The Effects of Repeated Measurement on Data Quality in Surveying Adolescents

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Session: Effects of Respondent's Age on Survey Research

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Theoretical Considerations

Surveying adolescents repeatedly may affect data quality in various ways:

1. Learning effects due to repeated participation
   positive effects on data quality

2. Satisficing due to decreased motivation
   negative effects on data quality

Effects of repeated measurement have to be separated from:

3. Age-related learning effects
   positive effects on data quality

Health Behavior and Injuries in School Age

- Main Objective: Identifying causes for injuries in the school environment
- Panel survey with six annual waves
- First wave in school year 2014/15 with 5th grade pupils (10-12 years old)
- Target population: All pupils enrolled in the 5th grade in general secondary education schools
- Stratified random sample of 854 schools
- Participation rate = 18% (160 schools, 10,000 pupils)
- Funded by the German Social Accident Insurance (DGUV)

DGUV
Deutsche Gesetzliche Unfallversicherung
Spitzenverband

Source: Own Illustration based on Portal der statistischen Ämter des Bundes und der Länder (DeStatis), David Liuzzo.

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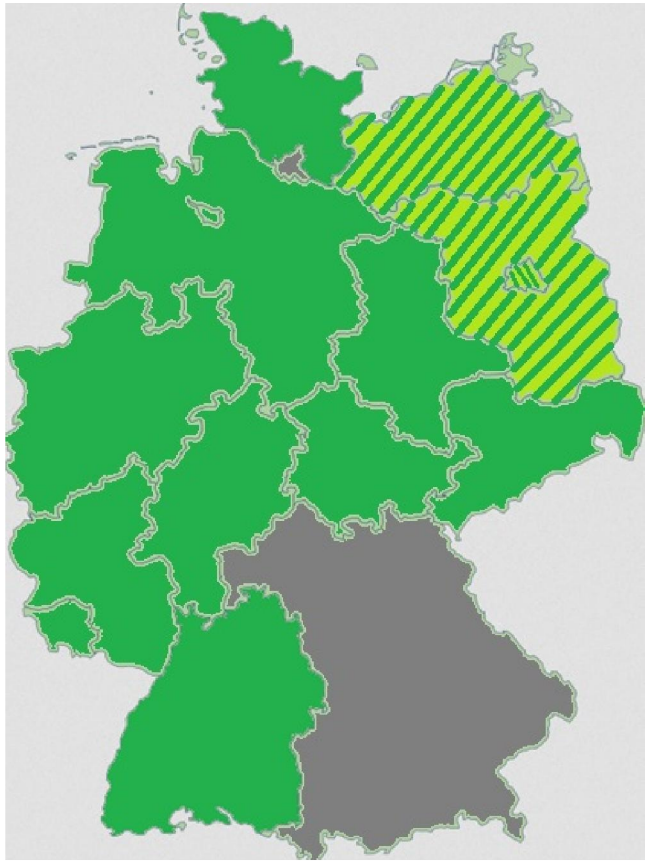
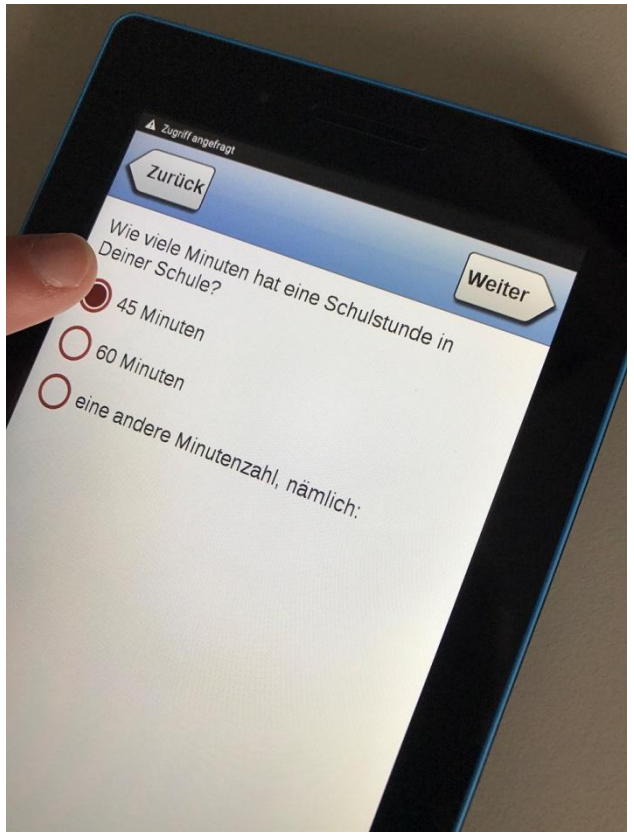


Methods

- Computer-assisted classroom survey
  - Questionnaire is played on tablet devices
  - Each pupil receives a device (self-administered offline survey)
  - Trained interviewers introduce the questionnaire, the workings of the devices and respond to questions
  - Survey results are uploaded by interviewers
  - Currently, data from waves 1-4 are available
  - Self-generated codes to link data from all waves



Source: Own illustration

Strategy of Analysis

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Participation waves 1-4	n (obs)	n(pupils)
1 0 0 0	2.404	2.404
0 1 0 0	910	910
0 0 1 0	1.146	1.146
0 0 0 1	1.194	1.194
1 1 0 0	2.354	1.177
1 0 1 0	592	296
1 0 0 1	420	210
0 1 1 0	1.182	591
0 1 0 1	654	327
0 0 1 1	2.440	1.220
1 1 1 0	4.056	1.352
1 0 1 1	1.350	450
1 1 0 1	2.259	753
0 1 1 1	3.027	1.009
1 1 1 1	15.864	3.966
Total	**39.852**	**17.005**

Strategy of Analysis

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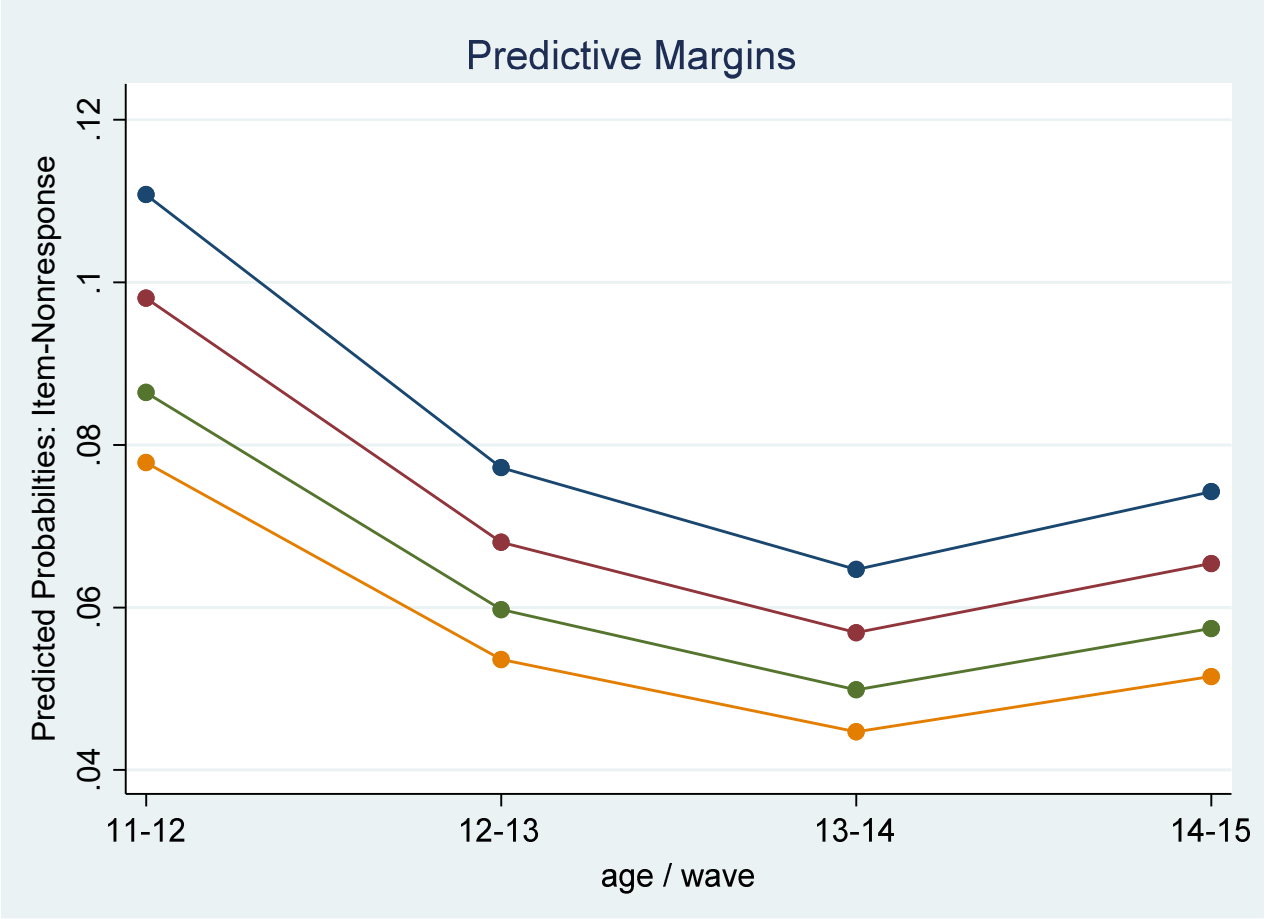
- Data Quality-Indicators
  - Item-Nonresponse
  - Response styles (straightlining)
  - Heaping
  - Scale reliability
- Dependent Variables: Dummies for Item-Nonresponse, straightlining and heaping
- Independent Variables
  - wave (1-4)
  - sex
  - school stream
  - frequency of participation (1-4)
- Logistic multilevel model with pupils (level 2) and observations (level 1)

Item-Nonresponse

- Dummy was coded 1 when pupils did not respond to at least one out of 15 items
- Items deal with pupils‘ health status, health complaints, mental health and their nutritional behavior

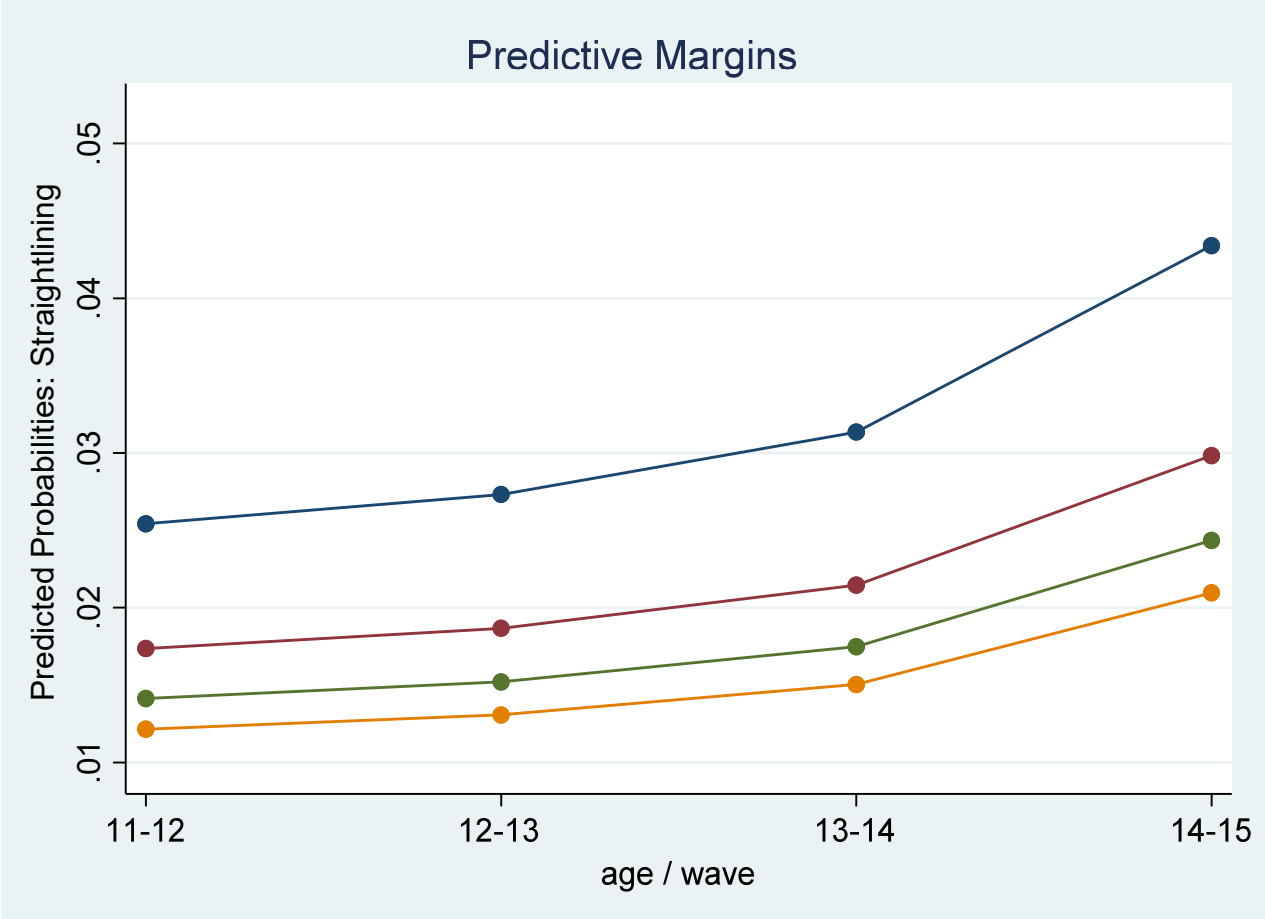
Item-Nonresponse



Response Styles

- Dummy was coded 1 when all questions of at least one out of three different scales were evaluated with the very same answer
- Scales deal with mental health, nutritional behavior and the quality of the neighborhood
- All scales also included items phrased in a reserved manner (e.g., „during the last week: how often did you feel lonely“ and „how often did you feel fit and comfortable“)

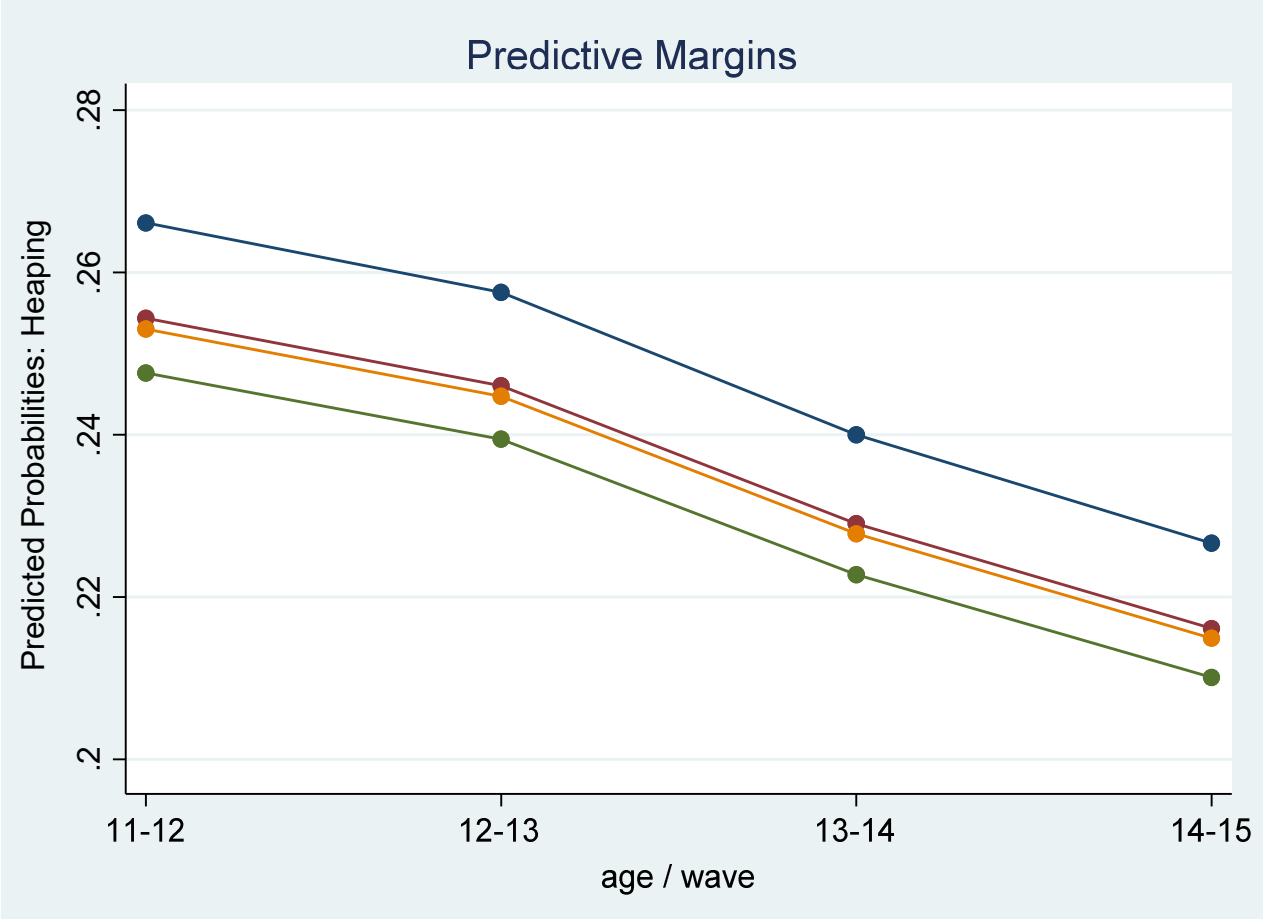
Response Styles



Heaping

- Dummy was coded 1 when pupils rounded up or down when they were asked for their height (e.g., 150 centimeters)

Heaping


Predictive Margins
Predicted Probabilities: Heaping
.2
.22
.24
.26
.28
11-12
12-13
13-14
14-15
age / wave

Scale reliability

	Physical and mental health (8 Items)		Evaluation of the classmates (3 items)		Quality of the neighborhood (5 Items)	
	unbalanced	balanced	unbalanced	balanced	unbalanced	balanced
Wave 1	.72	.70	.67	.67	.56	.57
Wave 2	.76	.75	.69	.70	.61	.61
Wave 3	.79	.78	.73	.74	.63	.65
Wave 4	.81	.80	.76	.77	.62	.64

- Evidence for age-related learning effects
- Frequency of participation / selective panel attrition seems not to play a role

Conclusion

- Age-related learning effects seem to increase data quality
- Decreasing motivation in the course of the study may reduce data quality after certain waves and/or when young people enter puberty
- The frequency of participation also seems to increase data quality but findings may be biased due to the lack of experimental data
- Additional analyses with other data quality indicators (e.g., acquiescence, answers to open-ended questions)

Thank you very much for your attention!

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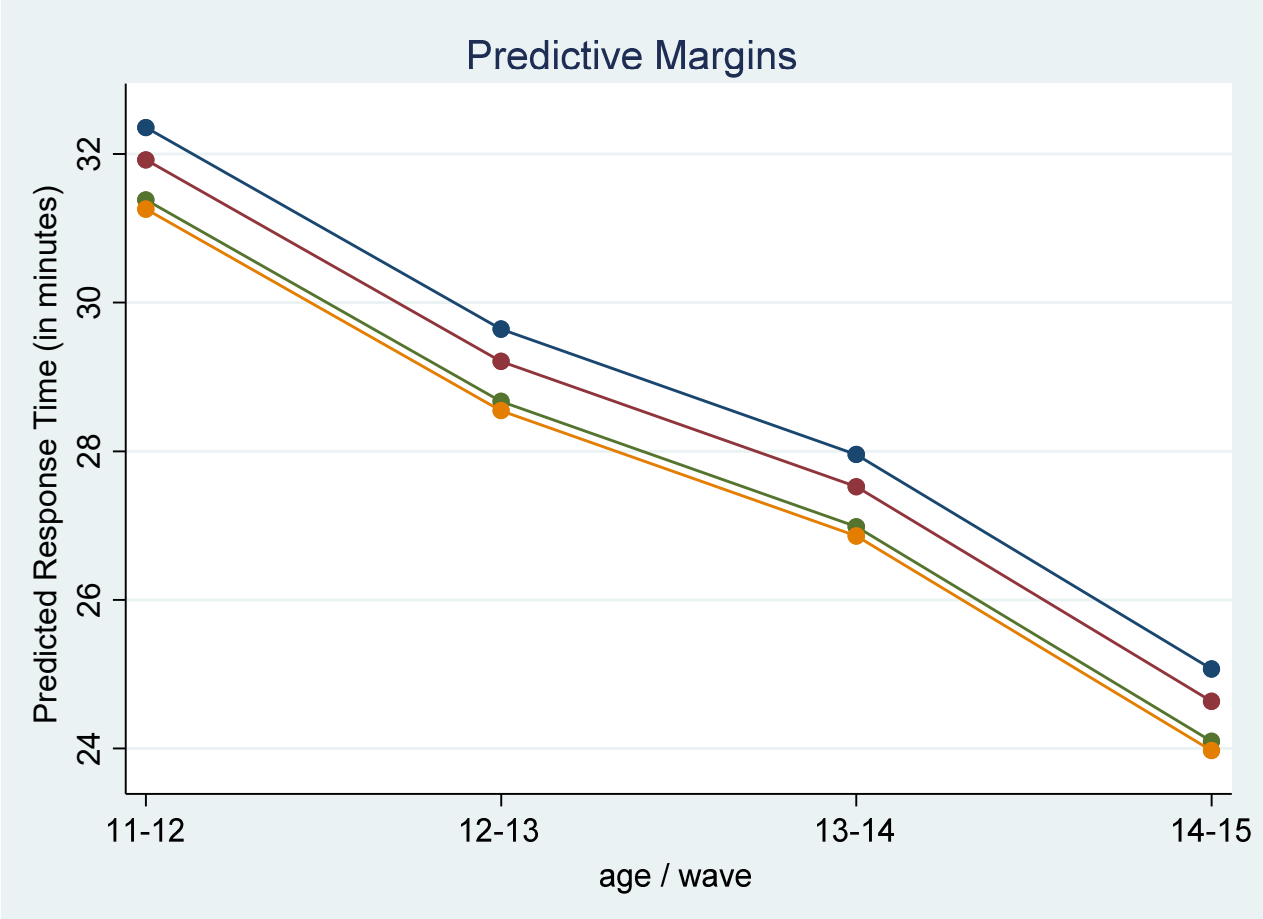
Models

Dependent Variable	Item-Nonresponse			Straightlining			Heaping		
Fixed Part									
Constant	-1.905	.063	***	-3.192	.121	***	-.832	.042	***
Frequency of participation									
1	Ref.			Ref.			Ref.		
2	-.137	.065	*	-.390	.100	***	-.061	.045	
3	-.277	.062	***	-.600	.097	***	-.097	.043	*
4	-.392	.059	***	-.754	.093	***	-.068	.040	
Wave									
1	Ref.			Ref.			Ref.		
2	-.400	.052	***	.074	.094		-.044	.035	
3	-.592	.054	***	.217	.091	*	-.139	.035	***
4	-.443	.053	***	.556	.088	***	-.213	.037	***
Girls	.135	.041	***	-.387	.066	***	-.195	.026	***
Higher school stream	-.466	.041	***	-.511	.066	***	-.143	.027	***
Random Part									
Prop. of Variance L2	19.0%			26.6%			11.9%		
N									
Level 1 (Observations)	39,123			35,430			36,242		
Level 2 (Pupils)	16,759			15,843			16,027		

Response time

- Dependent variable: Response time in minutes
- Additional independent variable: individual number of items that had to be answered (taking filter questions into account)
- Estimation of a three-level model due to stronger clustering effects on the school-level (e.g., varying duration of lessons, correlation between schools and interviewers)

Response time



Model

Dependent Variable	Response time		
Fixed Part			
Constant	29.229	.290	***
Frequency of participation			
1	Ref.		
2	-.435	.110	***
3	-.973	.110	***
4	-1.097	.110	***
Wave			
1	Ref.		
2	-2.711	.076	***
3	-4.398	.097	***
4	-7.285	.091	***
Girls	.108	.067	
Higher school stream	-1.259	.273	***
Number of items	.025	.002	***
Random Part			
Prop. of Variance L3	9.9%		
Prop. of Variance L2	32.6%		
N			
Level 1 (Observations)	38,181		
Level 2 (Pupils)	16,625		
Level 3 (Schools)	173		