181
R^2(McFadden)	0.128	0.151

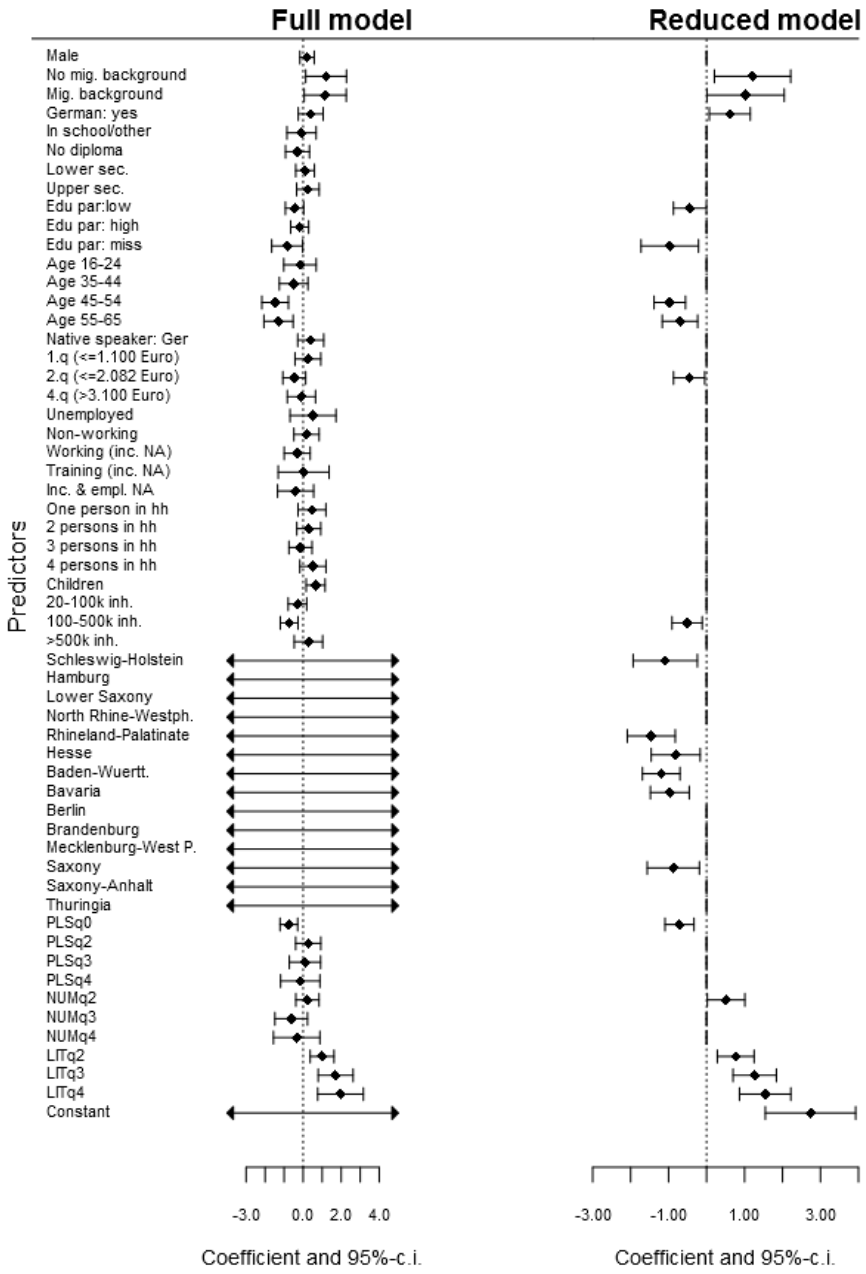

Figure 2 Coefficients and Confidence Intervals for Model 2[15]

Although the analysis cannot be interpreted on theoretical grounds, the results show effects that are to be expected (e.g., a positive effect of cognitive skills on participation). As already mentioned, this model has a much higher statistical power, also with respect to the following models. This means that the variables used are best suited to explain this step in the process of nonresponse-attrition within the first survey wave and non-consent to further waves. One interpretation of this finding is that the variables (see Figure 2) grasp topics that are characteristic for the PIAAC 2012 interview situation and

[15] List of abbreviations: q=Quartile (for income and proficiency measures), NA= No Answer, 1.q (<=1,100 Euro), 2.q (<=2,082 Euro), 4.q (>3,100 Euro) refer to monthly income.

content. This is in line with findings that the topic of a survey plays a role for survey participation (Groves, Presser, & Dipko, 2004). As mentioned earlier, the content-related interpretation of the models is not in the focus when modelling the nonresponse process. Also, the results of the other models do not provide any findings which would allow even such a general interpretation.

2.5 Model 3 – Nonresponse due to Noncontact

Model 3 is designed to model contact probability and includes, except for one, the same set of independent variables as model 2.[16] It shows lower statistical power than model 2 (see Table 5), demonstrating that the available variables are limited in their ability to explain nonresponse in this step.

Table 5 Fit Values for Estimated Models for Step 3

	Full model	Reduced model
Observations	5,188	5,188
Pseudo-R^2	0.104	0.091
R^2(McFadden)	0.060	0.077

[16] Paradata that were collected during fieldwork, such as information on the type and condition of a respondent's dwelling, could not be included in this analysis because that information was not available for all sample members.

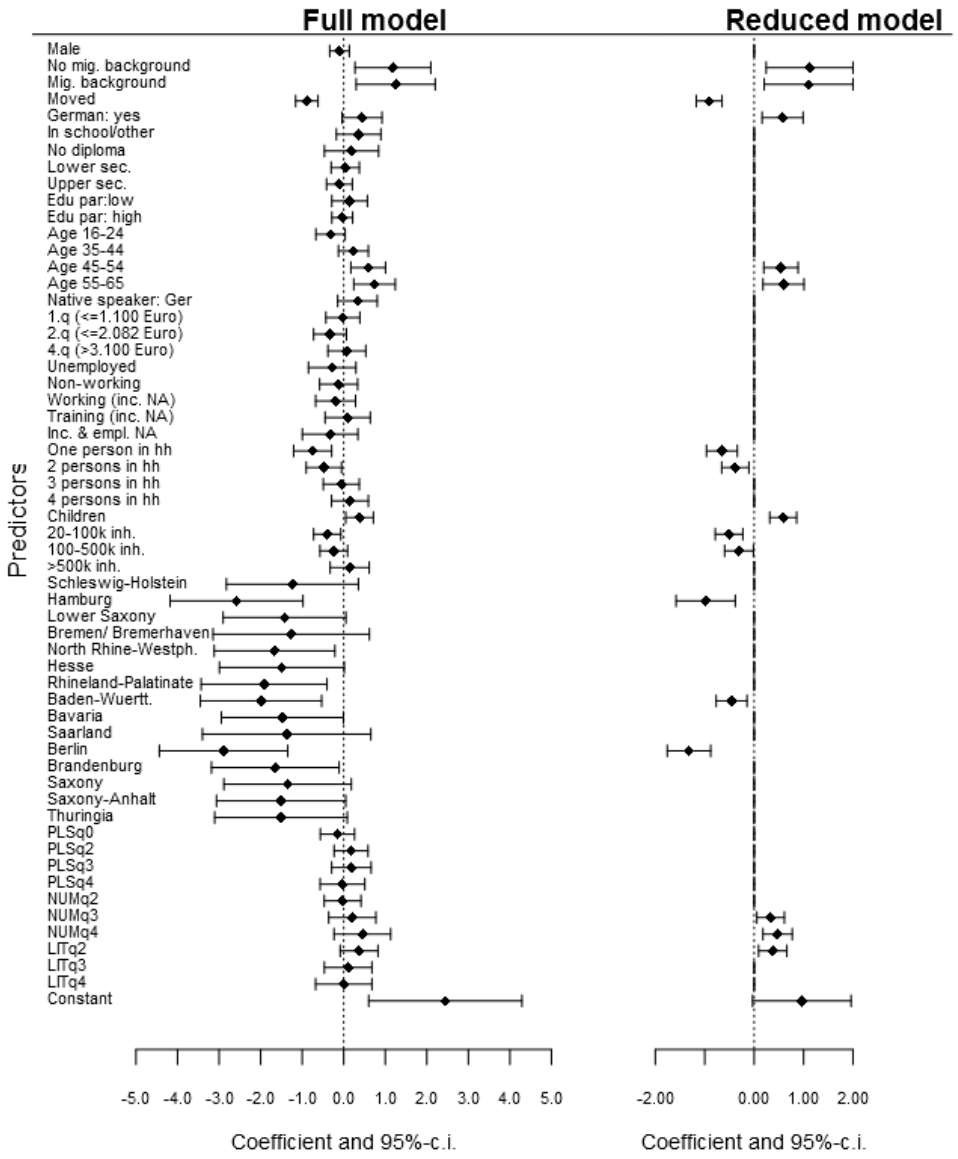

Figure 3 Coefficients and Confidence Intervals for Model 3

Referring to the variables that remain in the model (see Figure 3), there is a stronger focus on demographic variables such as household or municipality size than in model 2. This is in line with findings in other surveys (e.g., Stoop, 2005, pp. 66).

2.6 Model 4 – Nonresponse

Model 4 aims at modelling the final step: actual nonresponse to the interviewer's request to participate in PIAAC-L. This is, in numerical terms, the biggest step in the attrition process, with 1,060 individuals refusing to participate again. Still, the resulting statistical power of the model is again rather low (see Table 6).

Table 6 Fit Values for Estimated Models for Step 4

	Full model	Reduced model
Observations	4,821	4,821
Pseudo-R^2	0.042	0.031
R^2(McFadden)	0.014	0.027

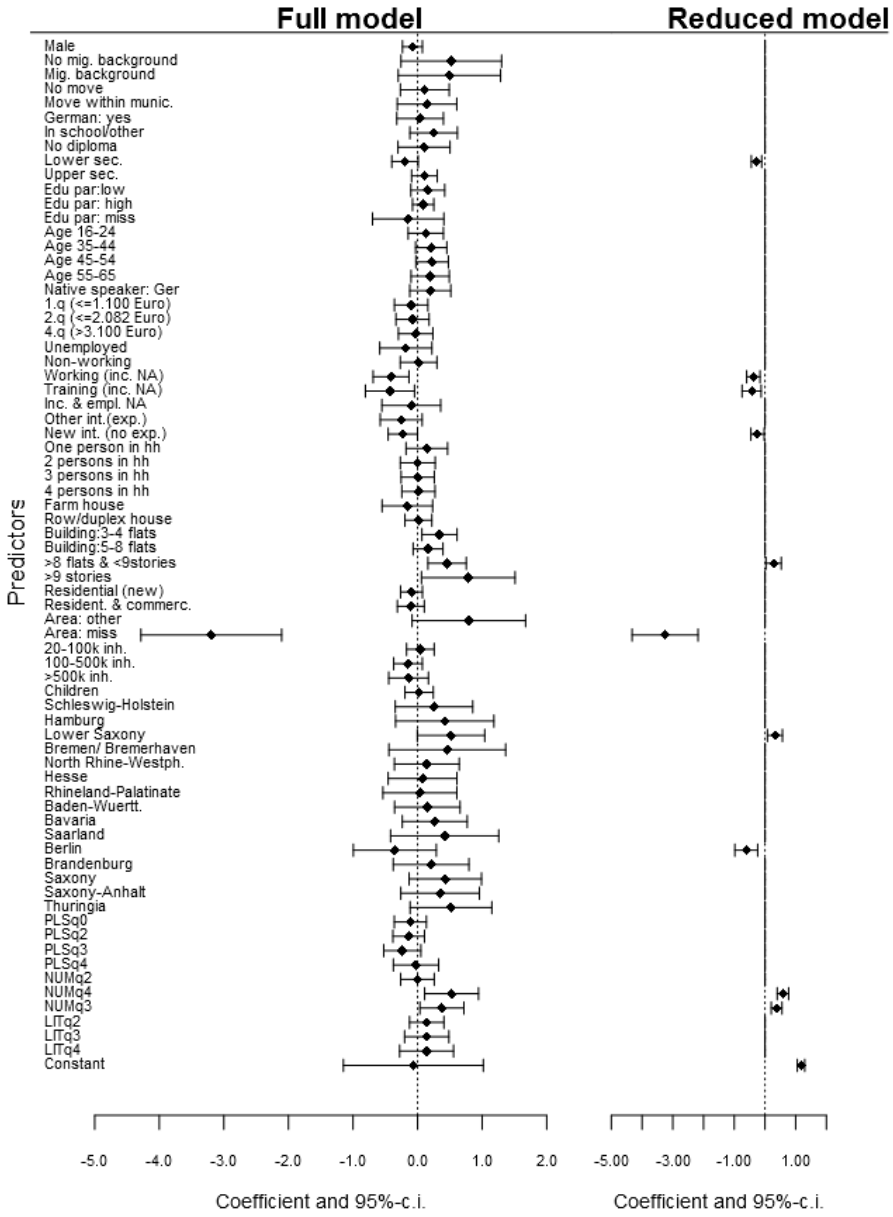

Figure 4 Coefficients and Confidence Intervals for Model 4

Only relatively few variables show explanatory power, including the competency scales and one of the education items (see Figure 4).

To calculate the raw nonresponse weight, the staying probability for each of the four models was calculated. The staying probability (P(WB=1)) consists of four factors, i.e. the calculated probability of each of these models described above: P(WB=1) = P(M1=1)*P(M2=1)*P(M3=1)*P(M4=1). The inverse of the staying probability forms the raw nonresponse weight.

2.7 Trimming of Weights

In contrast to PIAAC 2012,[17] weights of the first wave of PIAAC-L were trimmed prior to poststratification. In PIAAC 2012, weights were trimmed when exceeding $\left(3.5 * \sqrt{1 + \mathrm{CV}^2}\right) * \mathrm{Median}$, where CV^2 is the coefficient of variation of the weights (Mohadjer et al., 2013). The SOEP uses a similar approach, which is based on the ratio of weights. For example, for the refreshment sample K in 2012, the decision was made not to allow the maximum weight to exceed 1.75 times the mean weight (Kroh et al., 2014). The determination of the threshold is mainly driven by the decision not to trim more than 1% of the derived weights and thereby maintain efficacy. This strategy was also used in PIAAC-L 2014, resulting in the decision to trim weights that exceeded twice the median of the weight. Rather than reducing weights to the lower limit, the following formula was used:

$$\mathrm{W}_{\mathrm{korr}} = \left\{2 * \widetilde{\mathrm{W}}_{\mathrm{orig}} + \log\left(\mathrm{W}_{\mathrm{orig}} + 1 - \left(2 * \widetilde{\mathrm{W}}_{\mathrm{orig}}\right)\right), \text{if } \mathrm{w} > 2 * \widetilde{\mathrm{W}}_{\mathrm{orig}}\right\}$$

This resulted in 10 cases that were changed (0.26% of the sample) if above 2.78 (see Figure 5). Table 7 shows the distributions of the raw nonresponse weights and the trimmed weights which are identical with the final nonresponse weights bleib_14.

Table 7 Raw Estimated Nonresponse Weights vs. Trimmed / Final Weights (bleib_14)

	Min	10%	50%	75%	Max	Mean	SD
Raw nonresponse weights	1.15	1.24	1.39	1.52	11.36	1.44	0.30
Trimmed / final weights	1.15	1.24	1.39	1.52	3.96	1.44	0.21

[17] In PIAAC 2012, after the weighting step of nonresponse adjustment final sampling weights were computed and finally re-calibrated by firstly performing an initial calibration step and by secondly trimming extreme weights as required (see Mohadjer et al., 2013; Zabal et al., 2014).

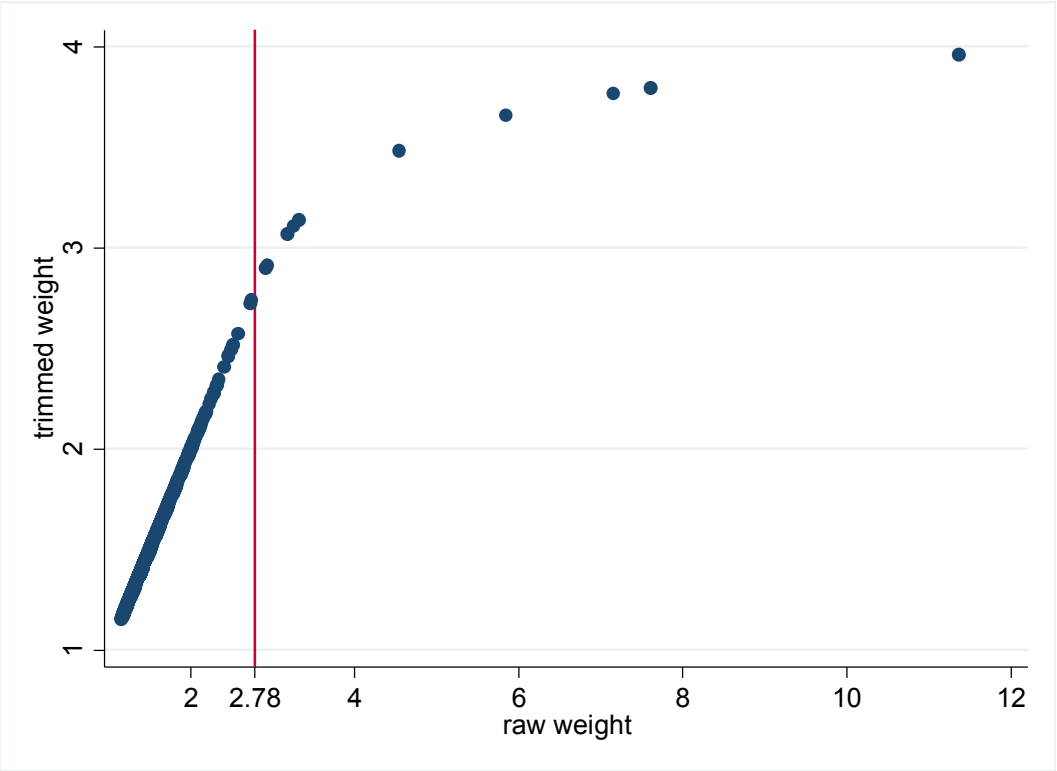

Figure 5 Scatterplot: Raw Estimated Nonresponse Weights vs. Trimmed / Final Weights

3 Calibration and Delivered Weights

The process of calculating weights described so far reflects the nonresponse adjustment. Calibration, however, 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.

In PIAAC-L, two questions had to be answered before starting the process: Question one referred to the definition of the reference population. Question two asked which variables and which procedures (raking vs. poststratification) were to be used.

The target population in PIAAC 2012 "[…] consisted of non-institutionalized adults aged between 16 and 65, whose usual place of residency was in the country, here Germany, during the time of data collection, regardless of their citizenship, legal status, or first language" (Zabal et al., 2014, p.50; also see Mohadjer et al., 2013; OECD, 2010). For PIAAC countries using a registry sample, such as Germany, only adults aged 16 to 65 on December 1, 2011 were considered as target population. For PIAAC-L, the reference population remained the same. However, since the PIAAC-L sample had no refreshment of sample members the target population was described as *non-institutionalized adults born between November 1946 and November 1995 that did not move to Germany in 2012 or later.* For this target group, the most up-to-date data from the 2014 Microcensus was used for calibration (Statistisches Bundesamt, 2015). This means that the population to which the weights refer consists of 51.46 million persons.[18]

Regarding the selection of variables for calibration in PIAAC-L 2014, the basic idea was to follow the approach used in PIAAC 2012: Here, the variables gender (2 categories), age (5), region (3) and education (4) were used at the individual level. These variables were used in a poststratification process. This weighting procedure could not be replicated one-to-one in PIAAC-L, as N in the cells in this 120-cell table (5*3*2*4=120) became too small with the reduced sample size. Therefore, a mixed approach between raking and poststratification was chosen. The combined table used the variables gender, age, and education as one raking reference and the variables region, size of household, and size of municipality as additional variables.[19] The additional variables were used according to the weighting approach of the German Socio-Economic Panel (Kroh et al., 2014), keeping in mind that the number of variables adjusted for should still be kept to a minimum.

The basis for the raking procedure was the product of the trimmed nonresponse adjustment factor (bleib_14) and the cross-sectional weight from PIAAC 2012. The descriptive statistics of the resulting weights are given in Table 8.

Table 8 Descriptive Statistics of the Final PIAAC-L-2014 Weights

	Min	10%	50%	75%	Max	Mean	SD
Final weights	3183.77	7010.73	11742.63	16050.20	74683.61	13692.84	7559.58

[18] Please note: Due to its design, it could not be ensured that the sample of the Microcensus precisely resembles the structure of the PIAAC-L sample, which, by definition, only includes persons in non-institutionalized households–both in 2011 and 2014. The reference sample might include a presumably small number of people that lived in institutions before 2014 as the Microcensus is a cross-sectional survey.

[19] For all variables, up-to-date information from 2014 was used.

3.1 Usage of Weights

In the dataset ZA5989_Weights_14, the two weighting factors bleib_14 and hrf_14 are included. The factor bleib_14 is the trimmed product of the (factors stemming from the) four nonresponse-analysis-steps. For longitudinal analyses, this factor should be multiplied with the cross-sectional weight from PIAAC 2012. The factor hrf_14 can be used for cross-sectional analysis with PIAAC-L 2014. Please keep in mind that the reference population as described above is limited to a certain age group and excludes people moving to Germany after 2012. Also, only anchor persons–those who had participated in PIAAC 2012–have a weighting factor. The information of the other persons in the household can be used as context information in the analyses.

3.2 Reduction of Bias

Table 9 gives an overview of the reduction of bias in PIAAC 2012 and PIAAC-L-2014 by means of weighting. In a first step, central sociodemographic indicators were estimated for the PIAAC 2012 cross-sectional sample by applying the PIAAC 2012 final full sample weight (SPFWT0). In a second step, a longitudinal estimation for the same sociodemographic indicators was conducted for the anchor persons' net sample in 2014, multiplying the final full sample weight of PIAAC 2012 with the non-response weight of PIAAC-L-2014 (SPFWT0 x bleib_14). Both, the unweighted results (raw) and the results after weighting for PIAAC-L-2014, are displayed in Table 9. It can be seen that bias induced by nonresponse in PIAAC-L was reduced by means of weighting in most cases.

Table 9 Reduction of Bias by Means of Weighting

	PIAAC 2012 (N=5,379)[20]	PIAAC-L-2014 (N=3,758)	
	Weighted	Raw	Weighted
Gender			
Male	50.51	49.02	50.24
Female	49.49	50.98	49.76
Total	100.00	100.00	100.00
Highest educational level, including those still in school*			
Low educational level	31.59	23.39	32.03
Middle educational level	34.36	35.63	33.63
High educational level	30.72	37.33	30.90
Still in school	3.33	3.65	3.44
Total	100.00	100.00	100.00
Birth cohort			
1946-1961	31.98	30.18	32.69
1962-1976	34.33	33.69	35.13
1977-1995	33.69	36.14	32.18
Total	100.00	100.00	100.00

*based on information from PIAAC 2012

[20] The 86 cases that are classified as literacy-related nonrespondents belong to the PIAAC 2012 net sample and thus have a weighting factor in 2012. They are included in the nonresponse adjustment in PIAAC-L. In 2012, only the information on age and gender was collected for them. As information on education as a variable of interest for the analyses of the reduction of bias is missing out for these 86 cases, the PIAAC 2012 sample used here consists of 5,379 (of 5,465) cases.

4 Summary and Outlook

This documentation described the weighting procedure for the first wave of PIAAC-L 2014. The strategy basically followed the approach of the SOEP as a long-running panel study but also took into account the weighting procedure in PIAAC 2012. The results are weights that can be used both for longitudinal and cross-sectional analyses. The weights were delivered in combination with the release of the scientific use file for the first wave of PIAAC-L at the end of March 2016. In December 2016, there was an update of the PIAAC-L-2014 weights dataset (Version 2.0.0, doi: 10.4232/1.12707, released 21.12.2016), among others, due to modifications concerning the calibration process including the calculation of the cross-sectional weighting factor hrf_14 provided in March 2016 (Version 1.0.0, doi: 10.4232/1.12487). Although the new cross-sectional weighting factor hrf_14 only marginally differs from the precursor weights, it is recommended to use the new hrf_14 provided in den PIAAC-L data base Version 2.0.0 for cross-sectional analyses. The non-response weight bleib_14 remains unaffected by this update.

Selectivity in PIAAC and PIAAC-L was detected in the area of education among others. The use of weights is thus recommended for analysis. As mentioned earlier, to account for the selectivity between PIAAC 2012 and PIAAC-L 2014, for instance, users should multiply the respective weighting factor of PIAAC 2012 with (the PIAAC-L) weighting factor bleib_14 (SPFWT0 x bleib_14). Using hrf_14 will adjust the figures to the population benchmarks in 2014 and should be chosen for cross-sectional analyses of the data from PIAAC-L 2014.

Nonresponse analyses will also be implemented for the following waves and the user will be provided with user-friendly longitudinal weights.

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