NEPS
National Educational Panel Study

Samples, Weights and Nonresponse: the Kindergarten Cohort of the National Educational Panel Study (Waves 1 to 6)

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1 Prequel

The National Educational Panel Study (NEPS) surveys a cohort sample of Kindergarten children and Grade 1 students (Starting Cohort 2, SC2) and follows them over their transition to elementary school and beyond. The data are released via corresponding Scientific Use Files (SUF). The current SUF version is available under DOI:10.5157/NEPS:SC2:6.0.1.[1]

This paper supplements the previous report for weighting by Würbach, Steinhauer, and Zinn (2017) as well as the more detailed NEPS Working Paper by Steinhauer, Zinn, Gaasch, and Goßmann (2016) and the Technical Report by Steinhauer and Zinn (2016), which give information on the applied indirect sampling procedure, the derivation of design weights, their successive adjustments, and the derivation of panel weights for previous waves.

In 2013, the cohort of Kindergarten children transitioned to elementary school. Children who transitioned to previously sampled schools were followed up within their institutional context together with their classmates who augment the cohort sample. Besides that, there are previously sampled schools no children transitioned to. Students within these schools also augment the cohort sample. Children who transitioned to other schools were tracked individually. By design, these children did not take part in the tests until Wave 6. Here, in Wave 6 (Grade 4), the entire sample was surveyed and tested again. Due to its composition the panel cohort of SC2 can be categorized into three groups:

Group 1 The group of students tested in Grade 1 in elementary schools, who were not tested in Kindergarten institutions in Wave 1 and Wave 2. These (target) persons form the augmentation sample of Wave 3.

Group 2 The group of Kindergarten children who were tested only in Kindergartens in Wave 1 and Wave 2. In Wave 3, they are assigned to the individual retracking field and are temporary dropouts by design until Wave 6.

Group 3 The group of Kindergarten children, who were tested in Kindergartens in Wave 1 and Wave 2 and transition to elementary schools surveyed by NEPS in Wave 3. These (target) persons belong to the longitudinal sample of Waves 1, 2, and 3.

Table 1 documents the accordant study numbers and survey year available in the current SUF.

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[1]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.

Table 1: Survey overview for Starting Cohort 2.

Wave	Time	Study number
Kindergarten children		
1	2011	A12
2	2012	A13
Elementary school students		
3	2013	A14, A14A
4	2013	A15
5	2014	A89
6	2015	A97, B103

For all participating children cross-sectional and, where appropriate, longitudinal weights are provided. Cross-sectional weights are assigned to children relying on their participation in the different panel waves. Furthermore, weights are given for subgroups of the panel cohorts that are of special interest in our analysis. This concerns particularly the group of children continually taking part in the successive waves of the survey (currently, Waves 1 to 6) and the group of children and parents participating jointly. Longitudinal weights are provided for those children who have continually participated. Additional cross-sectional and longitudinal weights are provided for joint participation of children and parents (currently for Waves 1 to 6).

The remainder of this supplement is structured as follows: Section 2 details the panel progress as well as the new features of the corresponding weighting data sets. In Section 3 the nonresponse in Wave 6 is analyzed. Nonresponse models are estimated using probit regressions. Finally, Section 4 concludes with a summary of the provided sampling weights and design information given in the corresponding weighting data sets.

2 Panel progress

The following Table 2 details the panel progress of Starting Cohort 2 by differentiating participants, temporary dropouts, and final dropouts for each group separately and in total. Final dropouts are separated into final dropouts due to refusal during the survey period and final dropouts between two consecutive waves.

Table 2: Panel progress of Starting Cohort 2 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**	[a]3007	0	3007	2949	47	11	0
2	**All**	2996	[b]215	2781	2727	54	0	1
3	**All**	9336	2419	6917	6733	184	0	5
	1	6341	0	6341	6176	165	0	2
	2	2419	2419	-	-	-	-	[c]3
	3	576	0	576	557	19	0	0
4	**All**	9331	2733	6598	6340	232	26	23
	1	6339	296	6043	5801	217	25	15
	2	2416	2416	-	-	-	-	2
	3	576	21	555	539	15	1	6
5	**All**	9282	3118	6164	5799	204	161	77
	1	6299	669	5630	5296	185	149	41
	2	2414	2414	-	-	-	-	31
	3	569	35	534	503	19	12	5
6	**ALL**	9044	554	8490	6943	1180	367	[d]727
	1	6109	61	6048	5462	425	161	[d]186
	2	2383	458	1925	998	735	192	[d]497
	3	552	35	517	483	20	14	[d]44

Notes: ”-” does not apply. Group 1 - The group of students tested in Grade 1 in elementary schools, who were not tested in Kindergarten institutions in Wave 1 and Wave 2. These (target) persons form the augmentation sample of Wave 3. Group 2 - The group of Kindergarten children who were tested only in Kindergartens in Wave 1 and Wave 2. In Wave 3, they are assigned to the individual retracking field and are temporary dropouts by design until Wave 6. Group 3 - The group of Kindergarten children, who were tested in Kindergartens in Wave 1 and Wave 2 and transition to elementary schools surveyed by NEPS in Wave 3. These (target) persons belong to the longitudinal sample of Waves 1, 2, and 3. [a] Panel size in Wave 1 is larger than the number of cases in the SUF, because of 11 final dropouts after Wave 1 and before publication of the SUF. Thus these cases are not included. [b] Cases not used left the institution they were surveyed in. These cases are tracked individually and surveyed again in Wave 6, when they are supposed to be in Grade 4. In the SUF their status is temporary dropout. [c] Final dropout in Group 2 is not included in the SUF. Here these cases are labeled as temporary dropout. [d] Among these final dropouts also previous parent withdrawals are subsumed. Due to the movement into the individual field the related students cannot be asked for participation again.

Compared to the previous release of the SC2 SUF (version 5.0.0), the current weighting data sets contain again additional weights for joint participation of the targets together with one parent. These are cross-sectional weights for Waves 4, 5 and 6 as well as longitudinal weights for Wave 1 up to Wave 6 for Group 3, and longitudinal weights for Wave 3 up to Wave 6 for Group 1.

In SC2 SUF version 5.0.0 the (target) persons of Group 1 (augmentation sample) were calibrated to population size in Wave 3. Data from Official Statistics (Statistisches Bundesamt, Fachserie 11, Reihe 1, 2012/13) regarding the gender ratio in the federal states has been used for post-stratification. In Table 3 the corresponding figures are given.

Table 3: Population sizes used for calibration of the augmentation sample in Wave 3.

	Gender	
`stratum_imp2_R`	Female	Male
Brandenburg	9534	10070
Berlin	10561	10890
Baden-Württemberg	43729	45286
Bayern	50565	52079
Bremen	2537	2757
Hessen	24569	25356
Hamburg	6520	6707
Mecklenburg-Vorpommern	6265	6478
Niedersachsen	34721	36494
Nordrhein-Westfalen	74297	76914
Rheinland-Pfalz	15454	16633
Schleswig-Holstein	11791	12646
Saarland	3492	3822
Sachsen	15467	15843
Sachsen-Anhalt	7845	8101
Thüringen	7533	7818

3 Participation in Wave 6

The processing in the nonresponse analysis is detailed in Chapter 3 in Steinhauer et al. (2016) as well as in Steinhauer and Zinn (2016). That is, a multilevel probit model is used to estimate the individual participation propensities for students in Grade 4 (participants in Wave 6) separately for all three groups. The results are given in Table 4. As can be seen, participation in previous waves significantly influences the participation probability in the current wave in Group 1. Joint participation propensities for targets and one parent are given in Tables 5 to 7.

Please refer to Steinhauer et al. (2016) and Steinhauer and Zinn (2016) regarding the interpretation of the participation propensity in previous waves.

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.

Table 4: Models estimating the individual participation propensities for Kindergarten children in Wave 1, Wave 2, and students in Grade 1 in Wave 3 up to Wave 6 of SC2 used to derive adjustment factors for adjusted wave-specific cross-sectional and longitudinal weights.

	Wave 1	Wave 2	Wave 3		Wave 4		Wave 5			Wave 6	
			Group 3	Group 1	Group 3	Group 1	Group 3	Group 1	Group 3	Group 2	Group 1
(Intercept)	3.472*** (0.295)	3.061*** (0.380)	1.839*** (0.101)	0.014 (0.279)	1.898*** (0.108)	1.715*** (0.183)	1.571*** (0.087)	0.062 (0.199)	−0.330 (0.456)	−0.847*** (0.129)	0.284** (0.089)
Place of residence with both parents yes	0.317 (0.173)									0.552*** (0.076)	
Participation in Wave 1 yes		0.935** (0.330)									
Participation in Wave 2 yes										0.257** (0.095)	
Participation in Wave 3 yes						0.431* (0.177)		0.384* (0.161)			
Participation in Wave 4 yes								1.296*** (0.129)	0.868* (0.379)		
Participation in Wave 5 yes									1.085*** (0.325)		1.552*** (0.064)
Native language German				1.258*** (0.146)							−0.104 (0.085)
Native language other than German				1.389*** (0.181)							−0.197* (0.097)
Special educ. needs no				1.502*** (0.277)							
Special educ. needs yes				1.356*** (0.350)							
German at home yes										0.253** (0.079)	
Random intercept (SD) on the Kindergarten level	1.953	2.468									
on the school level				0.794		0.635		0.370			0.255
Sample size	2996	2781	576	6341	555	6043	534	5630	517	1925	6048

Notes: Reference categories are: Place of residence (not with both parents), Participation in Wave 1/2/3/4/5 (no), Native language (missing), Special educational needs (unknown), German spoken at home (no).
*** , ** , and * denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses.
To model individual participation, the glmer function with a probit link provided by lme4 package (Bates, Maechler, & Bolker, 2012) in R (R Core Team, 2015) was used.
Group 1 - The group of students tested in Grade 1 in elementary schools, who were not tested in Kindergarten institutions in Wave 1 and 2 (forming the augmentation sample of Wave 3). Group 2 - The group of Kindergarten children individually tested in Wave 6. Group 3 - The group of Kindergarten children, who were tested in Kindergartens in Wave 1 and Wave 2 and transition to elementary schools surveyed by NEPS in Wave 3.

Table 5: *Models estimating the joint participation propensities for students and parents in Wave 1 up to Wave 3 of SC2 used to derive adjustment factors for adjusted wave-specific cross-sectional and longitudinal weights*

	Wave 1		Wave 2		Wave 3 Group 3		Wave 3 Group 1	
	Child	Parent	Child	Parent	Student	Parent	Student	Parent
(Intercept)	1.944***	0.776***	1.360***	−1.632***	1.839***	−0.346*	0.305	0.304*
	(0.118)	(0.026)	(0.263)	(0.104)	(0.101)	(0.149)	(0.181)	(0.152)
Place of residence								
With both parents	0.264			0.525***				
	(0.135)			(0.075)				
Target part. in Wave 1								
yes			0.731**					
			(0.269)					
German at home								
yes				0.686***				
				(0.074)				
Parent part. in Wave 1								
yes				1.650***				
				(0.067)				
Parent part. in Wave 2								
yes						1.446***		
						(0.165)		
Native language German							0.813***	0.246***
							(0.078)	(0.056)
Native language other than German							0.933***	−0.196**
							(0.116)	(0.063)
Special educ. needs no							1.056***	0.597***
							(0.180)	(0.149)
Special educ. needs yes							0.850***	0.062
							(0.251)	(0.174)
Correlation							0.138	
Sample size	2996		2781		576		6341	

Notes: Reference categories are: Place of residence (not with both parents), Target participating in Wave 1 (no), German spoken at home (no), Parent participating in Wave 1 (no), Native language (missing). Special educational needs (unknown). * * * , * * , and * denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses.
For modeling joint participation decisions, the SemiParBIVProbit function in the same named package (Marra & Radice, 2013; Radice, Marra, & Wojtys, 2016) in R (R Core Team, 2015) was used.

Table 6: *Models estimating the joint participation propensities for students and parents in Wave 4 and Wave 5 of SC2 used to derive adjustment factors for adjusted wave-specific cross-sectional and longitudinal weights*

| | Wave 4 | | | | Wave 5 | | | |
| | Group 3 | | Group 1 | | Group 3 | | Group 1 | |
	Student	Parent	Student	Parent	Student	Parent	Student	Parent
(Intercept)	1.899*** (0.108)	−0.763** (0.243)	1.200*** (0.156)	−0.288 (0.172)	1.183*** (0.145)	−0.105 (0.443)	1.290*** (0.048)	−0.673*** (0.173)
Target age group younger half yes				0.125** (0.039)				
Target part. in Wave 3 yes			0.310* (0.153)					
Target part. in Wave 4 yes						−0.936* (0.458)		
Parent part. in Wave 3 yes		2.043*** (0.157)	0.314*** (0.071)	1.574*** (0.049)				
Parent part. in Wave 4 yes					0.577** (0.184)	2.092*** (0.158)	0.379*** (0.057)	1.752*** (0.046)
Native language German		0.043 (0.232)		0.070 (0.057)				0.199*** (0.056)
Native language other than German		−0.535 (0.282)		−0.175** (0.066)				−0.171** (0.066)
Special educ. needs no				−0.328 (0.167)				−0.291*** (0.168)
Special educ. needs yes				−0.544** (0.196)				−0.705*** (0.203)
Correlation	0.538		0.291		0.330		0.511	
Sample size	555		6043		534		5630	

Notes: Reference categories are: Target age group (older half), Place of residence (not with both parents), Target participating in Wave 3/4 (no), Parent participating in Wave 3/4 (no), Native language (missing) Special educational needs (unknown). ***, **, and * denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses.
For modeling joint participation decisions, the `SemiParBIVProbit` function in the same named package (Marra & Radice, 2013; Radice et al., 2016) in R (R Core Team, 2015) was used.

Table 7: Models estimating the joint participation propensities for students and parents in Wave 6 of SC2 used to derive adjustment factors for adjusted wave-specific cross-sectional and longitudinal weights

	Group 3		Group 2		Group 1	
	Student	Parent	Student	Parent	Student	Parent
(Intercept)	0.380	−1.643***	−0.647***	−1.611***	−0.218	−1.238**
	(0.304)	(0.197)	(0.070)	(0.069)	(0.138)	(0.428)
Target age group younger half						0.118**
						(0.041)
Place of residence With both parents			0.291***			
			(0.075)			
Target part. in Wave 3 yes					0.373**	
					(0.133)	
Target part. in Wave 5 yes	1.210***				1.361***	0.545***
	(0.317)				(0.055)	(0.060)
Parent part. in Wave 3 yes		0.554**		0.270**		0.535***
		(0.213)		(0.092)		(0.065)
Parent part. in Wave 4 yes		0.850***		0.541***		0.819***
		(0.214)		(0.092)		(0.055)
Parent part. in Wave 5 yes		1.483***	1.085***	1.527***	0.590***	1.477***
		(0.171)	(0.062)	(0.083)	(0.051)	(0.047)
Native language German					−0.240**	
					(0.082)	
Native language other than German					−0.211*	
					(0.092)	
Start schooling earlier						−0.984*
						(0.436)
Start schooling later						−0.995*
						(0.436)
Start schooling regular						−0.990*
						(0.426)
Correlation	0.383		0.602		0.566	
Sample size	517		1925		6048	

Notes: Reference categories are: Target age group (older half), Target participating in Wave 3/4 (no), Parent participating in Wave 3/4 (no), Native language (missing), Special educational needs (unknown). ***, **, and * denote significance at the 0.1%, 1%, and 5% level, respectively. Standard errors are given in parentheses. For modeling joint participation decisions, the `SemiParBIVProbit` function in the same named package (Marra & Radice, 2013; Radice et al., 2016) in R (R Core Team, 2015) was used.

4 Summary of Weights

The NEPS provides various kinds of weights for Kindergarten children and elementary school students together with design information. Table 8 lists the design information and the different weights provided by SUF release version DOI:10.5157/NEPS:SC2:6.0.1. In SC2, weights are provided in two distinct weighting files: one for Kindergarten children (Groups 2 and 3) and one for elementary school students (Groups 1 and 3). All cross-sectional and longitudinal weights are provided in a trimmed and standardized form. The trimmed sampling weights are standardized with mean 1 to ease statistical weighted analysis, cp. Chapter 4 in Steinhauer and Zinn (2016). Summary statistics for all kind of weights provided are given in Table 9.

Please refer to Chapter 6 in Steinhauer and Zinn (2016) for advices regarding the usage of weights.

Table 8: Variables included in the weighting data sets for SC2 Version 6.0.1 of the SUF.

Variable	Applies to	Content
Identifier		
ID_t	all targets	Identifier for target person
ID_i	all targets	Identifier for the school the target person was initially sampled in
Design information		
tstud_st	all targets	Study number the target person was first surveyed in (A12, A14, A14A)
group	all targets	Grouping variable for children in Kindergarten and school context
stratum_imp2_R	schools	Implicit sampling stratum (Federal State the school is located in according to sampling frame)
stratum_imp3_R	schools	Implicit sampling stratum (regional classification according to sampling frame)
stratum_imp4_R	schools	Implicit sampling stratum (funding according to sampling frame)
tx80112_R	schools	Total amount of students in Grade 2 (from Official Statistics)
Weights referring to Kindergarten children (Groups 2 and 3)		
w_i	2,996 cases	Nonresponse adjusted design weight for Kindergarten, with $i = 1, \ldots, 268$
w_t	2,996 cases	Calibrated nonresponse adjusted design weight for target (Kindergarten child)
w_t1	2,949 cases	Cross-sectional weight for targets participating in Wave 1
w_tp1	2,309 cases	Cross-sectional weight for targets jointly participating with one parent in Wave 1
w_t2	2,727 cases	Cross-sectional weight for targets participating in Wave 2
w_tp2	1,965 cases	Cross-sectional weight for targets jointly participating with one parent in Wave 2
w_t12	2,685 cases	Longitudinal weight for targets participating in Wave 1 and 2
w_tp12	1,804 cases	Longitudinal weight for targets jointly participating with one parent in Wave 1 and 2
w_t123	539 cases	Longitudinal weight for targets participating in Wave 1, 2, and 3
w_tp123	388 cases	Longitudinal weight for targets jointly participating with one parent in Wave 1, 2, and 3
w_t1234	504 cases	Longitudinal weight for targets participating in Wave 1 up to Wave 4
w_tp1234	335 cases	Longitudinal weight for targets jointly participating with one parent in Wave 1 up to Wave 4
w_t12345	460 cases	Longitudinal weight for targets participating in Wave 1 up to Wave 5
w_tp12345	276 cases	Longitudinal weight for targets jointly participating with one parent in Wave 1 up to Wave 5
w_t123456	433 cases	Longitudinal weight for targets participating in Wave 1 up to Wave 6
w_tp123456	238 cases	Longitudinal weight for targets jointly participating with one parent in Wave 1 up to Wave 6

Weights referring to elementary schools students (Groups 1 and 3)

w_i	6,917 cases	Nonresponse adjusted design weight for elementary school, $i = 1, \ldots, 279$
w_t	6,917 cases	Calibrated nonresponse adjusted design weight for target (Grade 1 student)
w_t3	6,733 cases	Cross-sectional weight for targets participating in Wave 3
w_tp3	5,636 cases	Cross-sectional weight for targets jointly participating with one parent in Wave 3
w_t4	6,340 cases	Cross-sectional weight for targets participating in Wave 4
w_tp4	4,865 cases	Cross-sectional weight for targets jointly participating with one parent in Wave 4
w_t34	6,189 cases	Longitudinal weight for targets participating in Wave 3 and 4
w_tp34	4,487 cases	Longitudinal weight for targets jointly participating with one parent in Wave 3 and 4
w_t5	5,799 cases	Cross-sectional weight for targets participating in Wave 5
w_tp5	4,025 cases	Cross-sectional weight for targets jointly participating with one parent in Wave 5
w_t345	5,567 cases	Longitudinal weight for targets participating in Wave 3, 4 and 5
w_tp345	3,500 cases	Longitudinal weight for targets jointly participating with one parent in Wave 3, 4 and 5
w_t3456	5,257 cases	Longitudinal weight for targets participating in Wave 3 up to Wave 6
w_tp3456	3,044 cases	Longitudinal weight for targets jointly participating with one parent in Wave 3 up to Wave 6

Weights referring to elementary schools students (Groups 1, 2 and 3)

w_t6	6,943 cases	Cross-sectional weight for targets participating in Wave 6
w_tp6	4,641 cases	Cross-sectional weight for targets jointly participating with one parent in Wave 6

Table 9: Summary statistics for all weights provided.

Label of weight	Min.	Lower Quart.	Median	Mean	Upper Quart.	Max.
Weights referring to Kindergarten children (Groups 2 and 3)						
w_i	14.5722	76.0647	106.4483	138.2196	157.1446	1564.0796
w_t	9.1204	94.5444	143.5075	216.1175	248.5428	3269.7032
w_t1	0.0438	0.4559	0.6929	1.0000	1.2097	4.2678
w_tp1	0.0456	0.4594	0.7017	1.0000	1.2163	4.2532
w_t2	0.0412	0.4308	0.6768	1.0000	1.1866	4.4548
w_tp2	0.0297	0.3262	0.5155	1.0000	0.9454	5.2035
w_t12	0.0437	0.4550	0.7056	1.0000	1.2126	4.2555
w_tp12	0.0441	0.4733	0.7007	1.0000	1.1840	4.2237
w_t123	0.1129	0.4687	0.7409	1.0000	1.2309	4.1609
w_tp123	0.1139	0.4721	0.7385	1.0000	1.2160	4.0484
w_t1234	0.1122	0.4644	0.7307	1.0000	1.2424	4.2200
w_tp1234	0.0968	0.4487	0.7205	1.0000	1.2267	4.1917
w_t12345	0.1112	0.4582	0.7313	1.0000	1.2316	4.1976
w_tp12345	0.0970	0.4489	0.7321	1.0000	1.2295	4.1549
w_t123456	0.1130	0.4690	0.7392	1.0000	1.2414	4.1618
w_tp123456	0.0983	0.4581	0.7210	1.0000	1.2456	4.1269
Weights referring to elementary schools students (Groups 1 and 3)						
w_i	9.4518	23.5052	30.9038	39.3148	43.3969	332.6401
w_t	16.6909	48.0933	73.3117	97.5463	115.7840	3869.2945
w_t3	0.1739	0.5072	0.7778	1.0000	1.2341	3.7764
w_tp3	0.1602	0.4938	0.7505	1.0000	1.2314	3.9137
w_t4	0.1594	0.4778	0.7322	1.0000	1.1827	4.0832
w_tp4	0.0997	0.3300	0.5102	1.0000	0.9287	5.2957
w_t34	0.1738	0.5133	0.7826	1.0000	1.2334	3.6985
w_tp34	0.1663	0.5146	0.7682	1.0000	1.2332	3.7225
w_t5	0.1478	0.4557	0.7009	1.0000	1.1624	4.3391
w_tp5	0.0571	0.1970	0.3136	1.0000	0.6360	5.7258
w_t345	0.1708	0.5138	0.7828	1.0000	1.2274	3.6730
w_tp345	0.1629	0.5018	0.7561	1.0000	1.2424	3.7856
w_t3456	0.1695	0.5127	0.7849	1.0000	1.2341	3.6850
w_tp3456	0.1612	0.5055	0.7563	1.0000	1.2276	3.8012
Weights referring to elementary schools students (Groups 1, 2 and 3)						
w_t6	0.0932	0.3291	0.5336	1.0000	1.0301	5.0770
w_tp6	0.0222	0.1190	0.2066	1.0000	0.5783	5.7994

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