

The logo for NEPS (National Educational Panel Study) features the acronym 'NEPS' in a bold, blue, sans-serif font. To the left of the text is a vertical orange bar that is open at the top and bottom, resembling a bracket or a stylized 'L' shape.

**NEPS**

**National Educational Panel Study**

Ariane Würbach

## **Samples, Weights and Nonresponse**

NEPS Starting Cohort 1 — Newborns  
*Education From the Very Beginning*

Wave 7

Research Data

The logo for LifBi (Leibniz Institute for Educational Trajectories) consists of the letters 'LifBi' in a bold, black, sans-serif font. A vertical blue bar is positioned to the left of the 'i', and a vertical pink bar is positioned to the left of the 'B'.

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# **Samples, Weights, and Nonresponse: the Early Childhood Cohort of the National Educational Panel Study (Wave 7)**

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## Samples, Weights, and Nonresponse: the Early Childhood Cohort of the National Educational Panel Study (Wave 7)

### 1 Prequel

The National Educational Panel Study (NEPS) surveys an Early Childhood cohort sample (Starting Cohort 1, SC1) and follows them over their transition to Kindergarten and beyond. The data are released via corresponding Scientific Use Files (SUF). The current SUF version is available under [DOI:10.5157/NEPS:SC1:7.0.0](https://doi.org/10.5157/NEPS:SC1:7.0.0).<sup>1</sup>

This report documents the weighting of Wave 7 and supplements the previous NEPS Technical Reports on Weighting Wave 4 up to Wave 6 Würbach (2017, 2018, 2019) as well as the NEPS Survey Paper by Würbach, Zinn, and Aßmann (2016), which gives detailed information on the applied sampling procedure, the derivation of design weights, their successive adjustments, and the derivation of panel weights for the previous Waves 1 to 3.

Table 1 summarizes the study numbers, the survey modes, the periods of the studies as well as the numbers of participants in each panel wave available in the current SUF.<sup>2</sup> In all waves, all parents of the panel cohort were asked to be interviewed (by CATI or CAPI<sup>3</sup>).

*Table 1: Survey overview for Starting Cohort 1.*

Wave	Study number	Survey mode	Time	Number of Participants
1	B04	CAPI	2012/13	3,481
2	B05	CATI/CAPI	2013	2,862
3	B91	CAPI	2014	2,609
4	B100	CAPI	2015	2,478
5	B101	CAPI	2016	2,381
6	B102	CAPI	2017	2,209
7	B126	CAPI	2018	2,116

CATI: Computer-assisted telephone interview, CAPI: Computer-assisted personal interview.

All panel participants were invited for direct measurements in Wave 1 and Wave 3 and for competence measurements as of Wave 4. In Wave 2, only a subsample of children was asked participating in the direct measurements (Würbach et al., 2016, Section 2.2). The accordant numbers are given in Table 2. This table details the used gross sample size, the number of participants in the interviews and in the direct and competence measurements as well as the number of those who were actually weighted and available for analyses. The percentages given refer to the number of participants among the used gross sample.

<sup>1</sup>For general information on the NEPS, see Blossfeld, Roßbach, and von Maurice (2011). More detailed information is available in the documentation section on the [homepage](#).

<sup>2</sup>More details on the studies are given in the reports of the survey institute 'infas' *Institut für angewandte Sozialwissenschaft GmbH* which conducted the corresponding interviews and tests; see Bauer, Bech, Gilberg, and Kleudgen (2013), Aust and Bauer (2014a, 2014b), and Bauer et al. (2015).

<sup>3</sup>CATI: Computer-assisted telephone interview, CAPI: Computer-assisted personal interview.

*Table 2: Participation in direct measurements and competence measurements, respectively.*

Wave	Study number	Used gross sample	Participants	Analyzable and weighted cases	%
1	B04	3,481	3,481	3,111	89.4
2	B05	1,893	1,510	1,407	93.2
3	B91	3,281	2,609	1,921	73.6
4	B100	3,143	2,478	2,324	93.8
5	B101	2,872	2,381	2,049	86.1
6	B102	2,665	2,209	2,087	94.5
7	B126	2,504	2,116	1,989	94.0

Across the distinct panel waves, for all participating units cross-sectional as well as longitudinal weights are provided. Furthermore, weights are given for individuals with additional information from direct and competence measurements, respectively.

The remainder of this supplement is structured as follows: Section 2 details the panel progress of the Starting Cohort 1 and the composition of the gross and net samples of the different waves is described. In Section 3 the nonresponse in Wave 7 as well as the response propensity for continued participation in all seven waves is analyzed. Nonresponse models are estimated using logistic regressions. Finally, Section 4 concludes with a summary of the provided sampling weights and design information given in the corresponding weighting data set.

## 2 Panel progress

The following Table 3 completes the study summary of Starting Cohort 1 (Table 1) by detailing the composition of the distinct samples together with the numbers of nonrespondents and final dropouts. Final dropouts are separated into final dropouts due to refusal during the survey period and final dropouts between two consecutive waves.

*Table 3: Panel progress of Starting Cohort 1 by wave.*

Wave	Group	Panel Cohort			Status at the end of the wave			
		Total size	Not used	Used sample	Participants	Temporary dropout	Final dropout (in wave)	Final dropout (after wave)
1	All	–	–	8,483	3,481	0	5,002	50
2	<b>All</b>	<b>3,431</b>	<b>0</b>	<b>3,431</b>	<b>2,862</b>	<b>468</b>	<b>101</b>	<b>49</b>
	CATI	3,431	0	3,431	2,849	480	101	48
	CAPI	3,431	1,538	1,893	1,510	340	43	21
3	All	3,281	0	3,281	2,609	539	133	5
4	All	3,143	0	3,143	2,478	541	124	147
5	All	2,872	0	2,872	2,381	383	108	99
6	All	2,665	0	2,665	2,209	357	99	62
7	All	2,504	0	2,504	2,116	327	61	63

### 3 Weighting Adjustments for Wave Participation

Systematic refusals may arise and for this, the (non)response and attrition processes of the sampled individuals, has to be accounted for. Thus, for reasons of usability, commonly design weights are adjusted to account for nonresponse in the survey. For this purpose, the units' probabilities to participate in each survey wave are employed.<sup>4</sup> The processing in the non-response analysis with a comparison of the gross sample and the realized sample of Wave 1 is detailed in Würbach et al. (2016, Chapter 4).

Logistic regression models are used to estimate the individual participation propensities. On the basis of the estimated (non)response models participation probabilities are predicted and used as adjustment factors to derive cross-sectional and longitudinal survey weights.

#### 3.1 Modeling Wave 7 Participation

Directly on the onset of Wave 7, the panel cohort comprised 2,504 parents and children pairs. That is, 927 units dropped out from the panel by either withdrawing panel consent or being repeatedly temporary dropout in preceding waves. The Tables 4, 5 and 6 give the corresponding variables and results for panel and wave participation. Please note that only the prediction models used to derive the adjustment factors are given in the participation models. That is, only the models with significant estimates are used, not the full model from Table 4.

Regarding panel willingness, gender, educational attainment, employment status, and migration background of the interviewed person as well as the household composition show a stable significant effect on the participation probability, cp. Table 4. Male respondents are less likely to maintain participation in the panel. Having a migration background also decreases panel willingness significantly. In the opposite direction, the higher the educational attainment, the higher is the willingness for further participation, compared to interviewed parents having a CASMIN 1b, 1b, 2b. Being employed or being married also increases the probability to stay in the panel. The number of children in the household exhibits a trend effect, too. The more children the higher the propensity to remain in the panel, compared to those parents having just one child in the household.

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<sup>4</sup>In SC1 the target population are newborns but the respondents are their legal guardians. Hence, in this particular case it would be more appropriate to use the term realization probability instead of participation probability. Nevertheless, realization probability is not commonly used in the context of survey weighting, therefore it is waived.

Table 4: Model estimating the individual panel entrance propensities for respondents of the SC1 in Wave 7.

Value	Wave 7
Intercept	-1.516*** (0.235)
Birth month	
March	-0.136 (0.136)
April	0.184 (0.151)
May	0.117 (0.143)
June/July	-0.028 (0.145)
Gender ( <i>IP</i> )	
Male	-0.857*** (0.237)
Year of birth ( <i>IP</i> )	
Before 1975	0.108 (0.165)
1976-1980	-0.046 (0.148)
1981-1985	-0.083 (0.143)
Federal region	
West	0.138 (0.122)
BIK categories	
50,000 up to 500,000 inhabitants	0.002 (0.137)
500,000 or more inhabitants	0.087 (0.139)
CASMIN ( <i>IP</i> )	
1c, 2a	0.141 (0.155)
2c	0.425** (0.156)
3ab	0.575*** (0.170)
Employment status ( <i>IP</i> )	
Employed	2.304*** (0.102)
Migration background ( <i>IP</i> )	
Yes	-0.551*** (0.102)
Marital status ( <i>IP</i> )	
Married	0.348** (0.122)
Divorced/widowed	0.298 (0.243)
Number of children in household	
2	1.006*** (0.108)
3	1.517*** (0.152)
4+	1.545*** (0.245)
Number of cases	3431

Notes: *IP* – interviewed person. Reference categories are: Birth month (February), Gender *IP* (Female), Year of birth *IP* (1986 and later), Federal region (East Germany incl. Berlin), BIK categories (less than 50,000 inhabitants), CASMIN *IP* (1a,1b,2b), Employment status *IP* (Unemployed), Migration background *IP* (No), Marital status *IP* (Single), Number of children in household (1). \*\*\*, \*\*, and \* denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses.



Table 5: Model estimating the individual participation propensities (CATI of parents) in Wave 7.

Value	Wave 7
Intercept	-0.399 (0.229)
Year of birth ( <i>IP</i> )	
Before 1975	0.669*** (0.201)
1976-1980	0.501** (0.180)
1981-1985	0.477** (0.179)
CASMIN ( <i>IP</i> )	
1c, 2a	0.603** (0.205)
2c	0.880*** (0.208)
3ab	1.032*** (0.217)
Employment status ( <i>IP</i> )	
Employed	0.834*** (0.134)
Migration background ( <i>IP</i> )	
Yes	-0.322** (0.125)
Number of children in household	
2	0.391** (0.137)
3	0.912*** (0.202)
4+	0.407 (0.302)
Number of cases	2504

Notes: *IP* – interviewed person. Reference categories are: Year of birth *IP* (1986 and later), CASMIN *IP* (1a,1b,2b), Employment status *IP* (Unemployed), Migration background *IP* (No), Number of children in household (1).

\*\*\*, \*\*, and \* denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses.

Table 6: Model estimating the propensities for children participating in competence measurements (Wave 7).

Value	Wave 7
Intercept	−0.196 (0.205)
CASMIN ( <i>IP</i> )	
1c, 2a	0.559** (0.192)
2c	0.823*** (0.191)
3ab	1.035*** (0.194)
Employment status ( <i>IP</i> )	
Employed	0.810*** (0.121)
Migration background ( <i>IP</i> )	
Yes	−0.327** (0.111)
Number of children in household	
2	0.294* (0.123)
3	0.704*** (0.175)
4+	0.557 (0.285)
Number of cases	2504

Notes: *IP* – interviewed person. Reference categories are: CASMIN *IP* (1a,1b,2b), Employment status *IP* (Unemployed), Migration background *IP* (No), Number of children in household (1). \*\*\*, \*\*, and \* denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses.

The probability of attending the CATI is significantly influenced by age, the educational attainment, the employment status, the migration background, and the number of children in the household, cp. Table 5. The older the respondent, the more likely is participation in CATI, compared to interviewed parents being born after 1985. This is the same with the educational level of the respondents: the higher the CASMIN, the higher is the participation propensity, in particular those having intermediate secondary education and higher. Being employed, or having two or more children also positively influences participation in the CATI. On the contrary, respondents with migration background are less likely to participate.

The propensity for participation in the direct and competence measurements is almost the same as for the participation in the parent CATI, cp. Table 6. With except of age of the respondent which has no significant influence here.

### **3.2 Modeling Participation in Consecutive Waves**

In addition to the cross-sectional weights, also weights for participation in consecutive waves, i.e. longitudinal weights, are provided. These weights comprise the longitudinal weights for participating in the parent interview in all seven waves on the one hand, and the longitudinal weight for participation in the direct and competence measurements in all seven waves on the other hand. For this purpose, two logistic regression models have been estimated: one for attending all of the CATIs (in Wave 1 up to Wave 7) and another one for participating in all direct and competence measurements (in Wave 1 up to Wave 7). Table 7 and Table 8 show the corresponding variables and results.

The coefficients of the longitudinal model for parent participation in the CATI confirm the picture that has emerged from previous modeling of longitudinal participation, cp. Table 7. Age, educational attainment, employment status, migration background, marital status and number of children in the household significantly influence continued participation. The older the respondent, the higher the CASMIN, or the higher the number of children in the household the higher is the propensity for repeated participation. Being employed, being married or having no migration background also positively influences repeated participation in the CATI.

For continued participation in direct measurements and competence measurements, respectively, only the educational attainment, the employment status, the migration background and the federal region are highly significant, cp. Table 8. Employed respondents and respondents with higher educational attainment have generally higher propensities for repeated participation than respondents with a low educational level or those being unemployed. On the opposite, having a migration background or living in West Germany considerably decreases propensity for repeated participation in the direct and competence measurements. However, the interpretation of the federal region should be treated with caution. This predictor variable is significant only at a 5%-level and was insignificant in all of the previous models. It is to be shown in later waves whether federal region will exhibit a stable effect on continued participation in competence measurements.

Table 7: Model estimating the longitudinal individual participation propensities (CATI of parents) for Wave 3 up to Wave 7.

Value	Waves 1 to 7
Intercept	-1.227*** (0.227)
Year of birth ( <i>IP</i> )	
Before 1975	0.813*** (0.169)
1976-1980	0.533*** (0.154)
1981-1985	0.420** (0.153)
CASMIN ( <i>IP</i> )	
1c, 2a	0.719*** (0.192)
2c	1.049*** (0.193)
3ab	1.153*** (0.197)
Employment status ( <i>IP</i> )	
Employed	0.433*** (0.112)
Migration background ( <i>IP</i> )	
Yes	-0.431*** (0.100)
Marital status ( <i>IP</i> )	
Married	0.253* (0.126)
Divorced/widowed	-0.023 (0.239)
Number of children in household	
2	0.188 (0.114)
3	0.277 (0.154)
4+	0.347 (0.266)
Number of cases	2504

Notes: *IP* – interviewed person. Reference categories are: Year of birth *IP* (1986 and later), CASMIN *IP* (1a,1b,2b), Employment status *IP* (Unemployed), Migration background *IP* (No), Marital status *IP* (Single), Number of children in household (1). \*\*\*, \*\*, and \* denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses.

**Table 8: Model estimating the longitudinal propensities for children participating in direct measurements (Wave 1 up to Wave 3) and competence measurements (Wave 4 up to Wave 7).**

Value	Waves 1 to 7
Intercept	−1.496*** (0.369)
CASMIN (IP)	
1c, 2a	1.306*** (0.366)
2c	1.276*** (0.362)
3ab	1.369*** (0.359)
Employment status (IP)	
Employed	0.557*** (0.149)
Migration background (IP)	
Yes	−1.011*** (0.142)
Federal region	
West	−0.318* (0.132)
Number of cases	1414

Notes: IP – interviewed person. Reference categories are: CASMIN IP (1a,1b,2b), Employment status IP (Unemployed), Migration background IP (No), Federal region (East Germany incl. Berlin). \*\*\*, \*\*, and \* denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses.

## 4 Summary and Use of Weights

The NEPS provides various kinds of weights for the Early Childhood cohort together with design information. Table 9 lists the design information and summarizes all types of weights and their accordant label provided by SUF release version DOI:10.5157/NEPS:SC1:7.0.0. To ease statistical analysis, all weights apart from the pure design weight (Wave 1) are provided in a trimmed and standardized form (Würbach et al., 2016, Chapter 6). Standardized weights have mean one and sum up to the number of participants in the corresponding wave. Summary statistics for all kind of weights provided are given in Table 10.

Please refer to Würbach et al. (2016, Chapter 6) for advices regarding the usage of weights.

Table 9: Variables included in the weighting data for SC1 version 7.0.0 of the SUF.

Variable	Applies to	Content
<i>Identifier</i>		
ID_t	all targets	Identifier for target person
<i>Design information</i>		
psu	all targets	Primary Sampling Unit (Point number)
stratum	all targets	Stratification variable according to sampling frame
px80101_R	all targets	Federal State according to sampling frame
<i>Design weights adjusted for initial nonresponse</i>		
w_t1ext*	3,481 cases	Design weight for parents participating in Wave 1 (unstandardized)
w_t1	3,481 cases	Cross-sectional weight for parents participating in Wave 1
w_t1comp	3,111 cases	Cross-sectional weight for children participating in Wave 1 with direct measurements
w_t2	2,862 cases	Cross-sectional weight for parents participating in Wave 2
w_t12	2,862 cases	Longitudinal weight for parents participating in Wave 1 and 2
w_t2comp	1,407 cases	Cross-sectional weight for children participating in Wave 2 with direct measurements
w_t12comp	1,353 cases	Longitudinal weight for children participating in Wave 1 and 2 with direct measurements
w_t3	2,609 cases	Cross-sectional weight for parents participating in Wave 3
w_t123	2,427 cases	Longitudinal weight for parents participating in Wave 1, 2, and 3
w_t3comp	1,921 cases	Cross-sectional weight for children participating in Wave 3 with direct measurements
w_t123comp	970 cases	Longitudinal weight for children participating in Wave 1 up to Wave 3 with direct measurements
w_t4	2,478 cases	Cross-sectional weight for parents participating in Wave 4
w_t1234	2,171 cases	Longitudinal weight for parents participating in Wave 1 up to Wave 4
w_t4comp	2,324 cases	Cross-sectional weight for children participating in Wave 4 with competence measurements
w_t1234comp	861 cases	Longitudinal weight for children participating in Wave 1 up to Wave 4 with direct and competence measurements
w_t5	2,381 cases	Cross-sectional weight for parents participating in Wave 5
w_t12345	2,001 cases	Longitudinal weight for parents participating in Wave 1 up to Wave 5
w_t5comp	2,049 cases	Cross-sectional weight for children participating in Wave 5 with competence measurements
w_t12345comp	735 cases	Longitudinal weight for children participating in Wave 1 up to Wave 5 with direct and competence measurements
w_t6	2,209 cases	Cross-sectional weight for parents participating in Wave 6
w_t123456	1,817 cases	Longitudinal weight for parents participating in Wave 1 up to Wave 6
w_t6comp	2,087 cases	Cross-sectional weight for children participating in Wave 6 with competence measurements
w_t123456comp	661 cases	Longitudinal weight for children participating in Wave 1 up to Wave 6 with direct and competence measurements
w_t7	2,116 cases	Cross-sectional weight for parents participating in Wave 7
w_t1234567	1,702 cases	Longitudinal weight for parents participating in Wave 1 up to Wave 7
w_t7comp	1,989 cases	Cross-sectional weight for children participating in Wave 7 with competence measurements
w_t1234567comp	613 cases	Longitudinal weight for children participating in Wave 1 up to Wave 7 with direct and competence measurements

\*The superscript ext indicates that this weight can be used to extrapolate to the target population.

Table 10: Summary statistics for all weights provided.

Label of weight	Min.	Lower Quart.	Median	Mean	Upper Quart.	Max.
w_t1ext	26.346	40.683	49.752	93.062	67.924	656.658
w_t1	0.285	0.440	0.538	1.000	0.734	4.788
w_t1comp	0.268	0.432	0.544	1.000	0.765	4.777
w_t2	0.251	0.419	0.538	1.000	0.781	4.824
w_t2comp	0.306	0.471	0.592	1.000	0.816	4.801
w_t12comp	0.302	0.466	0.588	1.000	0.815	4.790
w_t3	0.231	0.390	0.534	1.000	0.849	4.811
w_t123	0.225	0.388	0.530	1.000	0.861	4.856
w_t3comp	0.199	0.350	0.504	1.000	1.027	4.809
w_t123comp	0.243	0.414	0.557	1.000	0.887	4.727
w_t4	0.236	0.404	0.530	1.000	0.793	4.837
w_t1234	0.224	0.395	0.521	1.000	0.821	4.842
w_t4comp	0.230	0.398	0.525	1.000	0.797	4.841
w_t1234comp	0.235	0.400	0.531	1.000	0.875	4.870
w_t5	0.243	0.411	0.527	1.000	0.769	4.915
w_t12345	0.224	0.395	0.520	1.000	0.803	4.864
w_t5comp	0.240	0.406	0.531	1.000	0.792	4.800
w_t12345comp	0.267	0.405	0.523	1.000	0.878	4.880
w_t6	0.249	0.415	0.537	1.000	0.766	4.820
w_t123456	0.230	0.406	0.534	1.000	0.801	4.844
w_t6comp	0.245	0.418	0.542	1.000	0.774	4.830
w_t123456comp	0.281	0.435	0.566	1.000	0.872	4.776
w_t7	0.253	0.421	0.537	1.000	0.764	4.800
w_t1234567	0.235	0.410	0.527	1.000	0.801	4.824
w_t7comp	0.246	0.418	0.532	1.000	0.759	4.795
w_t1234567comp	0.257	0.411	0.529	1.000	0.885	4.838

For further information on weighting please contact [statistik@lifbi.de](mailto:statistik@lifbi.de).

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