



Transitionen von der Erstausbildung ins Erwerbsleben  
Transitions de l'Ecole à l'Emploi  
Transitions from Education to Employment



<sup>b</sup>  
UNIVERSITÄT  
BERN

## Transitions from Education to Employment Cohort 2 (TREE2)

# TREE2 Study Design Update 2023

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## I Summary/Overview

This document describes the design and implementation of the TREE2 panel survey. The document is published simultaneously with the second release (2023) of scientific use data on the TREE2 cohort (TREE, 2023). TREE2 is the panel survey following up the second cohort of the TREE study (Transitions from Education to Employment), a large multi-cohort longitudinal survey conducted among Swiss youth after they have completed compulsory school in 2016 (i.e., starting at the end of lower secondary schooling at average age 15-16). Like its predecessor TREE1 that started in 2000 (see TREE's multi-cohort design in the following chapter), it draws on a baseline survey assessing students' skills at the end of compulsory school in three language regions of Switzerland (German, French, Italian).

Figure 1: Core elements of the TREE2 survey design

Year Ø age of sample	2016 16	2017 17	2018 18	2019 19	2020 20	2021 21	2022 22	2023 23	2024 24	2025 25	2026 26
<b>Transition progress of sample</b>	End of compulsory school	Transitions from lower sec. to upper sec.			Transitions from upper sec. to tertiary level or labour market				Transitions from tertiary level to labour market		
<b>Surveys</b>	AES baseline	panel wave 1	panel wave 2	panel wave 3	panel wave 4	panel wave 5	panel wave 6		panel wave 7		panel wave 8
<b>Samples and Participation</b>											
Initial sample *	22423 *	9741 *	9251 *	8918 *	7855	6949	6128				
Valid response **	11887 *	7971	6903	6154	5353	4501	4461				
Response rate ***	53%	82%	75%	69%	68%	65%	73%				

Data collected and published

Data collected

Data collection planned

\* Due to retrospective exclusions from the sample, the published datasets comprise only 8,429 cases (see section 4.5 for details).

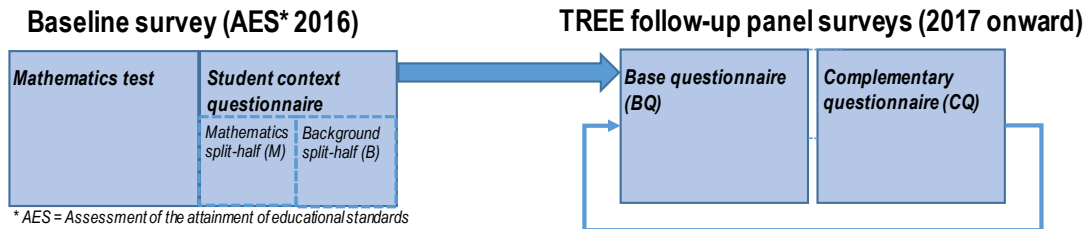
\*\* Complete base questionnaire (Baseline survey: AES questionnaire incl. background module and consent to be contacted by TREE)

\*\*\* Valid responses in per cent of initial sample (baseline survey: average rate covering all sources of baseline nonresponse, see chapter 6 for details)

Like TREE1, TREE2 is designed to observe and analyse transitions to and throughout post-compulsory education (upper secondary and tertiary level) as well as transitions to working and adult life. A starting sample of 8429 respondents has been followed up, to date, by means of six panel survey waves at yearly intervals, with further waves planned at looser intervals ranging from two to five years in the future (see Figure 1). Response has been gradually declining from 7971 individuals in panel wave 1 to 4461 in panel wave 6.

With regard to the survey panels completed so far, data from the baseline survey and panel waves 1 to 3 are available to the scientific community at large (TREE, 2023).<sup>1</sup> Data from panel waves 4 to 6 will be published in the near future.

Figure 2: TREE2 survey design (overview)



TREE2 draws on a baseline survey designed to assess mathematics skills at the end of students' last school year in lower secondary education. The survey is complemented by an extensive student context questionnaire (see Figure 2; for details, see Section 4.2.3). For the student questionnaire, a design with two differing versions was implemented. Each questionnaire version was administered to a randomised split-half of the total sample (see also Figure 6). Whereas the version M (for mathematics) focussed on characteristics relevant to the successful acquisition of mathematical skills, the version B (for background) was developed in order to measure the initial conditions deemed to be relevant for the respondents' further education and labour-market careers. Both questionnaire variants included a common pool of items completed by all students participating in AES. Adopting a multi-mode survey design, the TREE2 follow-up panel waves capture, on the one hand, respondents' education, labour market and other activities, drawing on a sophisticated proactive dependent interviewing scheme (base questionnaire, see chapter 5 for details). The detailed episodic data of the collected activity spells are complemented by respondents' in-depth assessments regarding these activities as well as their personal situation and a wide range of subjective assessment measures regarding the respondents themselves and (their significant) others (complementary questionnaire). For more detail, see Sections 3 (main concepts), 4 (panel survey design) and 5 (implementation and field work).

On the one hand, this document intends to provide readers having a general interest in the TREE study with an overview of its most important features. On the other hand, it comprises detailed information on sampling, survey management, and data that complements the documentation of the most recent TREE2 data release published simultaneously (TREE, 2023).

<sup>1</sup> TREE (2023). Transitions from Education to Employment, Cohort 2 (TREE2), panel waves 0-3 (2016-2019) (2.0.0) [Dataset]. University of Bern. Distributed by FORS data service. <https://doi.org/10.48573/kzod-8p12>

## 2 The TREE multi-cohort study: objectives and design

TREE (Transitions from Education to Employment) is a multi-disciplinary longitudinal large survey providing high-quality longitudinal data on educational and occupational pathways in Switzerland for the use within the scientific community at large. The source of the data is a multi-cohort panel study of compulsory school leavers who are first surveyed at the end of compulsory school at the age of approximately 15 to 16 years (see Figure 3).

The first TREE cohort (TREE1) was launched in 2000 and draws on a large national (compulsory) school leavers' sample ( $n=6343$ ) tested and surveyed on the occasion of Switzerland's then first-time participation in PISA.<sup>2</sup> Since then, the sample has been followed up by means of 10 panel waves, the most recent one conducted in 2019/20. Further panel waves are planned at five-years intervals. At the time of the last panel wave conducted to date (2019/2020), TREE1 respondents had reached an average age of approximately 35 and been surveyed for a period of over 20 years, spanning from early adolescence up to early middle-age. The study thus has gradually grown into a full-blown life course survey (Gomensoro & Meyer, 2017; TREE, 2016).

Over the years and across a wide range of academic disciplines (e.g., sociology, economics, psychology, educational and health sciences), TREE1 has become an invaluable database for research on pathways and transitions of adolescents and (young) adults. Today, TREE1 is to be found among Switzerland's most widely used data infrastructures in the social sciences.

The second TREE panel study (TREE2) covers a comparable population of school leavers who left compulsory education in 2016 ( $n=8429$ ). As its baseline survey, it draws on the AES 2016 (see chapter 4 for details), a national large-scale assessment of mathematics skills.<sup>3</sup> Since then, this second cohort of school-leavers has been re-surveyed six times at yearly intervals.

Along with detailed student background characteristics, the baseline surveys of both TREE cohorts provide elaborate measurements of cognitive skills which are at the respondents' command at the end of their compulsory schooling (9<sup>th</sup> grade).<sup>4</sup> The subsequent panel waves then collect detailed data on education and labour market pathways, which are contextualised by a rich set of complementary information on various life domains that have been identified in previous research as factors relevant for the respondents' later transitions from education into working and adult life. This allows researchers not only to analyse respondents' pathways in great detail, but also to examine how these context factors shape the observed pathways.

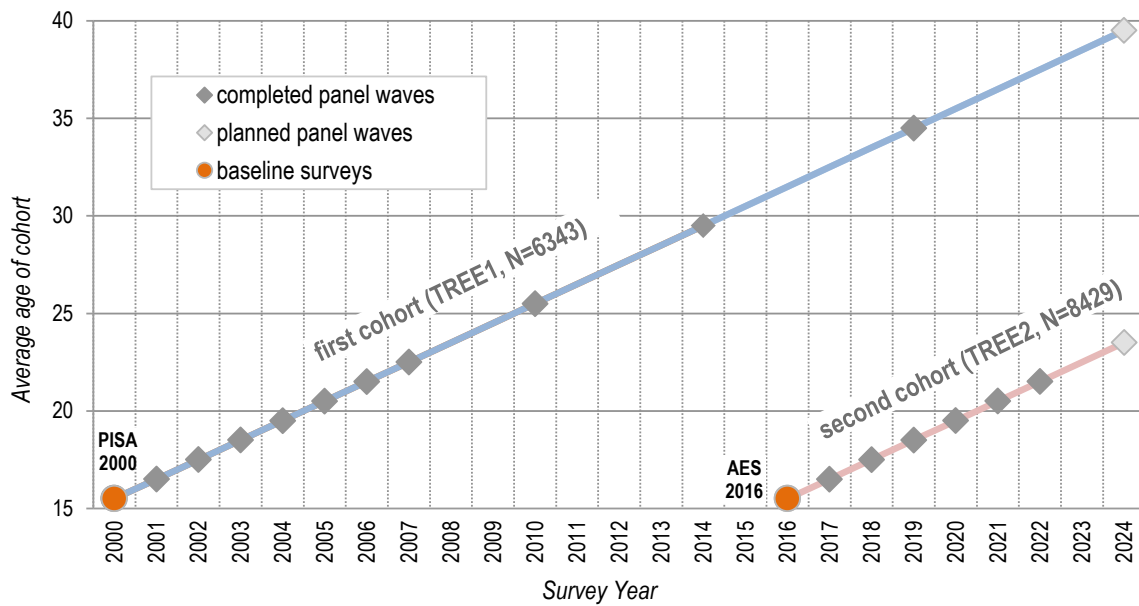
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<sup>2</sup> Programme for International Student Assessment.

<sup>3</sup> Assessment of the Attainment of Educational Standards.

<sup>4</sup> 11<sup>th</sup> grade (including two years of kindergarten) in the official numbering of grades adjusted in the context of HarmoS (EDK, 2007).

Figure 3: TREE multi-cohort design



TREE2 adopts essential characteristics of the first cohort's (TREE1) design, which allows for inter-cohort comparison of how school-to-work transitions have changed over time (Gomensoro & Meyer, 2017; TREE, 2016). The two cohorts are comparable insofar as

- they both are followed up on their pathways through upper secondary and tertiary education into gainful employment and young to middle adulthood;
- they both are followed up at yearly intervals up to age 22-23, and at looser intervals (2-5 years) later on, thus providing a dense and comprehensive observation of all relevant types of activities during school-to work transitions;
- they both draw on a baseline survey including elaborate assessments of cognitive skills acquired by the end of lower secondary education;
- the baseline surveys of both cohorts provide comprehensive measurements of students' starting conditions deemed to be relevant for their later educational and labour market pathways;
- they both draw on a large sample of students in their last year of compulsory education (i.e., at the end of lower secondary education). Moreover, survey participation in both baseline surveys is extraordinarily high (PISA 2000: 95 %; AES 2016: 93 %; see BFS & EDK, 2002; Verner & Helbling, 2019), which substantially facilitates measures to correct for non-response bias due to panel attrition.



## 3 Theoretical background and main concepts

### 3.1 Theoretical framework and overall thematic coverage

TREE focuses on post-compulsory education and employment trajectories of Swiss school leavers. At the end of compulsory schooling, young people need to make their transition into upper secondary education. In a country where two thirds of all school leavers enter vocational education and training (VET), this transition is very often tantamount to choosing a (training) profession and applying for an apprenticeship (training) place.<sup>5</sup> However, this phase is also characterised by far-reaching developmental and identity-finding processes, which may influence career choice. School-to-work transitions therefore must be analysed in the context of adolescents' psychological development and of the opportunity structures in which they make decisions and act.

The aim of TREE is not only to describe these trajectories in as much detail as possible, but also to find potential explanations for the different paths taken by young people. As an inter-disciplinary social science data infrastructure, TREE aims to include concepts from a broad range of disciplines and fields of study.

As an overarching theoretical framework, we draw on the life course paradigm (Baltes, 1990; Blossfeld et al., 2016; Elder, 1994; Schoon & Silbereisen, 2009), which has been systematised by Bernardi et al. (2019) in a three-dimensional matrix accounting for temporal interdependencies as well as interdependencies between life domains (for more detail see Hupka-Brunner et al., 2022).

Figure 4 adapts Bernardi et al.'s life course cube to the specific purposes of the TREE study. Along the various timelines (cohort age, biographical stages, historical time), we distinguish three levels of analysis: The supra-individual level (i.e., the societal macro-context), the level of individual action in various life domains and the level of intra-individual processes. Against the backdrop of the topmost level (which we do not measure directly), our survey instruments strive to cover, as comprehensively as possible, the (domain-specific) individual and intra-individual levels and their intricate interdependencies.

Against this macro-theoretical background, the aim of TREE2 is not only to obtain detailed information on post-compulsory education and employment trajectories of Swiss school leavers. TREE2 also aims at providing data on school-to-work transitions in the context of changing school, family, institutional, labour market and demographic conditions (Hupka-Brunner et al., 2022). Based on the life course paradigm and in accordance with TREE's multi-disciplinary character, the study's design strives to do justice to salient theories within the disciplines drawing on its data.

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<sup>5</sup> For a schematic overview of the Swiss education system, see <https://www.edk.ch/en/education-system/diagram>. See also Hupka-Brunner et al. (2022) for more background.

Figure 4: TREE2 survey dimensions from the perspective of Bernardi et al.'s life course cube

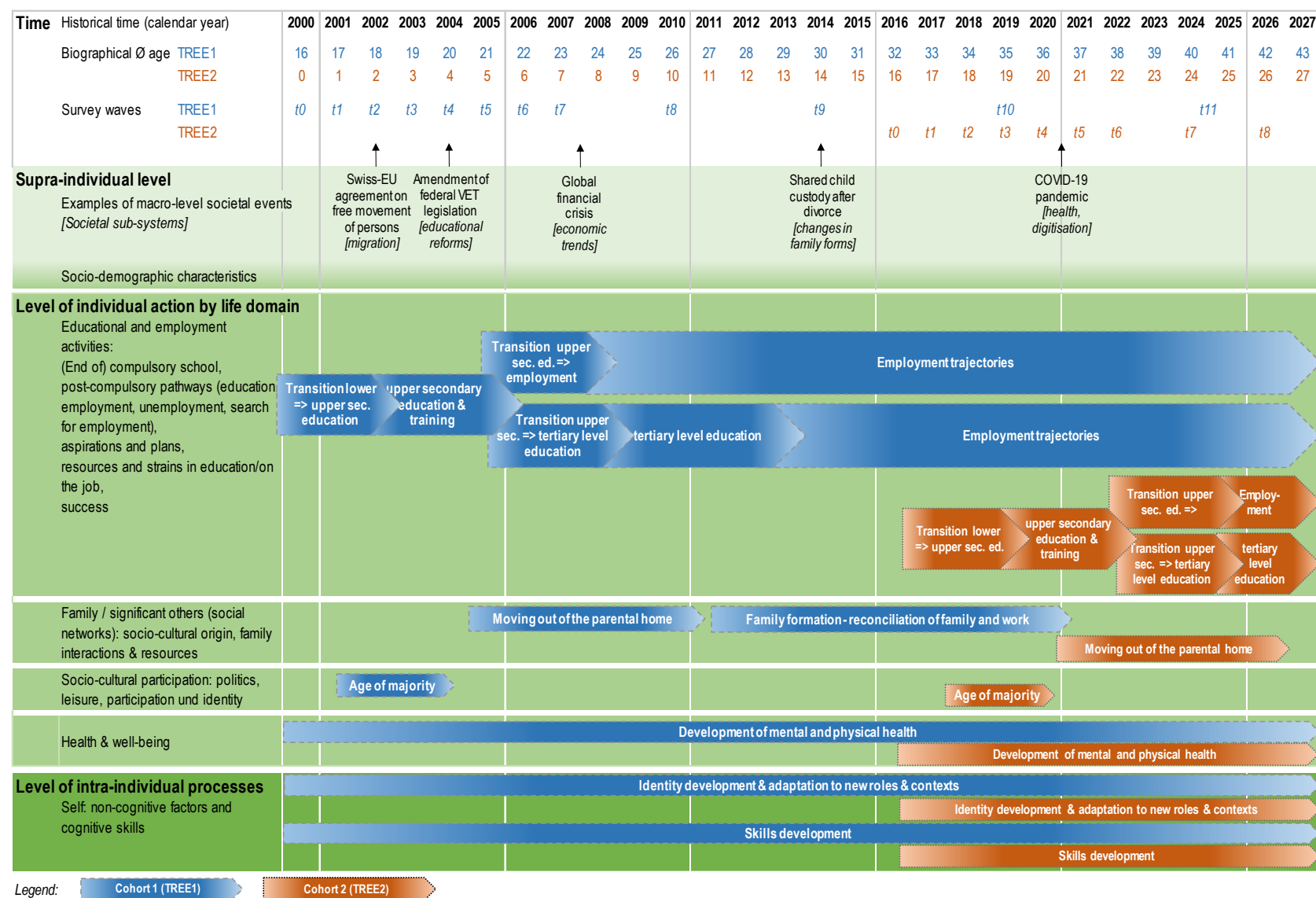


Table 1 provides a comprehensive overview of the topics and concepts covered by the TREE2 panel survey. It also illustrates whether a topic has already been covered by TREE1, thus highlighting the areas that are particularly well suited for cohort comparison, or whether a topic is new or has been extended and refined. For example, substantial additions and extensions have been made in the areas of family and (child)care, political and social integration, social networks, health and media use.

In the appendix of this document, we enclose a variant of Table 1 that provides the sources we drew on for each concept adopted by TREE2, including a comprehensive bibliography.

*Table 1: Topics covered by the TREE2 survey*

<b>Survey topics</b>		<b>Comparability with TREE1</b>		
		(partly) comparable	extended or refined	improved time references
<b>Main</b>	<b>Detailed</b>			
<b>Socio demographics</b>	Socio-demographic characteristics and housing situation			
	Age and Gender	C		
	Civil Status	C		⌚
	Housing situation	C	*	
	Composition of (own) family	C		⌚
	Migration background and nationality			
	Migration background	C	*	
	Nationality, residence status		**	⌚
<b>Education, training and employment</b>	Educational pathways and transitions (lower sec. level)			
	Educational biography (compulsory school)	C	(*)	
	Educational decisions (transitions lower => upper sec. education): perceived cost, benefit and chances of success		**	
	Educational objectives and aspirations	C	**	
	Plans for education and training	C	*	
	Characteristics of maths lessons (end of lower secondary education)		+	
	Educational situation and post-compulsory pathways			
	Attended educational programmes	C		⌚
	Attended schools	C		⌚
	Attended training firms	C		⌚
	Skills requirements for educational activities / media use		*	
	Absenteeism / intention to change education	C		
	Resources and strains (education)	C	*	
	Credentials and marks	C	**	⌚
	Reasons discontinuing education and training		**	⌚
	Employment situation (incl. internships) and pathways			
	Employment / internships	C		⌚
	Conditions of employment	C	*	
	Job position within company's hierarchy	C		
	Salary	C	*	
	Resources and strains (employment)	C	*	
	Job tasks, requirements and job-skills-mismatch	C	**	
	Absenteeism / intention to change job	C		
	Reasons for termination of employment		*	⌚
	Self-assessment of education and employment pathways			
	Assessment of current education and training		**	
	Assessment of completed education & training	C	**	

Survey topics		Comparability with TREE1		
		(partly) comparable	extended or refined	improved time references
Main	Detailed			
	Perceived fit and commitment: main activities	C	*	
	Desired job situation			
Other activities, job and training search	Search for education or employment			
	Search for education (end of lower secondary education)		*	
	Search for VET training place (upper sec.)	C	**	⌚
	Job search (upper sec.)	C	**	⌚
	Search for general education programme (upper sec.)		**	⌚
	Other activities			
	Unemployment (unregistered and registered)	C	*	⌚
	Vacation / holidays	C		⌚
	Military service	C		⌚
	Childcare (as main activity)	C		⌚
	Illness / accident	C		⌚
	Further activities	C		
	Maternity / paternity leave	C		⌚
	Gap / missing information	C		⌚
	Reasons for non-participation in education and employment			
	Reasons for non-participation in education and employment		*	
	Reasons for non-participation in education		*	
	Reasons for part-time & non-employment	C		
Family, significant others, social origin and networks	Family background			
	Family climate	C	*	
	Childcare situation (own children)	C	**	
	Socio-economic origin	C		
	Social, cultural, and economic resources			
	Social capital (own)		*	
	Cultural capital (family of origin)	C	*	
	Cultural capital (own)	C	*	
	Economic capital (family of origin)	C	*	
	Financial situation (general)	C	*	
Social participation	Social and cultural participation			
	Politics	C	[**]	
	Leisure		**	
	Media			
	Group affiliation and sense of belonging (identity)	C	*	
Well-being and health	Satisfaction and well-being			
	Satisfaction	C	*	
	School-related well-being		*	
	Critical life events	C	*	
	Health	C	[**]	⌚
Self	Non-cognitive factors			
	Motivational concepts	C	*	
	Self-perception	C	*	
	Emotions related to maths classes		+	
	Volitional strategies	C	*	
	Personality characteristics		*	
	Global preferences (risk, time and social preferences)		*	

<b>Survey topics</b>		<b>Comparability with TREE1</b>		
		(partly) comparable	extended or refined	improved time references
Main	Detailed			
	Values and attitudes	C		
	Attitudes related to maths classes		+	
	Cognitive skills (assessments)			
	basic mathematical skills	( C+ )	**	
	reading speed		[**]	
	cognitive skills		[**]	

Legend for columns on comparison with TREE1:

C = Data (partly) comparable across cohorts. ( C+ ) Elaborated, but not fully comparable assessment of math competences available for both cohorts (TREE1: PISA mathematics scores available for approx. 55% of sample).

\* Survey programme slightly extended compared to TREE1. \*\* Survey programme strongly extended compared to TREE1. + extended survey programme (AES topic). (\*) = New data on transitions from primary to lower secondary school not in this release. [\*\*] New survey modules (web only) for randomised split half sample (see Figure 5, Section 4.1).

⌚ Additional or refined data on the timing of activities, transitions or events in TREE2

### 3.2 Complementary tests, experiments and thematic modules

Over and above the core instruments listed in Table 1, we have implemented a number of additional measures, including complementary cognitive tests, experiments and particular thematic modules (see Table 2 for an overview). With respect to cognitive tests, we complemented the comprehensive mathematics assessment at baseline (AES) by a cognitive abilities test and a reading speed test (see Section 3.2.1). In the domain of experiments, we implemented a social value orientation (SVO) slider measure and an experiment on study choice (see Section 3.2.2). Finally, we implemented two special thematic modules on health and politics (see Section 3.2.3).

Table 2: Overview of cognitive tests, experiments and thematic modules

Panel Wave	Instruments
Baseline	AES maths test Cognitive abilities test (CAT)
Panel wave 1	Reading speed test
Panel wave 2	Thematic module on health Thematic module on politics Social value orientation slider measure (SVO) Experiment on study choice
Panel wave 3	Reading speed test

Beyond the above-mentioned additions, we also conducted several methodological experiments during the course of the study. One of them was geared towards optimising the measurement of parental attainment of education among young adolescents and was administered in the baseline

survey. Other experiments were concerned with effects of incentives on respondents' propensity of attrition (Sacchi et al., 2018) and with mode effects (paper-and-pencil vs. CAWI<sup>6</sup> mode).

### 3.2.1 Complementary cognitive tests

Having acquired basic skills (or competencies<sup>7</sup>) by the end of compulsory school is crucial for individuals' further life course, as these skills prove to be predictive for success in various life domains, especially on the labour market (OECD, 2010; OECD/PISA, 2001; Stalder et al., 2008). On the other hand, it is also assumed that these skills are also important at the societal level, as they seem to be a decisive prerequisite for socio-political participation (CERI, 2010; Gross et al., 2011). Accordingly, the achievement of basic competencies is also specified in national educational goals (EDK, 2011; WBF & EDK, 2015).

Depending on the historical-cultural context, the definition of skills or competencies to be acquired may vary. Nevertheless, some of them seem to be more fundamental than others: Mathematics and reading are often described as basic competencies for further learning success (OECD, 2013). Beyond the learning environment provided by formal schooling, it is furthermore assumed that basic cognitive competencies, often summarised as intelligence, represent a crucial foundation for learning processes. Cognitive, mathematical and reading skills are closely interconnected among themselves and with socio-emotional factors such as anxiety and motivation (Pollack, 2021). Collectively, these elements influence academic and vocational success through their impact on learning processes. Taking into account a diverse range of skills is therefore critical to a comprehensive understanding and fostering of learning and successful educational careers (Dunn et al., 2020; Pollack, 2021; Spencer et al., 2022).

Consequently, and beyond the measurement of mathematical competencies on the occasion of the TREE2 baseline survey, we implemented additional tests to analyse a broader range of skills. By introducing a reading speed test and a nonverbal test of cognitive abilities (see below for more detail), we thus aim at capturing interdependencies between learners' competencies and educational pathways. In order to capture skills development over time, a rare feature even in longitudinal surveys, we furthermore implemented a repeated measure design for the reading speed test.

#### *Cognitive skills test (KFT)*

Intelligence is often emphasized as a base element of competencies. It is defined as a general mental capability that involves being able to reason, think abstractly or learn from experience (Gottfredson 1997). Several strands of literature distinguish between fluid and crystallized intelligence (Brunner, Lang and Lüdtke 2014). Whereas acquired knowledge is part of crystallised intelligence, fluid intelligence, further differentiated into the two subcomponents processing speed and reasoning, is one of the most widespread psychological constructs, claiming to be predictive for many learning

<sup>6</sup> Computer-assisted (self-administered) web interview (roughly synonymous with CASI – computer-assisted self-interview).

<sup>7</sup> As is custom in other studies (OECD, 2013), we use the terms skills and competencies synonymously.

processes, health as well as the achievement of various goals throughout one's life course (Brunner et al., 2014; Cattell, 1963; Horn & Noll, 1997).

As a measure for the reasoning component of fluid intelligence, we administered the figural, nonverbal subtest N2 of the *Kognitiver Fähigkeitstest* (KFT, see Heller & Perleth, 2000). The subtest is suitable for children as of age of 7 and includes grade-specific tasks for German grade levels 4-12. In cooperation with the test publisher (Beltz Test GmbH), we adapted the test so that it could be implemented online and self-administered in TREE's three survey languages (German, French and Italian). Respondents had eight minutes to complete the test (see Appendix 8.2 and Krebs-Oesch, Jann, et al., 2023 for more detail).

### *Reading speed test*

Reading speed is a crucial factor for academic success and career trajectories, as it forms the basis for effective learning and information processing. It can also be used as a proxy measure of a person's general reading skills: A high reading speed indicates that an individual is able to extract information from texts rapidly and efficiently, while a low reading speed suggests a slower reading development. The inclusion of the test in the TREE2 panel survey hence provides a database allowing for longitudinal investigation of a wide range of interdependencies between the intra-individual development of an important facet of reading literacy, educational pathways, and the life course in general.

The test design provides measurements of reading speed at two points in time: the first measure was taken one year after the baseline survey (2017), the second, based on a randomized split-half design, either in the third panel wave (2019), or in the panel wave of the year before respondents graduated from upper secondary education. This extends the analytical potential of the TREE2 data in several ways (see Appendix 8.3 and Krebs-Oesch, Sacchi, et al., 2023 for details): First and foremost and as already mentioned, reading speed is an important precondition of academic success and career paths, as it forms the basis for effective learning and information processing (see previous paragraph). Second, a test of basic reading abilities fosters comparative analyses of both TREE cohorts. Third, the sample-split with an invariant, two-year test interval (extending approximately from age 16 to 18) allows to analyse interdependencies between enrolment in post-compulsory education and the intra-individual development of basic reading skills. Fourth, the sample-split with a measurement shortly before upper secondary graduation lends itself to assess the role of basic reading skills both for the completion of post-compulsory education and for the subsequent transitions to the labour market and to further education. The 2-minute test relies on a paper-and-pencil instrument developed by the NEPS (Gehrer et al., 2013; Zimmermann et al., 2012) that TREE has adapted for web-based self-administration (computer or smartphone) and translated to French (see again Krebs-Oesch, Sacchi, et al., 2023 for more detail).

### 3.2.2 Experiments

#### *Social value orientation slider measure (SVO)*

According to Murphy et al. (2011), the assumption of self-interest (i.e., individuals maximising their own material gain) is central to rational choice theory. At the same time, however, various counterexamples show that in the course of decision making, elicited preferences and choices are often influenced by the payoffs of others. Against this background, Murphy et al. proposed a specific measurement instrument capturing the magnitude of the concern people have for others, the called Social Value Orientation slider measure (SVO). We administered a simplified, web-based and incentivised adaptation of this instrument in panel wave 2 (see Werthmüller, 2020 and Appendix 8.4 for more detail). The measure was administered to the “M” (mathematics) split-half of the sample only.

#### *Experiment on study choice*

In panel wave 2, we conducted a vignette experiment on upper secondary general education<sup>8</sup> students’ choices of field of study (see Appendix 8.5 for more detail). At the time of the survey, students were on average 17 to 18 years old, and transition to university was approximately two years ahead of them. In the stated choice experiment (Street & Burgess, 2007), we systematically varied subject preferences (mathematics vs. other), “thinking styles” (analytical vs. associative/creative), job characteristics (technical vs. social, salary, reconciliation of job and family) and preferences for competition and risk. The choice sets administered in the survey contain a short introductory text, present two fields of study (unlabelled, titled subject A and subject B) with their attributes and conclude with a question asking students which of the two subjects they would choose (see also Combet, 2023 for more detail).

### 3.2.3 Complementary thematic modules

In panel wave 2, we implemented two thematic modules on health on the one hand and politics on the other hand. The health module includes items on self-reported general state of health, physical ailments and complaints, substance use, sports, sleeping habits and nutrition. The politics module comprised questions regarding political self-efficacy, political activities and identity, self-positioning on a left-to-right scale and party preferences. The two modules were each administered to one half of the AES sample-splits, i.e., the health module to the “B” (background) split-half, the politics module to the “M” (mathematics) split half. For a detailed view of items administered, see the documentation of the panel wave 2 questionnaires in the 2023 data release (TREE, 2023).

<sup>8</sup> That is, students attending a *Gymnasium* or *Kantonsschule* (German-speaking Switzerland), a *collège*, *gymnase*, *lycée* or *liceo* (French/Italian speaking Switzerland). Upon graduation, students in these tracks are eligible to transition to university.



### 3.3 Principles guiding the selection and development of survey instruments

In developing TREE2's survey instruments, we have systematically adhered to the principle of within-cohort longitudinal comparability of measurement, seeking to achieve a balance between new instruments and a core set of well-established TREE1 instruments that can be used for analyses focusing on comparison between cohorts. In the case of new instruments, preference was given to measures that have already proved their value in previous research (ideally in all administered survey languages). Important criteria were their conceptual relevance in research field-related theories, a well-established influence on important outcome dimensions, good measurement and/or scale quality as well as widespread use in other relevant surveys in order to enhance cross-survey comparability.

With particular regard to the longitudinal capture of trajectory and transition data, we have implemented further refinements of the dependent interview techniques previously adopted in TREE1 (Jäckle, 2009; Rudin & Müller, 2013), striving to yet improve coherence and reliability of the collected episodic data (see Section 5.2 for more detail). Moreover, and in view of the numerous repeated measurements of psychological characteristics, we have developed a concept that determines which instrument is going to be administered in which survey wave.<sup>9</sup> It is guided by the following criteria:

- Short measurement intervals for characteristics that can be expected to change rapidly (low intra-individual stability);
- To reduce survey burden while at the same time enhancing the validity of the measurements for specific analytical purposes, some survey instruments are administered only in selected waves and/or at specific points in time of individual educational pathways, i.e., before completion of upper secondary education (for the latter, see section 4.4.2 and Appendix 8.8);
- Whenever possible, replication of measures administered in the corresponding waves of the first TREE cohort (TREE1);
- Reduction of individual survey burden and avoidance of questionnaire sequences that might appear repetitive and/or redundant to respondents.

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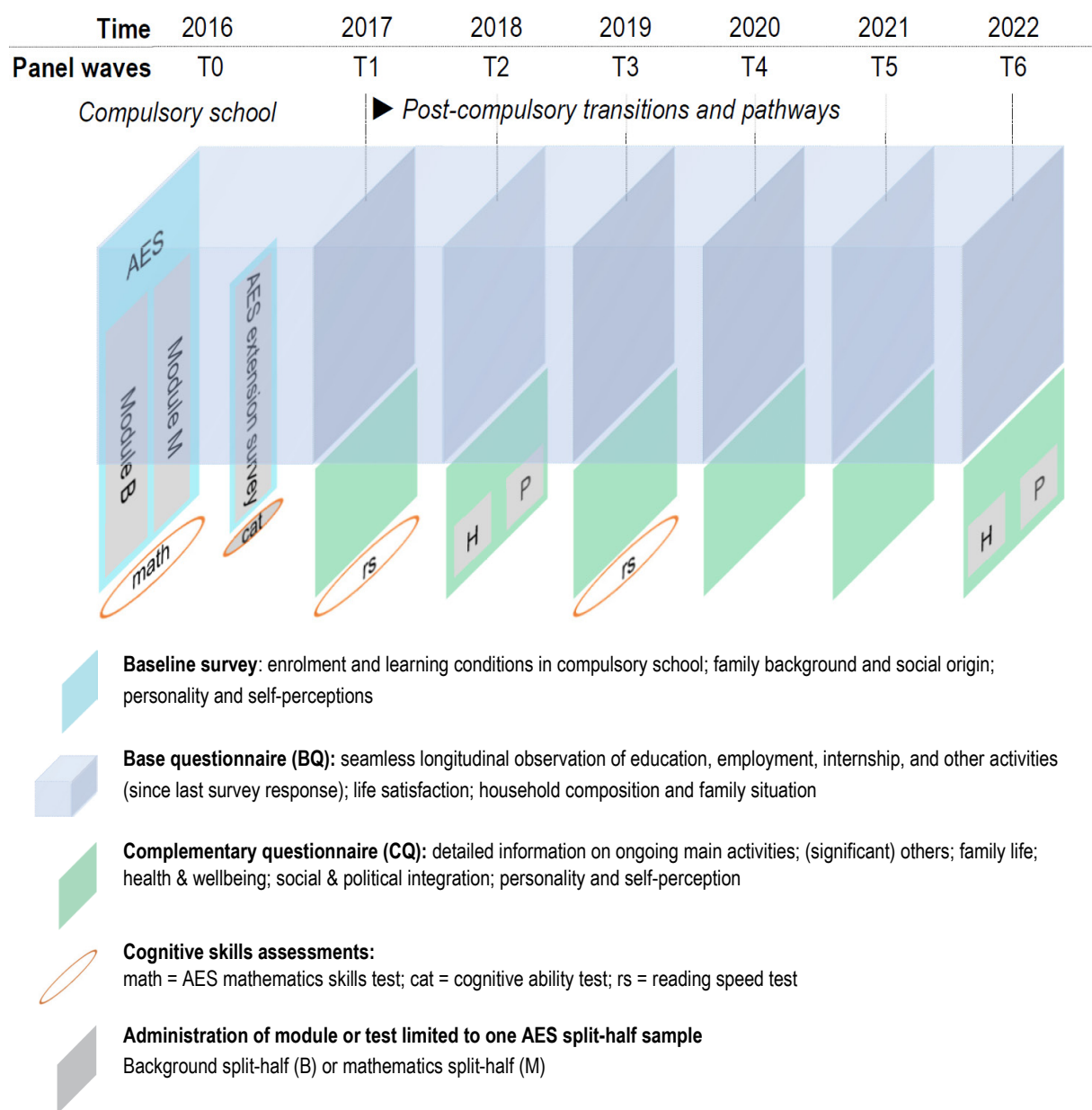
<sup>9</sup> To date, the concept comprises all panel waves up to the age of 30 (both completed and planned). It may be provided on request. The (time) point of each measure is exhaustively documented in the variable lists and codebooks of the published data (see TREE, 2023 for more detail).

## 4 Panel survey design

### 4.1 Overview

Figure 5 gives an overview of TREE2's panel design from its start (baseline survey in 2016) up to panel wave 6 in 2022. As is the case with the first cohort, TREE2 draws on the sample of a national large-scale assessment. While TREE1 drew on the Swiss sample of the PISA 2000 survey, TREE2 is based on a national survey conducted in the context of the Assessment of the Attainment of Educational Standards (AES), a mathematics skills assessment carried out in 2016 among students who were about to reach the end of compulsory school (9<sup>th</sup> grade).<sup>10</sup>

Figure 5: TREE2 panel design (up to panel wave 6)



<sup>10</sup> 11<sup>th</sup> grade (including two years of kindergarten) in the official numbering of grades adjusted in the context of HarmoS (EDK, 2007).

Apart from an extensive mathematics test, the assessment includes a comprehensive student context questionnaire (for details see Section 4.2).<sup>11</sup> The questionnaire covers a wide range of measures geared to assess respondents' starting conditions in view of their subsequent post-compulsory education and labour market trajectories (see Section 3 for more detail). It also includes some retrospective elements regarding the transition from primary to lower secondary education as well as search and orientation activities related to the transition from lower to upper secondary education.

As an important part of the student questionnaire was administered to only one random split-half of the AES sample ("B" in Figure 5), TREE conducted an extension survey among the other split-half ("M" in Figure 5) shortly after the AES main survey. This allowed us to substantially extend TREE2's baseline sample (see Sections 4.2 and 4.5 for more detail). Beyond the questionnaire parts which had not been administered in the AES main survey, respondents of the extension survey also completed a general cognitive skills test (see Appendix 8.2 and Krebs-Oesch, Jann and Hupka-Brunner, 2023).

After the baseline survey, TREE conducted follow-up panel waves at yearly intervals in order to ensure a seamless observation of the TREE2 sample's wide range of post-compulsory trajectories. Educational, labour market and other activities were collected in CATI<sup>12</sup> interviews relying on sophisticated dependent interviewing techniques (see Section 5 for more detail). In doing so, all relevant activities and transitions of the respondents are captured as episodes (spells) at an accuracy of one month. The CATI interviews are complemented by a subsequent self-administered questionnaire in which respondents, on the one hand, assess their main educational or labour market activities in greater detail than they did in the CATI interview.<sup>13</sup> On the other hand, the complementary questionnaire comprises a wide range of subjective assessment measures regarding the respondents themselves and (their significant) others, which covers areas such as family life, health and wellbeing, social and political integration as well as personality and self-perception (see Sections 3 and 5.3 for more detail).

Beyond the elements outlined above, the survey design is complemented, in specific panel waves and, in some cases, for specific (split-half) sub-samples by further cognitive assessment measures and thematic survey modules (yellow ovals and rust-coloured rectangles in Figure 5).<sup>14</sup>

## 4.2 Baseline survey

The Assessment of the Attainment of Educational Standards (AES) is a national monitoring scheme designed to capture student skills in mathematics, teaching and foreign languages at various stages

<sup>11</sup> Administered, as all subsequent TREE2 follow-up surveys, in the three national languages German, French and Italian.

<sup>12</sup> Computer-assisted telephone interview.

<sup>13</sup> We focus on training and working conditions as well as stress and resources of respondents in these contexts.

<sup>14</sup> The cognitive measures include a general cognitive and a reading speed test, the thematic modules cover health and politics issues (see Section 3.2).

of primary and lower secondary level education in Switzerland. The assessment surveys are tailored to national educational standards as defined by the HarmoS Agreement.<sup>15</sup>

As previously mentioned, the AES survey of 2016 serves as the baseline survey of TREE2. It is designed as a compulsory, cross-sectional in-school assessment, carried out under the responsibility of the Swiss Conference of Cantonal Ministers of Education (EDK/CDIP: see Konsortium ÜGK, 2019). In order to participate in the TREE2 panel, respondents therefore had to

- a) give their explicit consent to being contacted by the TREE2 panel survey later on and
- b) divulge their contact data on the basis of this consent.

The TREE2 baseline survey relies on the AES sample base and a questionnaire which was developed jointly and in close cooperation with the EDK. The data of the AES survey were collected by means of a computer-based classroom survey among a random sample of over 22000 students (Verner & Helbling, 2019). Students in each tested school were gathered in ad hoc test classes and instructed and supervised by trained test administrators on the basis of a standardised test protocol. The survey included a computer-assisted self-interview (CASI) on a variety of student background characteristics of approximately 45 minutes, along with a comprehensive test of basic mathematical skills (adb, 2017; Angelone & Keller, 2019; Girnat & Linneweber-Lammerskitten, 2019).<sup>16</sup> The main field work of the AES was conducted in spring/summer 2016. The data are available at the SWISSUbase repository (Nidegger, 2019).

#### 4.2.1 AES and TREE population definitions

The population covered by AES basically includes all students enrolled, in the school year 2015/16, in a 9<sup>th</sup> grade class under Swiss school legislation. Irrespective of its degree of public funding, this also includes private schools. For survey-practical reasons, about three percent of the students were excluded from the AES (mostly students from schools for special needs; Verner & Helbling, 2019).<sup>17</sup>

The population covered by TREE2 is almost identical to that of AES, except that it excludes students who repeated their 9<sup>th</sup> grade in the school year 2016/17.<sup>18</sup> Limiting the TREE2 population to (compulsory) school leavers allows us

- a) to direct the focus of our survey instruments for the subsequent panel waves on the specific biographical phase of post-compulsory education and
- b) to maximise comparability of populations between TREE cohorts 1 and 2.

<sup>15</sup> For more detail, see <http://uegk-schweiz.ch> (in German, French and Italian).

<sup>16</sup> The test includes two test sessions of 50 minutes each.

<sup>17</sup> Apart from 2.1 percent of the population enrolled in special-needs schools, another 1.3 percent of the population were individually excluded on grounds of insufficient test language proficiency or physical or cognitive handicaps.

<sup>18</sup> That is, who did not complete their compulsory education by the end of the school year 2015/16. These (relatively rare) cases were retroactively excluded from the TREE2 panel (see Section 4.5).

#### 4.2.2 AES sample design

From the population described above, AES drew a large, complex random sample of 22423 students. The sample was drawn by means of a two-step, disproportionally stratified sampling procedure with schools as primary sampling units. In cantons with small student populations, all students were drawn. Stratification aimed at obtaining sufficient sample sizes for analyses at cantonal level, which leads to a marked over-representation of small rural cantons. Moreover, students enrolled in tracks with low academic requirements were privileged in the drawing of some cantonal samples. For a detailed description of the complex sampling design we refer to Verner und Helbling (2019).

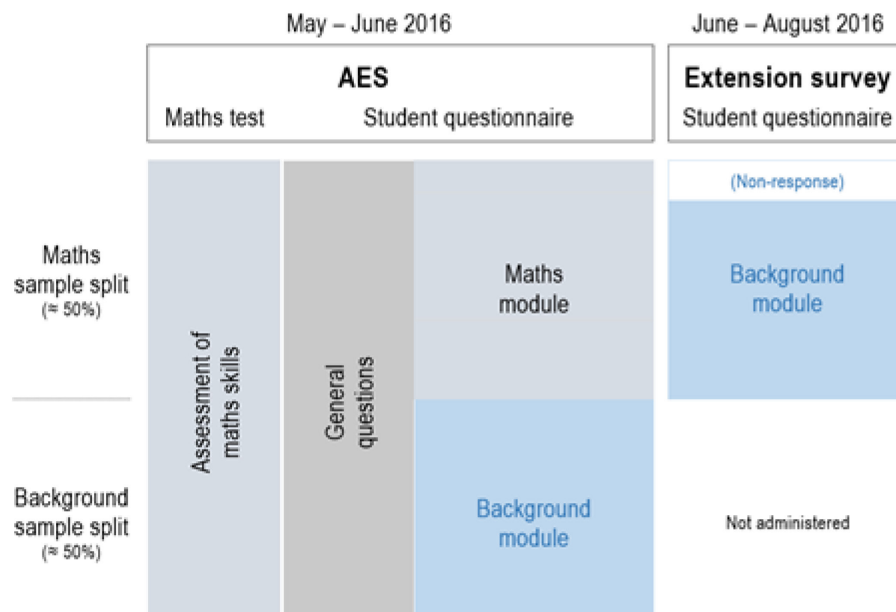
#### 4.2.3 Modularisation of the AES questionnaire

With regard to the computer-assisted self-interview (CASI) administered by the AES, a modular design with two different variants of the student questionnaire was implemented (Hascher et al., 2015; Hascher et al., 2019; Hupka-Brunner et al., 2015; Sacchi & Oesch, 2017). Each questionnaire variant was administered to a randomised split-half of the total sample (see Figure 6).<sup>19</sup> The main building block of one variant was a mathematics module, which mainly covered student, teacher and classroom characteristics relevant to the successful acquisition of mathematical skills during compulsory education and to related didactical and pedagogical research. The core of the second variant was a student background module co-designed by TREE to collect information on a broad range of resources of the surveyed students, their families and the schools they were attending at the time of the survey. This module was developed in order to measure, as comprehensively as possible, the initial conditions deemed to be relevant for the respondents' further education and labour-market careers and their life courses in general. Both questionnaire variants included a common section ("general questions") which was completed by all students participating in AES. The common section (about half of the questionnaire) incorporated items of general interest for the research objectives of both modules.

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<sup>19</sup> With regard to the consequences of this design for the weighting of the data, we recommend the use of the weights that TREE provides with its released data. For more detail, see the document '*Notes on weighting and variance estimation*' included in the TREE data release (TREE, 2023).

Figure 6: Modularised questionnaire design of the TREE2 baseline survey



Due to the modular design of the AES survey, a substantial part of the questionnaire pertaining to relevant initial conditions of the post-compulsory pathways was administered to only one split-half of the AES sample. In order to close the resulting data gap for the other split-half sample, TREE conducted an out-of-school extension survey shortly after the AES main survey.<sup>20</sup> Owing to the extension survey, TREE was able to substantially extend the sample base of its second cohort.

#### 4.2.4 The AES extension survey

The questionnaire of the extension survey basically replicates the survey programme of the background module in the AES main survey (see Figure 6). Two additional elements were placed at the end of the questionnaire: a brief test of general cognitive abilities as well as an experimentally varied repeated measurement of parental education. In every canton, the extension survey started as soon as the AES main survey had been completed in all sampled schools. The interval between AES and extension survey was kept as short as possible in order to maximise data comparability. The median time lag between the AES and extension survey was 29 days. Field work started in June and largely ended in August 2016.<sup>21</sup>

In order to maximise survey participation, the extension survey applied a sequential mixed mode design (de Leeuw et al., 2008) with a self-administered web survey as its primary mode. Students who did not participate in the web survey received an equivalent paper-and-pencil questionnaire as a secondary mode,<sup>22</sup> which accounts for approximately 13% of the total response. In order to further

<sup>20</sup> The average lag between main AES and extension surveys was at 29 days.

<sup>21</sup> The overwhelming majority of the respondents completed the questionnaire between June and August (98 %), with a few pencil-and-paper questionnaires being returned up to the end of October.

<sup>22</sup> The cognitive skills test and the measurement experiment regarding parental education were omitted in the paper & pencil questionnaire.

enhance participation, an unconditional a priori incentive of CHF 10 (in cash) was included in the letter of invitation to take part in the extension survey.<sup>23</sup> With this mixed-mode design, the extension survey achieved a response rate of almost 75% (see Table 6, p. 47).

The implemented mixed-mode design is expected to yield high comparability of data both between the administered modes and with regard to the AES main survey, which also relied on a self-administered mode (CASI). Furthermore, self-administered modes are also recommended to avoid social desirability biases (de Leeuw, 2018; de Leeuw & Hox, 2011).

We have thoroughly striven to optimise the extension survey with regard to maximum data comparability with the background module used in the AES. Nevertheless, it cannot be ruled out that data comparability across the different survey settings or modes may be compromised. Our checks in this respect, however, indicate that such effects are virtually negligible (Sacchi & Krebs-Oesch, 2023b).

### 4.3 Subsampling and sample optimisation after the baseline survey

After completion of the baseline survey, a sample of 13728 ninth grade students had provided their contact details and their consent to being contacted by TREE at a later date. Due to restricted funding, we were not in a position to include all respondents providing their contact details for the TREE2 panel sample. In a first step, we therefore excluded most of the consenting respondents who had failed to complete the questionnaire of the extension survey. In a second step, we excluded another 2235 respondents by means of a randomized subsampling, leaving us with a gross panel sample of 9741 students.

We used the subsampling to optimise the sample composition in view of the panel survey. The general idea was to privilege respondent groups of particular analytic value and/or groups known to be particularly affected by panel attrition. Privileged inclusion of these groups was achieved by either omitting them from the subsampling altogether (i.e., including them in the sample with a probability of one) or by assigning them an elevated sampling probability (Sacchi, 2023).<sup>24</sup>

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<sup>23</sup> Note that only respondents having previously consented to being contacted by TREE were asked to participate in the extension survey.

<sup>24</sup> Technically, this was achieved by means of a disproportionately stratified random sampling based on social origin (privileging students of low social status and/or with migration background), type of lower secondary track attended (privileging students in tracks with low academic requirements) and educational plans for the time after compulsory school (privileging students which could be expected to experience precarious transitions from lower to upper secondary education).

Furthermore, the following groups were sampled (i.e., included in the TREE2 panel sample without restriction) with a probability of 1:

- (a) Students who completed the extension survey and the appended general cognitive abilities test (CAT; see Appendix 8.2);
- (b) Students with particular types of transition (e.g., 2-years VET programmes);
- (c) Students belonging to the (small) Italian-speaking subsample.

## 4.4 Survey design of subsequent panel waves

### 4.4.1 Two survey parts and mixed modes

Figure 7 summarises the survey design of the subsequent panel waves. Each panel wave consists of two consecutive survey parts, i.e., the base questionnaire (BQ) and the complementary questionnaire (CQ). For both parts, a mixed-mode design is adopted. CATI is the primary mode for the BQ, while CAWI is adopted as primary mode for the CQ.<sup>25</sup> A self-administered paper & pencil questionnaires serves as the secondary mode for both survey parts.

One of the reasons for adopting CATI as the primary mode for the BQ is that we expect to reduce non-response, especially for the disadvantaged part of the population with poor literacy skills and low academic achievement (see, e.g., Beukenhorst & Kerssemakers, 2012; Sacchi, 2011). Above all, however, a carefully implemented CATI ensures high data quality for episodic data, which is a key focus of the BQ. In close cooperation with the survey institute mandated to carry out the field work, TREE has therefore developed a sophisticated dependent-interviewing scheme that draws on preloaded data from previous panel waves. In TREE1, we adopted a predominantly reactive dependent interviewing scheme,<sup>26</sup> where preloaded data are used to check consistency of responses across panel waves (see Rudin & Müller, 2013). In TREE2, we adapted the structure of the CATI questionnaire to proactive dependent interviewing, where respondents can build directly on the preloaded data from previous panel waves (see Section 5.2). This smoothens the interview flow, reduces respondents' survey burden and significantly improves the depth of observation, granularity and quality of the episodic data.

Respondents who cannot be contacted for a CATI interview (or who are not willing to be interviewed) are mailed a simplified self-administered paper-and-pencil version of the CATI instrument as secondary mode. The granularity of the episodes as well as the range of administered items is reduced in the paper & pencil version.<sup>27</sup> With regard to part 1 of the survey programme displayed in Figure 7, the paper-and-pencil mode contributed approximately 4 to 5 percent to the total response in panel waves 1, 2 and 3 (see Section 6 for more detail).

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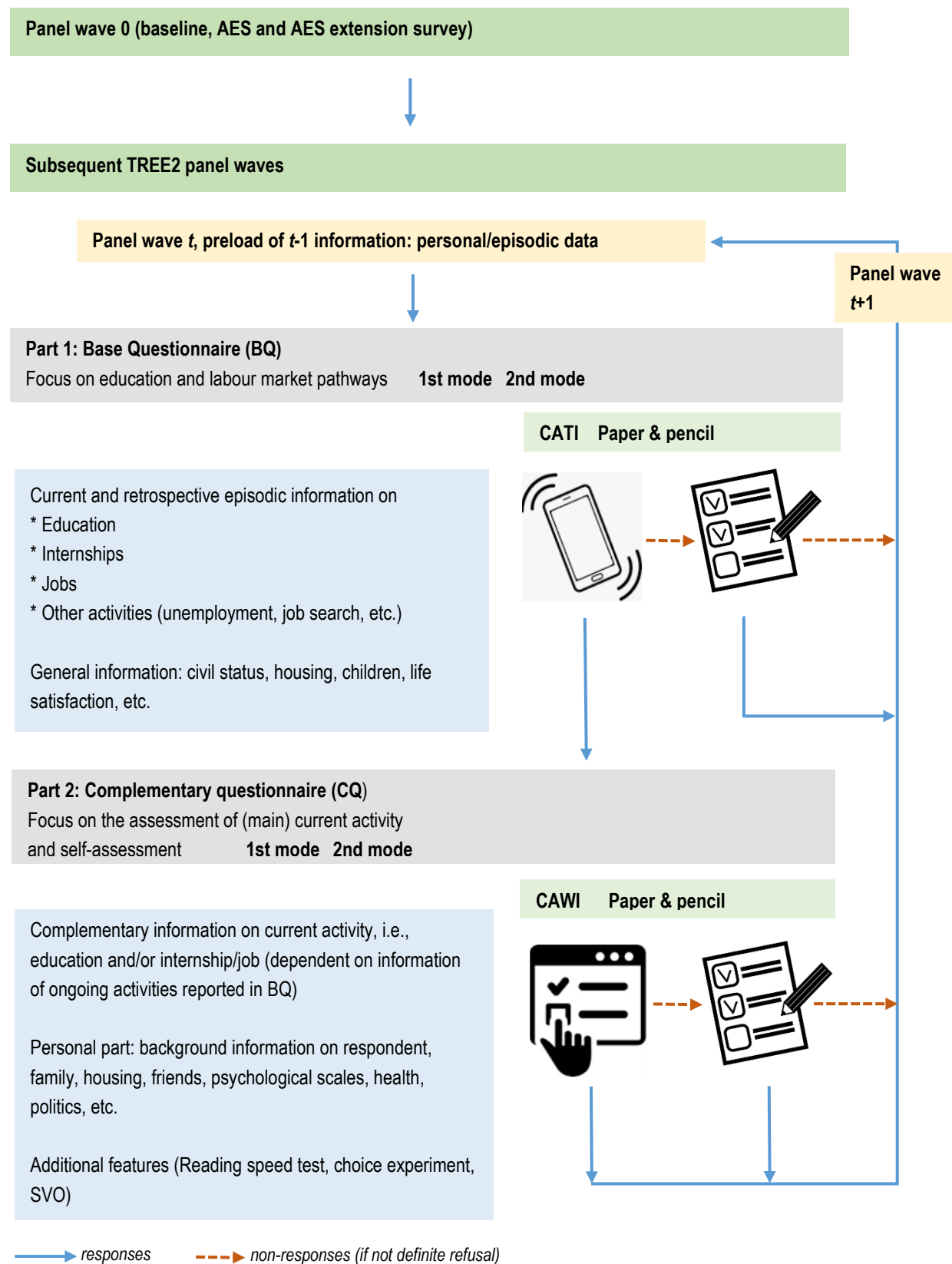
<sup>25</sup> CATI = Computer Assisted Telephone Interview  
CAWI = Computer Assisted Web (Self-) Interview.

<sup>26</sup> As of panel wave 8/2010.

<sup>27</sup> See the technical variable list in the data release for information on which variables were administered in which mode and wave.



Figure 7: Mixed-mode design applied in subsequent TREE panel waves (detailed)



Participants of the CATI interview are asked to take part in a complementary survey, which is to provide additional information on respondents' current main activities and a wide range of further measures, including psychometric scales (e.g., self-assessments) and sensitive questions that are susceptible to social desirability bias. Depending on their current main activities captured by the CATI, respondents receive personalised versions of the complementary questionnaire, which are tailored to collect relevant in-depth information on these activities (see Section 5).<sup>28</sup> In accordance with the recommendations of the methodological literature (particularly with regard to sensitive questions and social desirability bias), the complementary questionnaire is implemented by means of two self-administered modes which are activated sequentially (de Leeuw, 2008; de Leeuw & Hox, 2015; Kreuter et al., 2008).

The primary mode of the CQ is a web survey with a responsive design.<sup>29</sup> If respondents do not complete the web survey, they receive an equivalent paper-and-pencil version by mail (secondary mode).<sup>30</sup> An overwhelming majority (81% in panel wave 1, 94% in panel wave 2) of the respondents completed the survey in the web mode, three out of four of them on their smartphones (see Section 6 for more detail). For technical and/or methodological reasons, some elements of the survey programme were administered in the web mode only.

#### 4.4.2 Pathway-dependent administration of survey instruments

The completion of a post-compulsory education marks a crucial transition in the school-to-work transitions that are essential to TREE. We therefore implemented a number of measurements to be captured very specifically approximately one year before respondents' expected first post-compulsory graduation (labelled "pre-graduation measurements"). We are confident that this will contribute to increasing validity and measurement accuracy when analysing the transition in question, while at the same time substantially reducing respondents' survey burden.

The pre-graduation administration extends to a number of survey instruments that measure aspirations, various self-concepts and aspects of cultural capital (see Appendix 8.8 for details) expected to be relevant individual characteristics with respect to the completion of upper secondary education and to the subsequent transition to the labour market and/or tertiary level education. Furthermore, these psychological dimensions are likely subject to substantial intra-individual change over time (see Sacchi & Krebs-Oesch, 2023a) – another reason why the pre-graduation administration seems methodologically particularly promising. It should also be noted that the pathway-dependent administration of the survey instruments in question<sup>31</sup> is

<sup>28</sup> See Appendix 8.10 for the rules we adopted for assigning specific CQ modules based on information respondents provided in the CATI with regard to their activities.

<sup>29</sup> That is, the questionnaire can be completed on any web-connected device such as computer, tablet or smartphone.

<sup>30</sup> The technical variable list in the data release package specifies which variables were administered in which mode.

<sup>31</sup> In the 2023 data release (TREE, 2023), all pre-graduation measurements are compiled in the dataset 'TREE2\_Data\_Pregraduation\_v2'.

always complemented by their unconditional administration in preceding and possibly also in subsequent panel waves. For a more detailed description of the instruments at stake and their partly unconditional, partly pathway-dependent administration, we refer to see Appendix 8.8.

#### 4.5 Sample exclusions, attrition and weighting

After the subsampling performed to adjust the size and the composition of the panel sample (see Section 4.3), we made the following retroactive adjustments to the TREE2 panel sample:<sup>32</sup>

- Individuals who did not participate in any of the panel waves 1, 2, or 3 were declared as permanent non-respondents and excluded from the panel sample (due to the low likelihood of obtaining a response and lacking panel consent, these individuals were/will not be contacted again in subsequent panel waves);
- Individuals who repeated 9<sup>th</sup> grade in the school year following the TREE2 baseline survey were removed from the sample because they do not belong to the population of the study as defined above;
- Individuals who failed to consent to their TREE2 panel data being linked with the data of the AES baseline survey were removed from the sample.<sup>33</sup>

*Table 3: Permanent sample drop-out and sample exclusions*

Sample size	'Background' sample split	'Math' sample split	Total sample	(%)
Raw initial sample (after subsampling)	4971	4770	9741	100.0%
Panel drop-out and exclusions (Wave 1-3) <sup>1)</sup>				
– Never participated in wave 1 to 3	630	379	1009	10.4%
– Out of population <sup>2)</sup>	73	53	126	1.3%
– Consent to link AES and TREE2 data denied	77	60	137	1.4%
– Consent to link AES and TREE2 data missing <sup>3)</sup>	23	17	40	0.4%
Panel sample (as in data release)	4168	4,261	8429	86.5%

1) Corresponding figures in the 2021 version of this document were partly incorrect.

2) Includes almost exclusively repeaters of the last year of compulsory school (9<sup>th</sup> grade, for details see Table 9).

3) Invalid or no answer.

Details on these retroactive sample adjustments are listed in Table 3. They leave us with a total sample of 8429 individuals (i.e., 14.5% smaller than the raw initial sample after the subsampling).

As any panel study, TREE2 is affected by sample selectivity due to the various attrition processes, especially temporary non-response in one or several panel waves (for details, see Section 6). To

<sup>32</sup> As published in the TREE2 data release of 2023 (TREE, 2023).

<sup>33</sup> The AES survey is a mandatory school survey, whereas participation in the TREE2 panel survey is voluntary. For reasons of data protection, respondents had to explicitly agree to the linkage of AES and TREE2 data. Respondents who failed to provide this agreement (be it by refusing it or by not replying to the respective question) had to be excluded from the released data. However, and contrary to the refusers, non-responders to the linkage question were taken into account for the modelling of survey weights and scales. Data users wishing to consult these data may do so on request.

compensate for all these processes as well as for design-based differences in sampling probabilities (AES sampling and sub-sampling), we provide wave-specific sample weights adhering to the principle of the inverse inclusion probability. The weights are based on differentiated modelling of all selection processes preceding respondents' participation in a given panel wave. Data users are provided with a brief guide on how to use these weights.<sup>34</sup> For a detailed description of the modelling, the calculation and application of the weights we refer to the weighting documentation (Sacchi, 2023).

#### 4.6 Summary of distinctive features of the TREE2 design

To conclude, we would like to highlight the salient features of the TREE2 panel survey design of which we are convinced that they bear a high potential for a wide range of (explanatory) analyses:

- Fine-grained, seamless episodic data on educational and labour market activities combined with an abundant set of contextual data, including both retrospective and prospective measurements of respondents' individual characteristics, attitudes, assessments and dispositions;
- Comprehensive measurement of the “baseline” conditions under which respondents start their post-compulsory educational and labour market careers (i.e., at baseline), including elaborate skills assessment (AES mathematics test, additional cognitive tests);
- Outstanding response rate at baseline, providing excellent opportunities to correct potential biases due to panel attrition;
- A comprehensive set of survey instruments allowing for analyses covering a wide range of disciplines and theories and for regional as well as international comparisons;
- A multi-cohort design allowing for cohort comparisons between two cohorts 16 years apart (baseline years 2000 and 2016).

Contrary to TREE1 (which drew on PISA 2000 with a focus on reading literacy), TREE2 draws on the national mathematics skills assessment AES 2016 as baseline survey (see Section 4.2 for more detail). The two major advantages of AES are that

- it provides a substantially larger, more balanced baseline sample;<sup>35</sup>
- it allowed TREE a substantially closer conceptual linkage of baseline and follow-up surveys owing to the joint development of survey instruments between AES and TREE.<sup>36</sup>

<sup>34</sup> See: Notes on weighting and variance estimation. Update 2023 (TREE, 2023)

<sup>35</sup> More balanced particularly with respect to the representation of the Swiss-German part of the country. However, in TREE2, the small cantons are considerably overrepresented by design.

<sup>36</sup> The major disadvantage of the shift from PISA to AES is that the baseline surveys including the skills assessments are not fully comparable between cohorts.

## 5 Details on implementation and field work

### 5.1 Structure and survey modules of the panel waves

As outlined in Section 4.4, each TREE2 panel wave is comprised of two consecutive survey parts, i.e., the base questionnaire (BQ; primary mode: CATI) and the self-administered complementary questionnaire (CQ; primary mode: web survey). *Figure 8* provides an overview of the structure and modules of the two survey parts and how they are linked with each other.

*Figure 8: Overview structure and modules of the panel waves*

Base questionnaire (BQ) modules				Episode selection	Complementary questionnaire (CQ) modules			
GEN	<b>General module (Start):</b> Welcome and identity check, satisfaction, civil							
EDUC	<b>Education episodes:</b> All ongoing and past education episodes			↻	EDUC	Main ongoing education episode		
	EDSC	↻ All corresponding school sub-episodes	↻	→	EDSC	↻ Main corresponding current school sub-episode		
	EDFI	↻ All corresponding firm sub-episodes	↻	→	EDFI	↻ Main corresponding current training firm sub-episode (only if firm-based VET)		
INT	<b>Internship episodes:</b> All current and past internship episodes			↻				
JOB	<b>Job episodes:</b> All ongoing and past job episodes			↻	JOBINT	Main current job or internship episode		
OTHER	<b>Other activity episodes:</b> All ongoing and past episodes of unemployment, job or apprenticeship search, illness, military service, etc.			↻				
ALL	<b>General module (End)</b>				PERS	<b>Personal part:</b> Family life, health and wellbeing, social and political integration, personality and self-perception		
					Politics	Sub-module politics and SVO (Social Value Orientation): T2 & T6 only (administered to "M" sample split-half)		
	SIT	Evaluation of current (overall) situation			Health	Sub-module Health: T2 & T6 only (administered to "B" sample split-half)		
	END	Nationality, children, household, future			Reading Speed Test	Reading speed test: T1 (all) & T3ff (split design)		
	INFO	Address check, CQ announcement, comments						

↻ This symbol indicates that there is a reference to the principal episode from the school and firm sub-episodes.

↻ This symbol indicates that all episodes of a particular type are captured within a module, as many as there are.

The base questionnaire (BQ) collects key data on education, employment, internship, and other activities, along with satisfaction in various life domains as well as socio-demographic data and information on respondents' household and family situation. The main objective of this first part of the questionnaire is to collect a complete and seamless episodic record of all relevant activity spells since the last interview. To guarantee overall consistency of the data from different annual surveys, this is achieved by means of dependent interviewing (Jäckle, 2009). Previously collected data on individuals' activities are preloaded into the interview software in order to be completed and updated for the entire period since the respondents last response. In a carefully controlled interview process, the CATI design allows to correct, complete and update spell data collected in the previous panel wave (see Section 5.2 for more details).

The collected episode data also serve to determine the type of complementary questionnaire (CQ) respondents are asked to complete in the second part of the survey (see Sections 4.4.1 and 5.3 as well as Appendix 8.10 for more detail). For both parts of the survey, paper-and-pencil instruments are administered as secondary mode in case of non-response to the first mode (see Section 4.4.1).

The described two-step survey approach, which we have developed for the first TREE cohort (TREE1) and refined since for the second, has its advantages and disadvantages. One of the advantages is that the considerable overall survey burden is split up in two parts, both of which can be completed at the respondents' convenience. On the downside, we increase the risk of incomplete response of respondents who will complete the first, but not the second part of the survey. This proves to be the case for one in four to five respondents (see Table 8 on page 49). To counteract this risk, we preferentially placed crucial, indispensable items in the BQ (e.g., activities and trajectories, socio-demographics and "outcome" variables such as degrees, labour market status, wages or satisfaction).

When it comes to determine which data are best collected by CATI (BQ) and which by self-administered web-survey (CQ), we apply the following main criteria:

- CATI is more suitable for collecting complex information that requires background knowledge, e.g., on the education system or complex search lists (e.g., schools, firms, occupations). CATI interviews, when conducted by well-trained interviewers (see Section 5.4.4), are expected to improve the quality and coherence of collected data and to reduce survey burden on respondents.<sup>37</sup>
- Self-administered (written) instruments are more suitable for sensitive items (e.g., on health issues or substance consumption) and grid-formatted questions with an extended amount of text to be read – as it is often the case with psychometric scales.
- Furthermore, we account for the survey mode employed in the panel survey of the first TREE cohort for a given item: preference is given to mode coherence, i.e., collecting data on a given

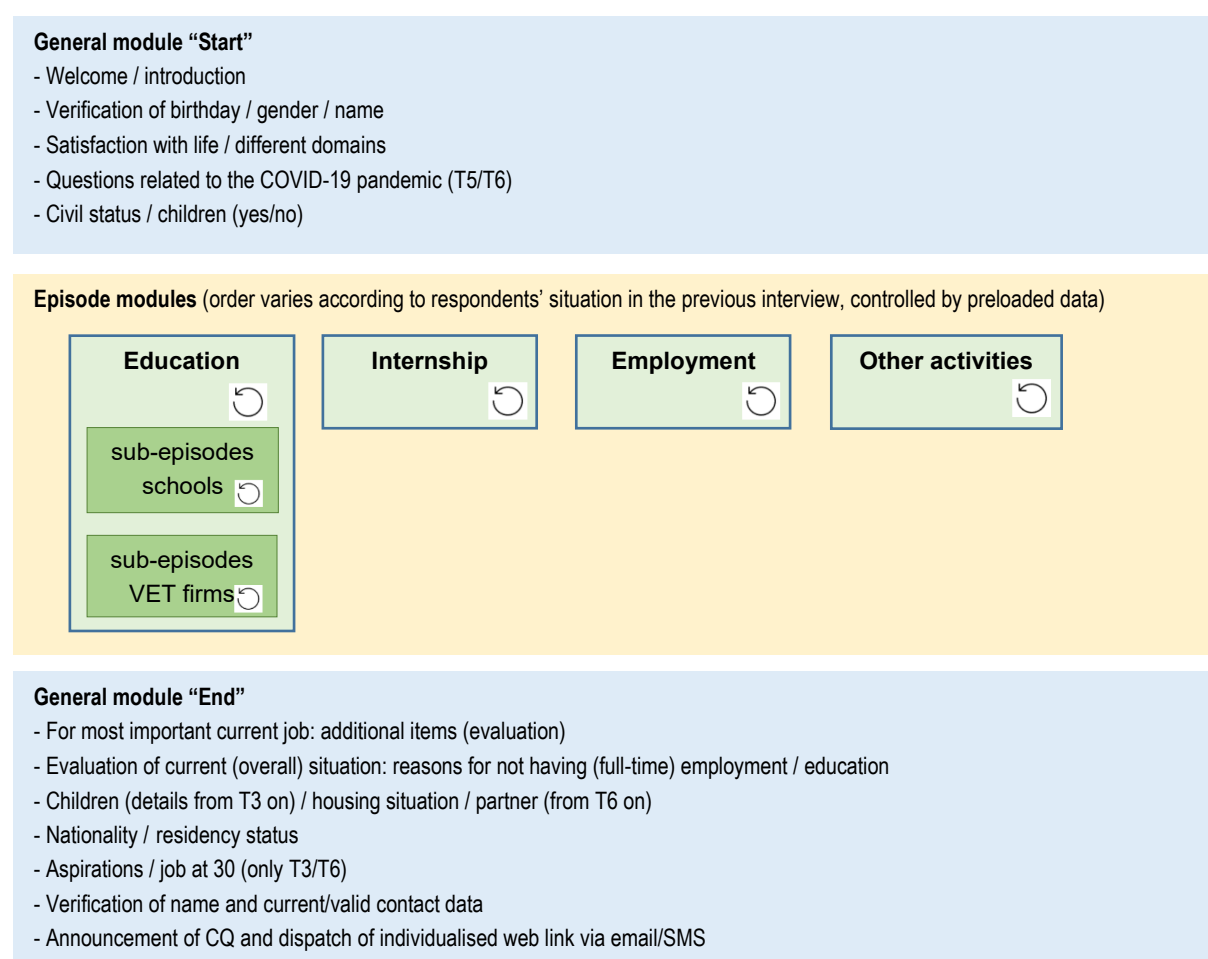
<sup>37</sup> With respect to the TREE2 respondents, who can be considered as "digital natives", it is likely that many of the advantages of the CATI mode may also apply to the CAWI mode. Furthermore, many of them can be expected to find telephone calls unpleasant and unfamiliar. We therefore implemented a CAWI variant of the base questionnaire as of panel wave 6.

item in the same mode for both cohorts. In doing so, we avoid inter-cohort mode effects and improve cohort comparability.

## 5.2 The base questionnaire (BQ)

The base questionnaire (CATI interview) comprises three main sections: In the first section (see “General module start” in *Figure 9*), respondent’s date of birth, gender and name are checked to ensure that the interview is being conducted with the sampled target individual. This part of the interview also includes items on life domain-specific satisfaction and basic socio-demographic information on marital status and parenthood. The second section (“Episode modules”) captures all relevant spells of activity undertaken since the last panel wave to which the interviewee responded. Types of activities include education, internships, employment and other activities such as, for example, job search or unemployment. The third section (“General Module End”) comprises general questions on respondents’ overall situation at the time of the interview and collects detailed information on household composition and residential situation, citizenship as well as, if applicable, on respondents’ children and/or partner. The interview concludes with questions about educational and/or job aspirations, followed by a thorough check of respondents’ contact details and the dispatch of a web link for the complementary questionnaire (CQ) via Email/SMS.

*Figure 9: Structure of the base questionnaire (CATI)*



As introduced above, the main part of the CATI interview consists of capturing episodes (or spells) of relevant types of activity since the last interview. If a respondent did not participate in the previous panel wave, the questionnaire is designed to capture all activities since the respondent's last interview.

Every episode is captured and recorded as a unit of observation and timed to the nearest month in terms of beginning and end. Throughout a given period of observation (from the last interview to the current date), a respondent may report multiple episodes of each type of activity, which may overlap in time. This allows for fine-grained sequencing of activities, whether they are parallel or consecutive. All types of episodes and their definitions are listed in *Figure 10*. An episode is always defined by a start date (month/year), end date (month/year) and a limited amount of additional core information.

*Figure 10: Episode types and definition*

Episode type		Episode core definition		
Name	Type	Begin date	Variable	End date
Education	principal episode	month/year	type of educational programme ( <i>educ_class</i> ) training profession / field of study ( <i>edo1ac</i> )	month/year
→ Education sub-type	secondary episode related to a principal episode (federal vocational baccalaureate 1)	month/year	type of education ( <i>educ_typ</i> ) type of educational programme ( <i>educ_class</i> ) training profession / field of study ( <i>edo1ac</i> )	month/year
→ School	sub episode	month/year	school name/location ( <i>sc_cod</i> )	month/year
→ Firm: VET contract	sub episode	month/year	firm name/location ( <i>ficobur</i> )	month/year
→ Firm: VET training	sub episode	month/year	firm name/location ( <i>ficobur</i> )	month/year
→ Firm: training (non-VET)	sub episode	month/year	firm name/location ( <i>ficobur</i> )	month/year
Internship	principal episode	month/year	occupation ( <i>pjobac</i> ) firm ( <i>pcobur</i> )	month/year
Employment	principal episode	month/year	occupation ( <i>jobac</i> ) firm ( <i>cobur</i> )	month/year
Other activities	principal episode, different sub-types ( <i>ntyp</i> )	month/year	1 Registered as unemployed with the regional employment centre 2 Search for a job 5 Mainly childcare 7 On vacation 9 Other 10 Military service 15 Illness 16 Gap 17 Maternity / paternity leave 18 Search for an apprenticeship place 21 Unemployed	month/year

*Variable names in parentheses as published in the 2023 data release (TREE, 2023)*



As illustrated in Figure 10, the modules internship and employment only consist of single principal episodes, identified by the profession (occupation) and the firm (name/place) that the respondent works for. Any changes to these core data result in the termination of the episode (and thus the creation of a new one).

The module on education, in turn, has a more complex structure that allows to link related secondary episodes to a principal episode as well as related sub-episodes at two additional hierarchical levels, which capture various learning sites/institutions such as schools and training firms.

The complexity of the structure reflects the analytic need to unequivocally link a given programme with a given certificate or diploma — irrespective of optional additional diplomas that may be obtained in parallel, and also irrespective of mobility between schools or training firms that may or may not lead to discontinuities in the pursuit of a specific credential.

The related secondary education episode accounts for the particularity that a given education and training episode may lead to an additional diploma, as is the case with the type 1 Federal vocational baccalaureate I (FVB 1), which may be obtained alongside a regular VET programme by attending a supplementary vocational school programme. The technical features of the secondary education episodes correspond to those of the sub-episodes (see below).

The training firm and school sub-episodes are technically referenced — by means of a unique episode number — to the relevant (principal) education episode. The two hierarchical levels of the training firm episodes are due to the institutional setting of dual (firm-based) VET, where apprentices sign a contract with a training firm for the duration of their apprenticeship, which is regulated by federal law. Contracting and training firm are not always one and the same, so several training firm episodes may be nested within a contract episode (e.g., practical training in different branches of one and the same training firm or in several firms associated in training firm networks<sup>38</sup>). The termination of an apprenticeship contract often leads to the discontinuation of training and thus to the end of a specific education episode. However, upon termination, an apprentice may remain in one and the same apprenticeship track by signing a contract with a new training firm (contract partner). As a result, different contract firms in our episodic structure are technically nested in one and the same education episode (mapped by referencing to the principal education episode).<sup>39</sup>

The third type of firm sub-episodes Figure 10 (non-dual-VET training firm) pertains to education and training that is not part of the dual VET system, but may include work experience or internships in training firms as an integral part of an educational programme (e.g., full-time school-based VET, specialised baccalaureate, au-pairs / interim solution programmes with spells of practical training, etc.).

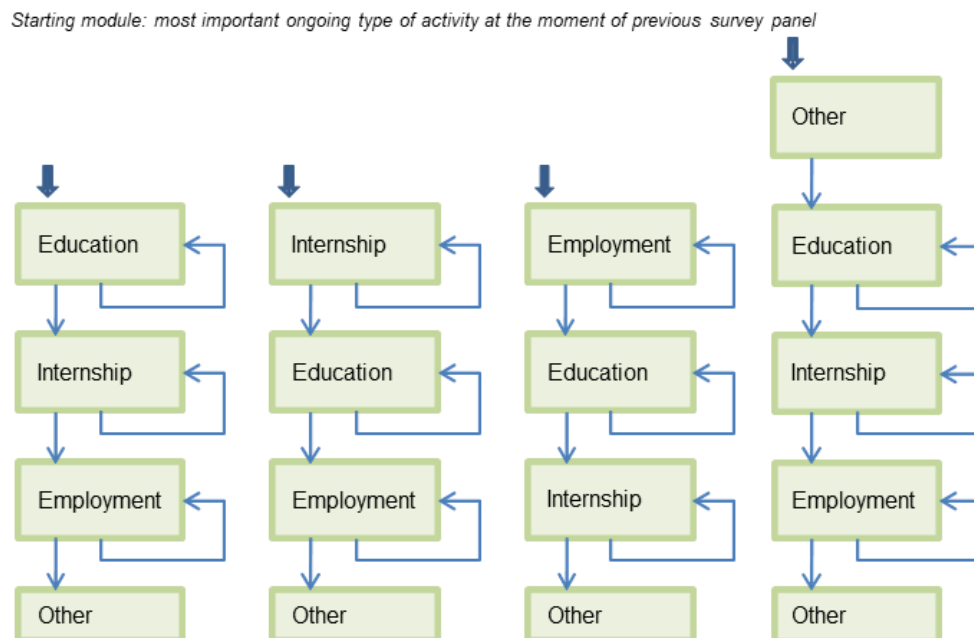
<sup>38</sup> German: Lehrbetriebsverbünde; French : réseaux d'entreprises formatrices

<sup>39</sup> For further detail on the Swiss dual VET system, see

<https://www.sbf.admin.ch/sbf/en/home/education/v-p-c-e/vocational-education-and-training--vet-.html>

In order to both collect a complete, correct set of episode data and maintain a reasonably coherent flow of the interview, the CATI programme provides a sequence of modules (education, employment, internship, other; see Figure 11).

Figure 11: Individualisation and modularisation of episode capture



The CATI programme’s selection of the starting module is individualised and predefined by preloaded “steering variables”. The choice of the starting module is basically defined by the respondent’s main activity at the time of the last interview. For example, if a respondent had been in education at the time of the previous interview, the respondent will be assigned the starting module “education” for the current interview (see Figure 11, leftmost column). The programme’s algorithm will begin with the main education episode reported as ongoing in the previous interview.<sup>40</sup> It will then proceed with updating other previously captured education episodes and capturing new education spells that have been started between the previous and the current interview. The CATI programme then proceeds in the same way through the remaining modules, moving on to internships, employment and other activities. For each captured activity spell, respondents are called to answer a wide range of follow-up questions, which depend on the episode type (e.g., employment) and on further filter conditions (e.g., number of working hours; see the Appendix 8.9 for a more detailed description of the content of the different episode types).

Previously captured episodes are validated and updated by relying on a proactive dependent interviewing scheme that draws on preloaded information. The preloaded data include the core parameters (see Figure 10) of all activities reported in the previous interview. For each “open” episode

<sup>40</sup> If there is more than one ongoing education episode from the last interview, the episode with the highest priority is also marked by preloaded information. The same is done within each (sub-)episode type (schools, firms, jobs, internships).

(i.e., an episode that was reported as ongoing in the previous interview), the questionnaire refers to the previously captured core information and then asks whether the episode in question is still ongoing or not (as illustrated in *Figure 12*).<sup>41</sup> In the proactive dependent interviewing mode, as adopted by TREE, the prototypical introduction to this procedure is: “You told us last time that ...”.

*Figure 12: Capturing/updating activity spells by drawing on previously collected data (screenshot of interview screen)*

**Q: xeducendq**

Education and training

School

Training firm

Training (contract) firm

Internship

Job

Other

[7262] 3-4-year firm-based vocational education and training

[7262] Industrial vocational school

[7262] Painting company

[7262] Painting company

J J A S O N D 2017 F M A M J J A S O N D 2018 F M A M J J A S O N D 2019 F

In the last interview in February 2018, you stated that you were pursuing the following education and training programme:

3-4-year firm-based vocational education and training

Painter, Federal Diploma of Vocational Education and Training.

What is the situation today: are you still pursuing this education and training programme, without any longer interruption?  
Or have you completed or discontinued this programme?

(Epi-Nr: [7262])

Longer interruption = period without attending an educational or training institution for over one month (was neither at school nor at a firm)

☐ This still applies; without a longer interruption

☐ This no longer applies or there was a longer interruption

☐ Error: The displayed information from before is incorrect. (ATTENTION: Episode will be corrected retroactively if possible.)

☐ Contradiction: I was never part of such an education and training programme nor a similar one at the time of the last interview (Episode will be DELETED)

☐ Don't know

☐ Indication not possible

☐ Explicitly refused

Back Continue

*Figure 12* displays a typical screen from a TREE interview. At the top of the screen, previously captured episodes are visualised on a timeline. Each episode type is displayed in a different colour and labelled with core episode information.<sup>42</sup> The example in *Figure 12* displays an education episode reported as ongoing in the previous interview and its related sub-episodes (school, contracting training firm and training firm). The visualisation of the episodes is interactive, i.e., adapted and updated in real-time depending on the interviewee's responses. As the interview progresses, the bars representing previously reported activity spells may be “concluded” or extended, and new bars/episodes may be added. In the process of updating previously captured episodes respondents are called to state whether the reported activity is still ongoing or has since been concluded (see *Figure*

<sup>41</sup> Contrary to the 2<sup>nd</sup> cohort (TREE2), dependent interviewing of the 1<sup>st</sup> cohort (TREE1) was introduced only in panel wave 8 (2010). Moreover, dependent interviewing in TREE1 was reactive rather than proactive, i.e., first capturing ongoing activities at the time of the (present) interview and then comparing these with previously captured information (for a discussion, see Rudin & Müller, 2013).

<sup>42</sup> *Figure 12* covers an observation period of three years. However, the data preloaded in the CATI programme include all episodes reported since the baseline survey of the panel. Interviewers may display earlier episodes by scrolling left on the timeline. Depending on the number of activities captured, the interviewer may also scroll vertically to view all episodes reported by a respondent. By default, the screen is however centred on the episode under discussion, which is highlighted with a shading. It is also possible to click into an episode for more detail, such as, e.g., the location of a school or VET training firm or details of a given training programme.

12 for the precise wording and categories of reply). Respondents also have the option of revoking or adjusting preloaded information: They may correct previously reported details on a given activity or revoke it altogether (e.g., in case of errors of capture in a previous interview).<sup>43</sup> Cases of major adjustments or revocation, however, are rare.

Figure 13: Questionnaire structure of within-episode information

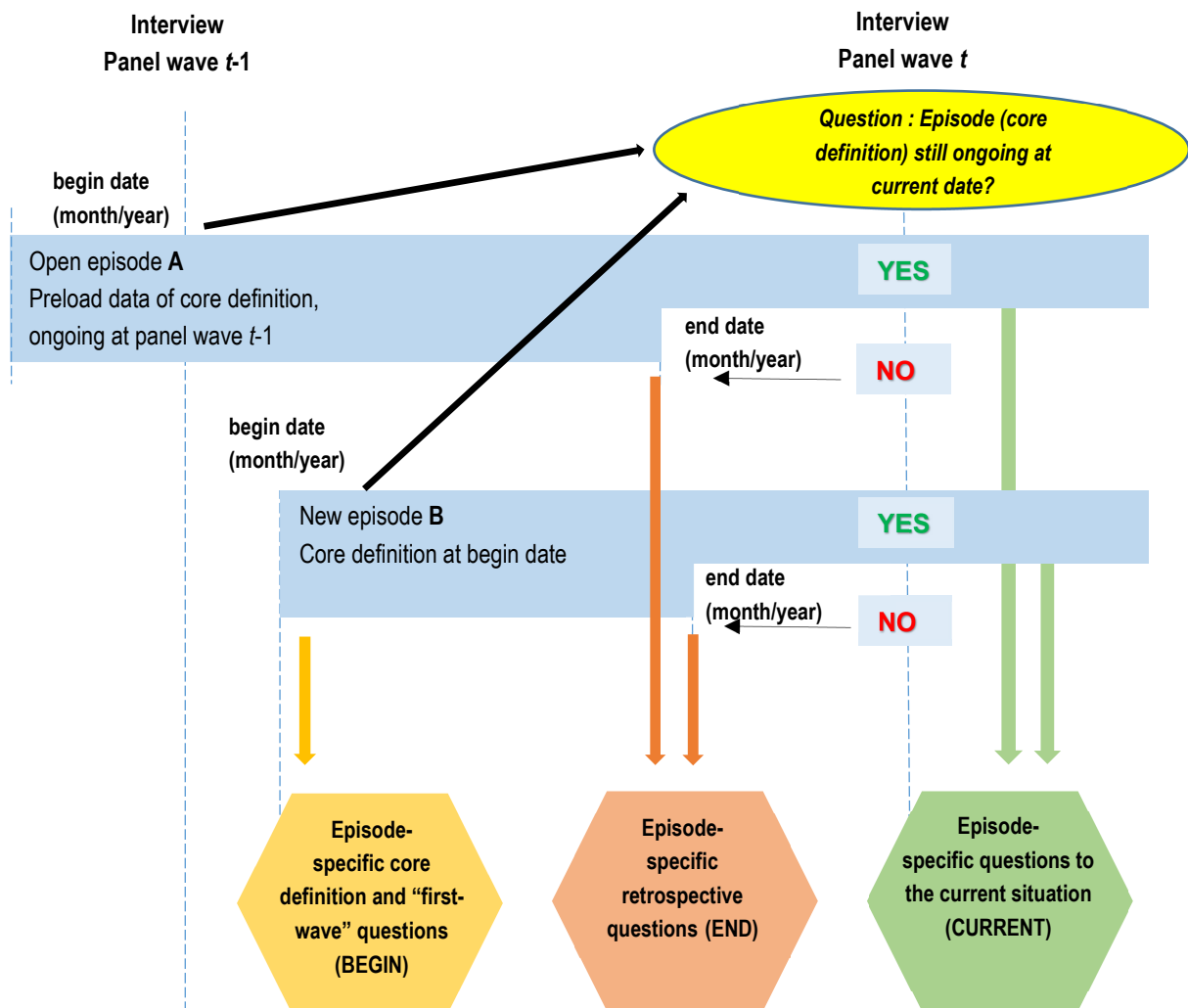


Figure 13 provides an overview of the structure of the interview/questionnaire within a given episode. For new episodes since the previous interview, the first step is to record the core episode definition (as defined in Figure 10) at the time of the start of the episode (represented by the yellow hexagon in Figure 13). This information is captured along with any related sub-episodes as well as additional information that is typically stable over an episode's duration or only relevant at its beginning (so-called "first-wave" questions).<sup>44</sup> The second step, which is very similar to the situation shown in

<sup>43</sup> Of course, the episode is not actually deleted, but only disappears from the visualisation and is flagged as deleted in the data. In the case of corrections, the preload episode is copied and flagged as deleted, a new episode with the same episode number is created, and the core information can be corrected in the interview.

<sup>44</sup> E.g., the standard duration of an education programme, how a given job or VET training place was found or else a job's initial salary and position within a company's hierarchy.

Figure 12, is to record whether the episode is still ongoing or has ended in the meantime. This step is represented by the yellow ellipse in Figure 13.

From this point onward, previous (preloaded) and newly captured episodes can be treated identically, with the further course in the questionnaire now depending on the temporal context of the episode, e.g., whether the episode is still ongoing at the time of the interview (context current, ongoing episodes) or has already ended (context retro, end of episodes). These two different paths are illustrated by the red and the green hexagon in Figure 13. Depending on the type of episode (education, job, internship, other activity), there are specific follow-up questions on current and completed episodes (for a detailed description, see Appendix 8.9). Typical questions on current episodes are, e.g., salary or satisfaction. Typical questions on terminated episodes are, e.g., the reason/circumstances why they ended (dropping out, termination of a contract, diploma, final grades).

After all episodes in all modules are captured, the CATI programme runs some checks,<sup>45</sup> the most important of which is the gap check module. If the programme identifies “gaps” of one month or more, i.e., periods without any recorded activities<sup>46</sup>, a screen is displayed that highlights the period in question and allows to deal with the gap in three different ways (see *Figure 14*):

- Adjustment of start or end dates of “neighbouring” episodes already recorded,
- Confirmation of the “gap” by means of inserting an explicit “gap episode” (missing information), or
- Capture of new episodes of any type.

In the case of new episodes, the programme is directed to the appropriate modules. The gap check module not only detects gaps within the period under consideration, but also missing information at the time of the interview (i.e., no ongoing episode). The absence of an ongoing activity spell has to be explicitly confirmed by the respondent and is technically eliminated by capturing a non-standard episode “other”.

Another check is the job check. It checks whether there is actually a job in the data, if there should be, namely if the question about the existence of a parallel employment contract within a military, sick or maternity/paternity leave episodes was answered in the affirmative.<sup>47</sup> If the check reports a

<sup>45</sup> In addition to the standard plausibility checks that ensure the coherence and formal validity of the data throughout the interview, e.g., consistency of start and end dates of episodes, duration of education and training programmes or plausibility of hours and wages.

<sup>46</sup> In fact, there are still exceptions as to which activities are technically accepted as gap-fillers, namely the episodes “apprenticeship search” or “job search”. As there is little guarantee that these episodes will fill a period exclusively, explicit attention is drawn to ensure that, for example, no unemployment episodes have been forgotten to be recorded.

<sup>47</sup> In Switzerland, an individual may have an ongoing employment contract even though he or she will de facto not be working for a certain period of time. This mainly concerns military service or maternity leave. In such cases, when capturing the military service or maternity leave, a question is asked whether an employment contract exists in parallel. The job check module then checks whether a corresponding job episode exists for this period.

problem, hitherto unreported jobs/internships can be subsequently captured or the start or end dates of existing job/internship episodes can be adjusted. Another way (last resort) to insert a missing episode of any type at the end of the episode module is given on the “stop gap” screen.

Figure 14: “Gap check” module

Q: xholecheck

Education and training

School

Training firm

Training (contract) firm

Internship

Job

Other

[-4] Gymnasium Matura

[-4] Gymnasium Bern

[-5] Search for Job

[-6] Service employee

J J A S O N D 2017 F M A M J J A S O N D 2018 F M A M J J A S O N D 2019 F

There is a period from 1.12.2017 to 28.2.2018 for which you have not stated an activity.  
What were you doing during that time?

INT: READ OUT LOUD!  
INT-INFO: Searching for an apprenticeship or employment does not fill the gap (special case). Such episodes can be altered under 'adjust data', but will not influence the gap check.  
If they are mentioned again as the only activity in a gap, then >> select the second option (enter a new episode or 'other').

☐ an activity that we have already discussed (adjust begin / end dates) ...  
☐ or an activity that we have not yet discussed (enter a new episode or 'other')  
☐ Don't know  
☐ Indication not possible  
☐ Explicitly refused

Back Continue

Individuals who fail to respond to the CATI are sent (after some reminders) a simplified paper-and-pencil version of the base questionnaire as secondary mode. Given the sophistication of the CATI's dependent interviewing scheme, however, data collected by means of the paper-and-pencil version do not match the level of detail of the CATI.<sup>48</sup>

Immediately upon conclusion of the CATI interview (only those with mode CATI), respondents are sent a web link to an individualised version of the survey's second part, the complementary questionnaire (CQ). Customisation of the CQ depends on the ongoing education and employment activities reported in the CATI interview (see Section 5.3 for more detail).

<sup>48</sup> The share of response completed in this mode is at approximately five percent (see Section 6). Detailed information on which items were administered in which mode and wave are provided in the technical variable list of the data release (TREE, 2023).

### 5.3 Assignment and structure of the complementary questionnaire (CQ)

As outlined above, the complementary questionnaire (CQ) is administered in two (self-administered) modes. The primary mode is a web-based questionnaire and can be completed on any device connected to the Internet (computer, tablet, smartphone).<sup>49</sup> The secondary mode is paper-and-pencil.<sup>50</sup>

*Figure 15: Types of complementary questionnaire by their module composition*

CQ Type	CQ type-Name	Module-Mix
CQ type 1	EDUC_PERS	Education I (with sub-module school) + Personal
CQ type 2	EDUC_FI_PERS	Education II (with sub-modules school and firm-based training) + Personal
CQ type 3	JOBINT_PERS	Job / Internship + Personal
CQ type 4	EDUC_JOBINT_PERS	Education I (with sub-module school) + Job / Internship + Personal
CQ type 5	PERS	Personal

(see Appendix 8.10 for a detailed technical description of the rules of CQ assignment and the composition of CQ types).

One of the main focuses of the CQ is to collect additional in-depth information with respect to the main ongoing education and employment activities reported in the base questionnaire. The bulk of items administered in the respective activity modules aims at capturing a detailed subjective assessment of respondents' learning and/or working conditions and environment (see Section 3).<sup>51</sup> The core parameters of the relevant activities (e.g., educational programme, school and/or training firm attended or, in the case of employment, occupation and employer's name and location) are individually printed at the beginning of the respective questionnaire modules so that respondents know which activity they are called to refer to.

The education module consists of a standard part that is identical for all respondents in education and training and includes a sub-module school (Education I). If the education and training programme also includes practical training in a training firm (e.g., firm-based VET), then the education module is administered with an additional sub-module training firm (Education II) (CQ type 2, see Figure 15). If respondents assigned to the standard education module are also gainfully

<sup>49</sup> The web questionnaire is programmed in an adaptive design, i.e., it can be completed on any electronic device connected to the internet (computer, tablet, smartphone). A large majority of the respondents completes the questionnaire on the smartphone. For mode- and device-specific response rates, see Section 6.

<sup>50</sup> The survey programme of the two modes is identical to the exception of survey elements such as skills tests and experiments which rely on technical features only available in the web mode. All types of complementary questionnaires are documented in the published TREE2 dataset (TREE, 2023). So is the information on which items have been administered in which survey mode (see technical variable list).

<sup>51</sup> For exhaustive details, see also the technical and conceptual variable lists of the data release (TREE, 2023). Filters within the CQ are also documented in the respective questionnaires (equally comprised in the data release).

employed for at least 8 hours per week, they are assigned to CQ type 4, otherwise ( $< 8$  hours/week) to CQ type 1. If more than one ongoing education episode is reported in the base questionnaire, the episode of reference in the CQ is firstly assigned according to a ranking of the education programmes, and secondly on grounds of the number of hours of attendance per week. The selection of the main school and main training firm (if several) is also based on the weekly number of hours of attendance.

The job/internship module consists of identical questions on either the ongoing main job or internship. The main episode (if several) is selected on the basis of the number of working hours per week (if  $\geq 8$  hours). Otherwise (if  $< 8$  hours) the job module is not assigned. If the respondent is engaged in both education and training and employment or internship, CQ type 4 is assigned (otherwise CQ type 3).

The personal module is administered to all respondents, irrespective of their type(s) of activity. If respondents are neither in education nor employed (“NEET”), they will only receive the personal module (CQ type 5). The personal module includes items and scales regarding health and well-being, family and significant others, political and social integration as well as non-cognitive factors which are considered relevant for the capture of intra-individual processes and characteristics (see Section 3 and the technical variable list in the data release for details).

Beyond this basic structure, the CQ lends itself to the introduction of “add-ons” such as short tests or (vignette) experiments, several of which have been implemented in the first few panel waves (see Section 3.2).

For detailed information on the CQ items administered in different waves, modules and modes we refer to Appendix 8.10 as well as to the technical variable list and the questionnaires in the 2023 data release (TREE, 2023).

## 5.4 Field work and data collection

### 5.4.1 Organisation and timing of field interventions

Main field operation of each panel wave runs from late February/early March to early July (end of the Swiss school year).<sup>52</sup> A pretest in January/February ensures that adjustments to the complex survey instrument design are adequately and correctly implemented.<sup>53</sup> Field operation is largely mandated to M.I.S. Trend S.A., a nationally operating Swiss survey institute with an excellent reputation in the field of large-scale scientific survey research. The mandate includes — always in close coordination and cooperation with TREE’s survey management:

<sup>52</sup> Depending on the canton, the Swiss school year runs from mid-August or early September to the end of June or beginning of July of the following year. The academic year in higher education programmes may deviate from this schedule.

<sup>53</sup> To this end, we have a separate pretest sample of initially 600 cases at our disposition, around 300 each from the baseline survey sample 2016 and from its pretest in 2015.



- programming of CATI and CAWI instruments; including field management infrastructure (automated call, invitation and reminder system);
- recruitment, training, organisation and supervision of CATI interviewers in the three survey languages (German, French and Italian);
- printing of personalised paper-&-pencil questionnaires;
- bulk mailing of announcement letters, questionnaires, incentives and reminder letters;
- maintenance of a hotline for each of the three survey languages throughout the field phase.

Given the high degree of mobility of the target population, contact data management efforts are crucial and extensive, both during the field and between panel waves. The updating and maintenance of contact data from previous panel waves is mainly conducted by the TREE back-office team, using a variety of sources: automated address updates provided by the Swiss postal services, requests at communal administrations as well as individual research on various internet platforms and directories. During the field phase, contact information obtained from hotline interactions with respondents (including reply cards) and contact data checks at the end of the interviews are processed directly by the survey institute.

In view of the (multi-)media usage common among TREE2's young "digital native" population, field interventions such as announcements, reminders, and interview scheduling management is conducted via various communication channels: (postal) mailing, E-mail, SMS and telephone.

#### 5.4.2 Detailed field-work processes

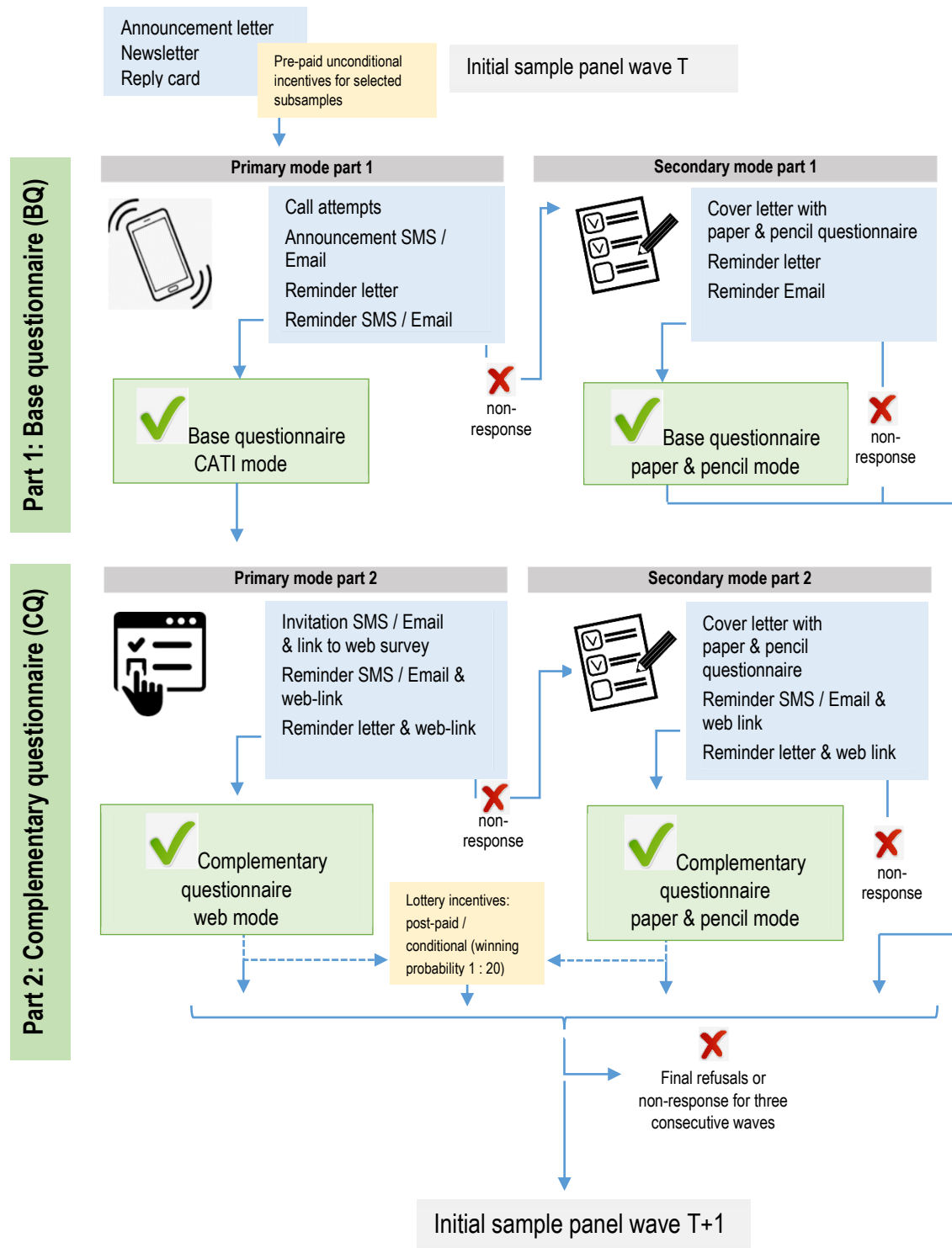
The announcement letter sent out shortly before the (individual) start of the main field includes a newsletter, a prepaid reply card for contact data check and, for selected subsamples, a prepaid unconditional incentive worth CHF 10 (cash or vouchers; see Section 5.4.5 for more detail). After that, the fieldwork largely follows the process displayed in Figure 16.

The gross sample to be contacted by interviewers is released in several batches on a weekly basis to ensure rapid telephone contact after receipt of the field announcement letter. Individuals in cantons with early summer school holidays are given priority, as are individuals with missing or ambiguous (telephone) contact details (i.e., no or several phone numbers).

Panel members who did not participate in the previous panel wave or who are suspected of being reluctant to participate again are contacted by particularly experienced senior interviewers. Respondents are called on varying weekday (early) evenings or Saturday mornings. Weekday mornings and afternoons are also available for interview appointments at respondents' request. If contact details include multiple phone numbers, mobile numbers are given priority. If the first few calls fail to establish contact, respondents receive a text message (SMS) encouraging them to answer our calls, to call back or to contact the TREE hotline (e.g., to make an interview appointment). After a certain number of unsuccessful calls to a given phone number, the next available number is

called (if any). After each phone number has been processed, respondents receive an email reminding them that they can also make an appointment for the interview, and the phone numbers that are still valid are called a few more times.<sup>54</sup>

Figure 16: Field implementation of survey, mode and incentives design



<sup>54</sup> The detailed design of the described call, invitation and reminder system varies slightly between panel waves as its implementation has been continuously optimised. Details are available on request.

Once all available phone numbers have been processed as described above, a contact search is initiated and a reminder letter is sent to the respondents, which again includes a newsletter and a reply-card. The letter asks them to provide a phone number under which they can be easily reached and/or suggestions as to when they would be available to conduct the interview. After a break of at least one week, the person is called again. New phone numbers go through the same process as above. Valid phone numbers that have already been called are contacted again for a certain number of additional calls, again with a SMS message and email after the first unsuccessful attempt.

Upon completion of the interview for the base questionnaire (BQ), respondents immediately receive a web link to the complementary questionnaire (CQ) via SMS and email.<sup>55</sup> The reminder system for the complementary questionnaire consists first of a reminder by SMS and email, then a reminder letter with personalised CAWI access data. If respondents still fail to complete the complementary questionnaire, a written reminder with a paper & pencil version of the questionnaire is mailed out. In a final step, a reminder is sent via SMS, email and postal mail.

Respondents who did not participate in the telephone interview are sent a paper & pencil version of the questionnaire (BQ only).

#### 5.4.3 Hotline

Throughout the field phase, the TREE hotline is available to respondents from morning until late at night. From wave 2 onwards, hotline calls, call-backs, emails, SMS or WhatsApp messages are handled by the supervisor team in the mandated survey institute's regional call centres by native speakers of the three survey languages. Hotline management includes requests for telephone appointments, changes of contact details, refusals, questions about the online questionnaire and other issues.

In order to maintain a coherent “corporate identity” vis-à-vis our respondents, all outgoing interactions from the mandated survey institute (interviewers, supervisors, hotline personnel) take place in the name of TREE. The same applies to all officially registered phone numbers involved in the field work (hotlines and numbers processing outgoing calls for the interviews). These measures aim at encouraging and fostering respondents' panel commitment. However, the fact that we delegate field work to an external survey institute is made transparent to respondents.

In cooperation with the mandated survey institute, TREE provides standard texts for common interactions as well as an extensive study documentation and argumentation guides for the interviewers and supervisors. An important share of interviewers and supervisors are engaged in the TREE survey across several panel waves, thus ensuring a high quality and continuity of interviews and hotline interactions with TREE respondents. As a result, only a limited number of problem

<sup>55</sup> In panel wave 1, we conducted a cohort-comparative mode experiment in which we administered a paper-and-pencil version of the CQ as primary mode to 800 randomly selected respondents (with respect to the first TREE cohort, P&P was the primary (and sole) CQ mode up to panel wave 9/2014).

cases or special requests from participants need to be passed on to the TREE survey management for further processing.

#### 5.4.4 Interviewer training and quality control

The interviewers play a crucial role in the success of a survey. Interviewers must be able to convince respondents to participate in new panel waves and ensure accurate and high quality data collection. Shortly before the start of each panel wave, interviewers and their supervisors are jointly trained by the survey institute and TREE. Interviewer training takes place on two training evenings for each regional call centre (German and French/Italian) and focuses on a wide range of topics outlined in Table 4.

*Table 4: Content of interviewer training*

Introduction to the survey and its significance:	The importance of the TREE study is emphasised and the study's objectives are placed in a wider context. Interviewers are made aware that their motivation and commitment is essential for the success of the study.
Argumentation and persuasion:	Interviewers are instructed in how to convince reluctant TREE panel members to (continue to) participate in the survey. Drawing on a manual of arguments provided by TREE, interviewers form pairs/small teams that practise argumentation based on hypothetical difficult or sensitive situations.
Presentation of the CATI instrument:	The computer interface of the CATI questionnaire is explained and demonstrated in detail to the interviewers. This includes terminology as well as any questions and uncertainties that may arise during data collection. The various stages of the interview are thoroughly trained, with special emphasis on crucial control points in the questionnaire, the search functions for real-time coding in various lists (companies, schools, occupations, educational programmes, etc.), the use of the visualisation tool and the various plausibilisation functions.
Reading and discussion of the documentation:	At the beginning of the second training session, the interviewers are handed over the documentation material and are given time to read it. The documentation includes several presentations from the first training session on the CATI interview, the argumentation, working principles for CATI interviews, a document on the Swiss education system with detailed descriptions of the various post-compulsory education programmes, an announcement letter with newsletter, and a fact sheet with the most important FAQs about the TREE survey, which is regularly updated.
Test interviews on screen:	Interviewers are given the opportunity to practise the survey instrument in pairs. Interactive training interviews that follow predefined scenarios confront them with difficult interview situations. Coding exercises ensure smooth and timely handling of search lists. Throughout the training sessions, supervisors and TREE staff are present and available for questions and difficulties.

The handling of the survey instruments and the functionality of all field processes, including the structure, storage and transfer of the collected data, are subject to extensive analysis during and after the pretest, taking into account the feedback from interviewers and respondents as well as the survey and para-data collected. An important element of quality control is the presence of TREE staff in the call centres during field start, so that ad hoc questions can be clarified and any interview

stumbling blocks can be identified and amended. Provided that the pretest does not reveal major functionality problems, main field start usually takes place in the course of the subsequent week.

At the end of each survey wave, debriefings are held between TREE and the survey institute's study and IT management, including a group of interviewers and their supervisors.

Ongoing quality control also includes the assessment of feedback and comments (concerns, questions, requests, refusals) from hotline interactions and comments from interviewers and respondents noted in the survey instruments.

#### 5.4.5 Incentives

Due to funding constraints, the budget for incentives is very limited. TREE has therefore developed a system of carefully targeted incentives for selected sub-samples, both in the form of pre-paid unconditional incentives and post-paid conditional lotteries. The TREE incentive scheme is summarised in Table 5.

Pre-paid unconditional incentives for selected subsamples are directly enclosed with the announcement letter. Unconditional incentives amount to CHF 10 and are paid either in cash or in the form of travel vouchers.<sup>56</sup> The selection of the sub-samples to be incentivised is based on models that predict (non-)response based on both response patterns in previous panel waves and individual background characteristics.

In order to encourage completion of the complementary questionnaire, we employ incentives paid conditional on responding to the second part of the survey. These incentives are awarded by drawing lots at a winning probability of approximately 1 : 20. The value of the prizes drawn ranges from 15 to 100 CHF, paid either in cash or in the form of vouchers (e.g., cinema tickets).

Beyond the (limited) material incentives, we attempt to foster respondents' panel commitment by immaterial incentives of "symbolic" nature, the most important of which are the newsletters mentioned above.<sup>57</sup> Produced in a language and format appropriate to the target group, these newsletters provide practical information about the (next) panel survey, underline the importance of (and TREE's gratitude for) panel participation and provide respondents with interim study results. Based on respondents' feedback, the newsletters are highly appreciated and thus can be expected to contribute significantly to panel commitment.

<sup>56</sup> "Rail checks": These can be cashed in for any kind of public transportation.

For details, see <https://business.sbb.ch/en/travelcards-tickets/tickets/rail-check.html>.

"REKA" checks: cashable for public transportation and touristic accommodation and infrastructure such as hotels. For details, see <https://reka.ch>.

<sup>57</sup> See the TREE study's website [www.tree.unibe.ch](http://www.tree.unibe.ch) for examples (special pages addressed to the respondents, available in German, French and Italian only).

Table 5: Description of incentive scheme by panel wave

Wave	Survey part	Incentive (CHF)	Group description	N	% of sample
Baseline survey		None	--		
Baseline extension survey (T0X)		Cash 10 CHF (unconditional)	All cases of the baseline extension survey sample	6846	100
Panel wave 1	BQ	Cash 10 CHF (unconditional)	Respondents who were promised 10 CHF for TREE participation during contact data collection in the baseline survey and who had not yet received 10 CHF cash (not in the T0x sample).	1899	19.5
		Rail check 10 CHF (unconditional)	Respondents who were NOT promised 10 CHF for TREE participation during contact data collection in baseline survey OR respondents who had already received 10 CHF cash in baseline extension survey.	7863	80.5
		None	--	0	0%
	CQ	None	--	5731	100
Panel wave 2	BQ	REKA check 10 CHF (unconditional)	Small randomised subsample (experiment), weighted by predicted probability of participation.	500	5.4
		None	Rest	8751	94.6
	CQ	Lottery incentives: cash 15 to 100 CHF (conditional)	Based on chosen pay-off in incentivised SVO slider measure in sub-module politics (web only; initially randomised AES sample-split-half M "mathematics"). Winning probability of approximately 1:20.	140	2.9
		Lottery incentives: cinema vouchers 2 x 20 CHF (conditional)	AES Split-half B AND completed CQ (web only); initially randomised AES sample split-half B "background". Winning probability of approximately 1:20.	100	2.1
		None	Rest	4814	95.0
Panel wave 3	BQ	Cash 10 CHF (unconditional)	Non-respondents of panel wave 2 who belong to the lowest quartile of estimated response probability based on personal characteristics.	801	9.0
		Rail check 10 CHF (unconditional)	<ul style="list-style-type: none"> <li>- Non-respondents of panel wave 2 who were not in the lowest quartile of estimated response probability.</li> <li>- Respondents who chose to complete the paper &amp; pencil version of the base questionnaire in panel wave 2 (instead of CATI).</li> <li>- Respondents who completed the CATI in panel wave 2 and were in the lowest quartile of estimated response probability.</li> <li>- Respondents who completed the CATI in panel wave 2, but did not complete the CQ.</li> <li>- Respondents who otherwise display increased risks of panel refusal (e.g., negative comments).</li> </ul>	3868	43.4
		None	Rest (Respondents who completed both parts (BQ and CQ) in panel wave 2 and were not in the lowest quartile of estimated response probability.)	4249	47.6
	CQ	Lottery incentives: cash 15 to 100 CHF (conditional)	Respondents who have completed the CQ. The lottery of cinema vouchers (100 winners) and the cash lottery add up to a win probability of 1/20.	116	2.7
		Lottery incentives: cinema vouchers 2 x 20 CHF (conditional)		100	2.3
	CQ	None	Rest	4089	95.0

## 6 Response and attrition

This section provides an overview of the key figures regarding survey response from the baseline survey up to panel wave 3. With respect to the TREE2 baseline survey<sup>58</sup>, response in both the maths assessment and the subsequent CASI survey (student context questionnaire) is close to exhaustive (see Table 6). This is due to the official, quasi-mandatory character of the survey (AES, see Section 4.2). TREE2 is therefore in an exceptionally favourable position when it comes to the detection and correction of potential attrition bias. It is also worth noting that, compared to the first TREE cohort, the rate of consent to being contacted by the TREE2 panel is substantially higher (62 vs. 55%). Nevertheless, it remains the most important single source for sample attrition and selectivity.

*Table 6: TREE2 key response figures: Baseline survey to panel wave 3 <sup>1)</sup>*

	Fieldwork <sup>2)</sup>	Initial sample (n)	Response (n)	Response (%)
AES survey (2016), comprising ...	May - June			
– Maths assessment <sup>3)</sup>		24117	22423	93.0 %
– CASI survey		22423	22339	99.6 %
– Consent to be contacted by TREE		22339	13728	61.5 %
AES extension survey (2016) <sup>4)</sup>	June - August	6846	5016	73.3 %
Panel wave 1 (2017) <sup>5)</sup>	April - July	9741	7971	81.8 %
Panel wave 2 (2018) <sup>5)</sup>	March - July	9251	6903	74.6 %
Panel wave 3 (2019)	February - July	8918	6154	69.0 %
Consent to link AES and TREE2 data <sup>6)</sup>	/	8606	8429	97.9 %

1) The figures in the table include cases not contained in the data release (see Table 3). 2) Main fieldwork period (from field start to at least 98 percent of the total response). 3) Cf. Verner and Helbling, 2019, p. 39. 4) Conducted in one sample-split only (cf. Section 4.2.3; when including partly completed questionnaires, the response rate rises to 74.8 %. 5) Including retrospectively excluded participants (cf. Table 3), the response rate is at 84.7% ( $n = 8,252$ ) for wave 1, and 74.8% ( $n = 8252$ ) for wave 2. 6) Cumulative result for waves 1-3.

The response rates in the subsequent panel waves up to wave 3 range from 69 to 82 percent (Table 6). In view of the generally deteriorating response in (panel) surveys (e.g., Olson et al., 2019), we consider the achieved response rates to be at least satisfactory.<sup>59</sup> However, the wave-specific response rates are significantly lower than those in the corresponding panel waves of the first TREE cohort (TREE1). There are two main reasons for this:

- In the TREE2 panel, we have oversampled “critical” group, which are known to show increased risk of attrition (cf. Section 4.3);

<sup>58</sup> Response rates of the baseline survey also take into account cases which, for reasons elaborated in Section 4.5, were retrospectively excluded from the published/released data.

<sup>59</sup> To a substantial extent, this was achieved by a.) innovations with respect to panel maintenance, and b.) model-based, targeted incentives.

- Adolescents are particularly prone to the factors contributing to the general deterioration of response in surveys.<sup>60</sup>

Given that the TREE2 panel relies on mixed-mode surveys (see Sections 4.2.4 and 4.4.1), we proceed by providing some details regarding the distribution of the total response across *survey modes* (Table 7). Apart from the background module, the baseline survey exclusively relied on a computer-assisted self-interview (CASI) conducted in a proctored classroom setting. Contrariwise, almost half of the background module data was collected by means of an out-of-classroom web survey.<sup>61</sup>

*Table 7: Survey response by waves and administration modes*

Surveys	Survey year	Share of applied survey modes (%) <sup>1)</sup>			P&P <sup>3)</sup>
		CASI <sup>2)</sup>	CATI	Web	
Baseline survey modules: <sup>4)</sup>	2016				
Common section (general questions)		100.0%	/	/	/
Background module <sup>5)</sup>		49.7%	/	45.8%	4.5%
Mathematics module		100.0%	/	/	/
Wave 1 (Base questionnaire) <sup>6)</sup>	2017	/	95.0%	/	5.0%
Wave 2 (Base questionnaire) <sup>6)</sup>	2018	/	95.5%	/	4.5%
Wave 3 (Base questionnaire) <sup>6)</sup>	2019	/	95.7%	/	4.3%

1) Percentage of the valid responses (as in data release). 2) Implemented in a proctored classroom setting. 3) Mailed paper-and-pencil questionnaire. 4) See section 4.2.3 for an outline of the survey modularisation. 5) AES and AES extension surveys combined. 6) Includes respondents without valid complementary questionnaire.

To an overwhelming degree ( $\geq 95\%$ ), the response mode of the subsequent panel waves (base questionnaire part) was computer assisted telephone interview (CATI), involving dependent interviewing techniques (see Sections 4.4.1 and 5 for details). Accordingly, the share of questionnaires completed by means of paper-and-pencil is marginal and slightly decreasing from one wave to the next. With regard to *survey languages*, more than two thirds of the sample complete the German questionnaires, about a quarter the French and about 6% the Italian version (not displayed in table).

The share of CATI respondents who also completed the complementary questionnaire in the first three waves of TREE2 varies between 76 and 82 percent. (see Table 8).<sup>62</sup> The share of CATI respondents having completed the complementary questionnaire in *all three* panel waves is at 63.1% (not displayed in table; 67.5% when including partly completed questionnaires).

<sup>60</sup> This is particularly true for the far-reaching changes of (tele)communication behaviours (Suter et al., 2018) as well as for the growing distrust vis-à-vis “unknown” calls and the technical possibilities to block them (Czajka & Beyler, 2016; Dillman, 2016; Jäckle, Gaia, & Benzeval, 2017). As a matter of fact, automatic call blockers have been a permanent challenge when trying to establish contact to our respondents. To the best of our knowledge, we strove to circumvent call blocking, adopting various strategies including negotiations with commercial providers of call blockers.

<sup>61</sup> To a small extent, we also drew on a paper-and-pencil mode. Both web and paper-and-pencil modes aimed at maximising data comparability with the CAWI mode (see Section 4.2.4 for details).

<sup>62</sup> Respondents who completed the paper-and-pencil version of the base questionnaire did not receive the complementary questionnaire.



*Table 8: Response to complementary questionnaire by panel wave, mode and device*

Complementary questionnaire response	Survey year	Share of CQ response (%)			P&P <sup>2)</sup>	CQ response <sup>3)</sup>	CQ response rate <sup>4)</sup>
		Web by device Computer <sup>1)</sup>	Smartphone	Web			
Wave 1	2017	33.3 %	47.9 %	81.1 %	18.9 %	5731	75.7 %
Wave 2	2018	24.2 %	69.4 %	93.5 %	6.5 %	5426	82.3 %
Wave 3	2019	25.3 %	69.2 %	94.5 %	5.5 %	4539	77.1 %

1) Desktop, notebook or tablet. 2) Mailed paper-and-pencil questionnaire. 3) Number of cases, including partly completed questionnaires. 4) Share of initial sample (completed CATI-Version of base questionnaire) with valid complementary questionnaire (including 6.5%, 4.0%, and 4.0% partly completed questionnaires in waves 1, 2, and 3, respectively).

Breaking down response by device underscores the increasing importance of smartphones when it comes to complete the complementary questionnaire. The respective share, already substantial in panel wave 1 (47.9%), rose to almost 70 percent in panel wave 3. The share of all other devices and modes, especially paper-and-pencil, decreases accordingly.

To conclude, Table 9 breaks down survey response and all sources of attrition by the two split-half samples imposed by the baseline survey design (see section 4.2.3). The split-samples partly varied in terms of the survey programmes they underwent both in the baseline survey and in the subsequent TREE2 panel waves (see Figure 5). This implies some differences with regard to attrition processes and the selectivity of the remaining samples. We therefore present detailed figures for both sample splits.

Table 9: Detailed sampling, response and panel drop-out statistics

Sample size or percent (% in brackets)	AES split-half samples		Total sample
	'Background'	'Math'	
<b>AES initial sample <sup>1)</sup></b>	/	/	<b>24117</b>
Absent, did not participate (math assessment)	/	/	1694
AES participants (math assessment)	/	/	22,423
AES math assessment participation rate <sup>1)</sup>	/	/	(93.0 %)
AES CASI: Unavailable / did not participate	/	/	84
<b>AES participants with CASI survey</b>	11208	11131	<b>22339</b>
AES CASI Response rate			(99.6 %)
No valid contact information available	4337	4274	8611
Consent to be contacted by TREE	6871	6857	13728
Contact consent rate	(61.3 %)	(61.6 %)	(61.5 %)
AES extension survey: Initial sample <sup>2)</sup>	/	6846	/
Refusals before field start	/	24	/
Out of population <sup>3)</sup>	/	1	/
Refusals and nonresponse	/	1805	/
Response extension survey	/	5016	/
Response rate extension survey	/	(73.3%)	/
<b>Response baseline survey</b>	6871	5016	<b>11887</b>
Panel refusals after extension survey	/	11	/
Subsampling after extension survey	1900	235	2135
Initial sample wave 1	4971	4770	9741
<b>Response wave 1 <sup>4)</sup></b>	3914	4057	<b>7971</b>
Response rate wave 1	(78.7 %)	(85.1 %)	(81.8 %)
Panel drop-outs between waves 1 and 2:			
Panel refusals <sup>5)</sup>	119	140	259
Consent on AES-TREE data linkage denied <sup>6)</sup>	61	48	109
Not in population (9 <sup>th</sup> grad repeaters) <sup>7)</sup>	70	51	121
Out of population <sup>3)</sup>	0	1	1
Drop-out rate (between waves 1 and 2) <sup>8)</sup>	(3.6 %)	(3.9 %)	(3.8 %)
Initial sample wave 2	4721	4530	9251
<b>Response wave 2 <sup>4)</sup></b>	3291	3612	<b>6903</b>
Response rate wave 2	(69.7 %)	(79.7 %)	(74.6 %)
Panel drop-outs between waves 2 and 3:			
Panel refusals <sup>5)</sup>	180	142	322
Consent on AES-TREE data linkage denied <sup>6)</sup>	4	3	7
Not in population (9 <sup>th</sup> grad repeaters) <sup>7)</sup>	2	1	3
Out of population <sup>3)</sup>	0	1	1
Drop-out rate (between waves 2 and 3) <sup>8)</sup>	(3.9 %)	(3.2 %)	(3.6 %)
Initial sample wave 3	4535	4383	8918
<b>Response wave 3 <sup>4)</sup></b>	2893	3261	<b>6154</b>
Response rate wave 3	(63.8 %)	(74.4 %)	(69.0 %)
Panel drop-outs between waves 3 and 4:			
Panel refusals <sup>5)</sup>	199	174	373
Consent on AES-TREE data linkage denied <sup>6)</sup>	6	4	10
Not in population (9 <sup>th</sup> grad repeaters) <sup>7)</sup>	1	0	1
Out of population <sup>3)</sup>	0	1	1
Drop-out rate (between waves 3 and 4) <sup>8)</sup>	(4.5 %)	(4.1 %)	(4.3 %)
Excluded from sample after wave 3 <sup>9)</sup>	456	222	678
Exclusion rate wave 4	(10.1 %)	(5.1 %)	(7.6 %)
Cumulated rate of drop-out /exclusions up to wave 4	(20.6 %)	(15.4 %)	(18.1 %)
Initial sample wave 4	3873	3982	7855

1) Cf. Verner and Helbling, 2019, p. 39. 2) Excluding 11 erroneously not contacted cases, 3) Deceased, no longer able to participate (accident, illness). 4) Realised sample with completed base questionnaire (CATI or paper-and-pencil). 5) Between field start and the field start of the next wave. 6) Respondents with missing or ambiguous information on AES-TREE data linkage consent have been excluded from the panel after wave 3 (see Section 4). 7) The study population is restricted to students who left compulsory school after the baseline survey. 8) Panel refusals or consent denied as a percentage of the initial sample. 9) Never participated in the first three waves (and without panel consent).

## 7 Data

### 7.1 Consistency checks and data structure

After completion of each survey, collected data are stored in a relational database.<sup>63</sup> Raw data are stored unaltered, so that the raw and edited data may be compared at any time. For user convenience and data protection purposes, TREE does not publish raw data or any sensitive information such as names, open text responses, etc. Whenever possible, open text responses are subsequently coded or cleaned to the extent that they no longer contain sensitive information and/or information compromising respondents' anonymity. As a general rule, data checks are restricted to formal consistency checks (for detailed information see von Rotz et al., 2023). Wherever possible, relevant classification variables are converted into national or international classification systems of common use (e.g., ISCED for education or ISCO/ISEI for occupations). Items used for building scales are subjected to thorough scale validity checks prior to publication (for details, see Sacchi & Krebs-Oesch, 2021).

As outlined in Section 5, TREE collects data at the level of two observation units (which can be linked with each other): at the respondent level and the level of activity spells (or episodes; e.g., education, employment, internship or unemployment). The relation between the two levels is 1: $n$ , i.e., each respondent is related to the  $n$  number of episodes that he or she reports. Every episode is assigned a unique identification number.<sup>64</sup> Data on respondents' activities (as defined in Figure 10) in the panel wave-related datasets are always consistent with those captured in the episode dataset, as the source for both is one and the same.<sup>65</sup> For the convenience of data users, we have calculated some key composite variables such as aggregates on respondents' educational and labour market status (see Appendix 8.6) and parental attainment of education<sup>66</sup> (see Appendix 8.7).

Another important consistency check regards data from the complementary questionnaire (CQ). As outlined in Section 5.3, CQs are individually tailored to types of activity that respondents report as ongoing in the CATI interview (e.g., various types of education, employment or internship or combinations thereof). Respondents are then asked to assess a specific (main) current activity in more detail in the CQ.<sup>67</sup> In some cases, previously reported activities are adjusted in subsequent panel waves, usually as a result of contradicting information (e.g., an activity reported as employment in

<sup>63</sup> TREE makes use of the open-source database PostgreSQL.

<sup>64</sup> Variable *epinr* in the published datasets (see TREE, 2023).

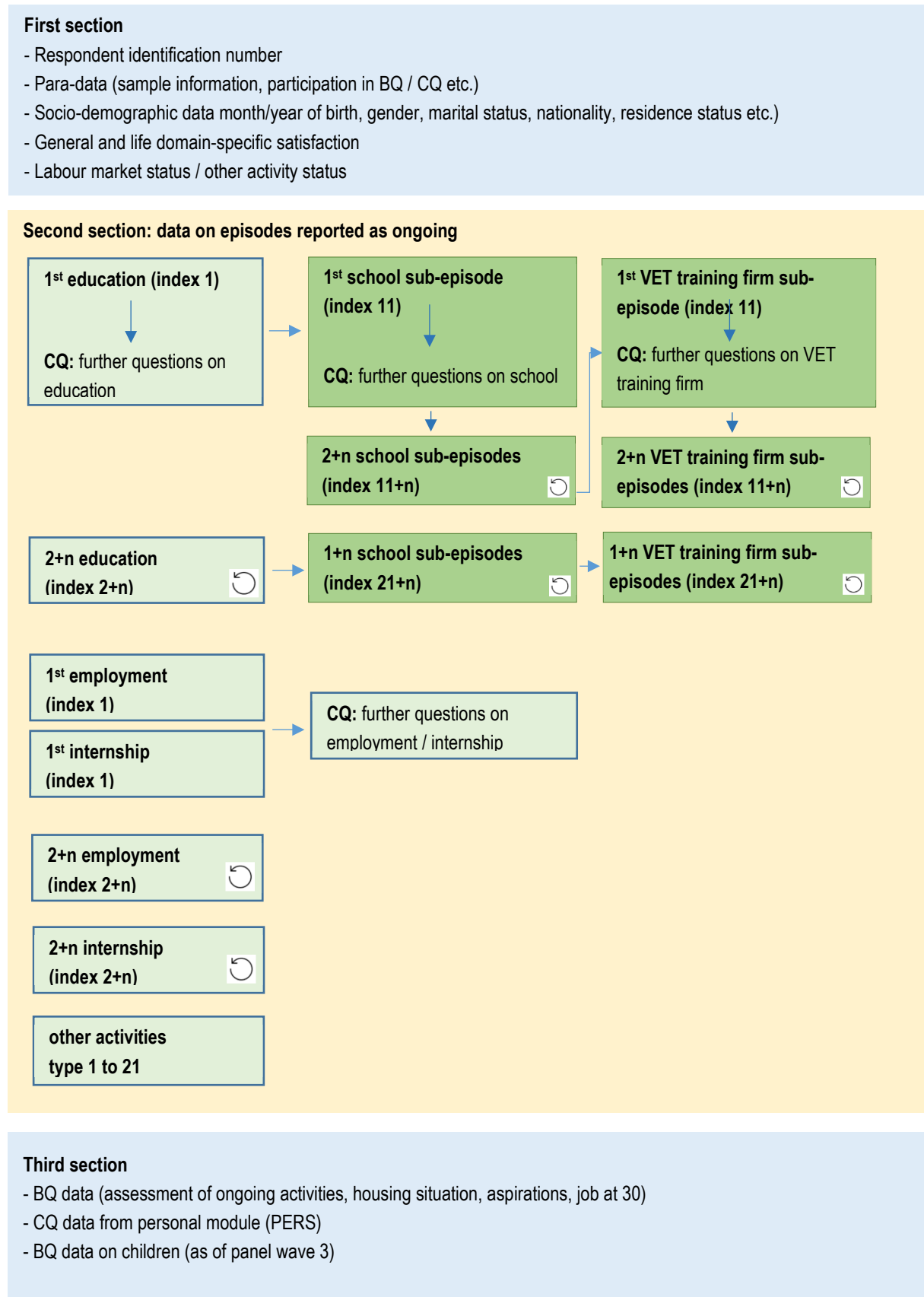
<sup>65</sup> Note that an important part of plausibility checks of (episodic) activity data is performed at the time of the subsequent survey, where all previously reported activity spells are visible to the interviewers – and can be adjusted or corrected if the respondent says so (see Section 5.2). This is one of the main reasons why TREE data of a given panel wave cannot be published before data of the subsequent panel wave are available.

<sup>66</sup> In the case of parental education, we have adopted a particular strategy to minimise missing and inconsistent data: we have continued to administer the respective items throughout panel waves 1 to 3 if respondents had failed to provide valid data in previous waves. We then drew on these data to construct composite variables that aggregate the responses across all measured waves.

<sup>67</sup> For more detail, see Section 5.3 and Appendix 8.10.

panel wave  $t$  turns out to be an internship in panel wave  $t+1$ ). Within a given panel wave, such adjustments may lead to the rupture of the linkage between the activities reported in the CATI and those that the CQ relates to. TREE performs thorough plausibility and consistency checks to detect and correct such inconsistencies (see von Rotz et al., 2023 for more detail).

Figure 17: Structure of activity data in the wave-specific datasets



In the published datasets (see TREE, 2023), episodic and wave-specific data are stored in separate files. These files can be combined by means of the unique identification numbers assigned to respondents on the one hand and to the activity spells they report on the other.<sup>68</sup> Based on the checks mentioned above, consistency between the two types of datasets is always guaranteed.

In the wave-specific datasets, records are sorted by the respondent identification number in order to facilitate data merging.<sup>69</sup> All wave-specific datasets contain the same number of cases/records (8429, i.e., the number of individuals defined by the initial panel sample), irrespective of the fact whether respondents have participated in a given panel wave or not.<sup>70</sup>

In the wave-specific datasets variable names are composed of a wave-specific prefix (e.g., “*ti*” for panel wave *i*), an abbreviation of the measured concept and a suffix number in case of grid questions (Likert scales). In the episode section comprising the data on (ongoing) activity episodes (see Figure 17), the variables pertaining to the episodes are supplemented with indices from 1 to *n* which number all episodes of a given type of activity (education, employment, etc.). If a respondent has completed the CQ, the CQ data related to a given activity can always be found in the episode indexed 1. Within the data on education spells, CQ data pertaining to school and VET training firm sub-episodes are assigned the index 11 (see also Appendix 8.10).<sup>71</sup>

These datasets only contain data on activities reported as ongoing at the time of the respective panel wave. Contrariwise, the episodic dataset comprising all activity spells additionally includes episodes that have been reported retrospectively, i.e., falling in between two subsequent panel waves.

In the dataset containing the data at episode level (see Figure 18), each episode (i.e., record) contains variables specifying the type of activity, its begin and (for completed episodes) end date, along with additional information on, e.g., reasons for and conditions of starting or ending the activity. For example, education episodes include data on obtained diplomas or certificates, while employment episodes contain, e.g., data on starting salaries. As the examples illustrate, some data on activity spells are collected only at the spells’ start<sup>72</sup> (e.g., starting salary), others only retrospectively after their termination (e.g., reasons for ending the activity).<sup>73</sup>

Beside the core episodic information (see Figure 10 in Section 5.2), no wave-specific information is comprised in the episodic dataset. The number of episodes per respondent varies strongly. While

<sup>68</sup> See the introductory document in the published dataset (2023), titled “Working with the TREE2 data release: How to get started.”

<sup>69</sup> The respondent identification number is also comprised in each record of the episodic dataset so that the link between respondent and episode can be established at any time.

<sup>70</sup> See Section 4.5. Wave specific survey participation is captured by several variables in the data. For details see documentation in the published dataset (TREE, 2023).

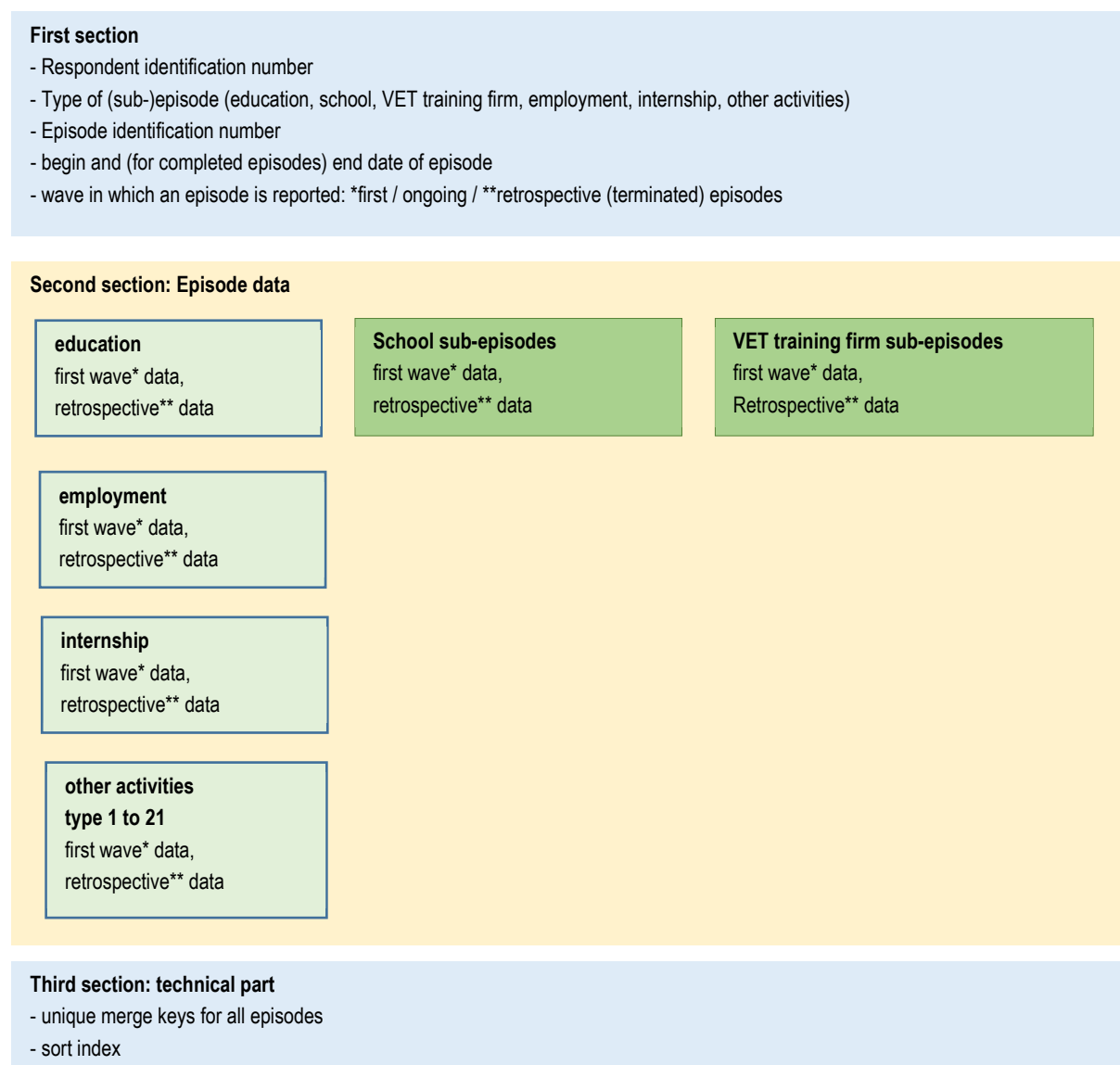
<sup>71</sup> Please take note of the special case of CQ data pertaining to employment and internship episodes, which both lead to the same CQ part. These data are integrated in the dataset after the employment resp. internship episodes with index 1. The variable *cq\_job\_prac* indicates in whether the CQ data relate to a job or an internship.

<sup>72</sup> I.e., the panel wave in which a spell is first reported.

<sup>73</sup> For details on this specific type of data, see technical variable list provided in the published dataset (TREE, 2023).

respondent A respondent may, e.g., report just one education/training episode, respondent B may report several training and employment episodes.

*Figure 18: Structure of activity data in the episodic dataset*



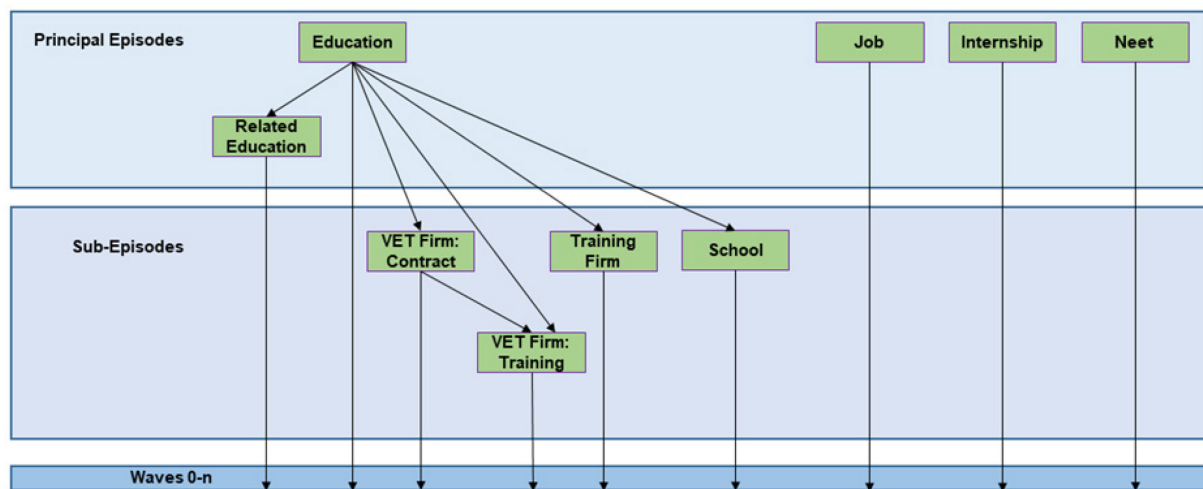
While the episodic data span the entire observation period of the panel (i.e., from the first TREE panel wave to the last), the wave-specific data only contain information on activities reported as ongoing at the time of a given panel wave.<sup>74</sup> The wave-specific data include identifiers for each activity so that they can be merged with the corresponding episodic information in the episodic data file.<sup>75</sup>

<sup>74</sup> If, in the course of his or her interview in panel wave 2018, a respondent reports, e.g., activities undertaken in 2017 these activities will be comprised in the episodic data, but not in the wave-specific data of panel wave 2018.

<sup>75</sup> See the introductory document in the published dataset (TREE, 2023), titled “Working with the TREE2 data release: How to get started.”

Episodes in the TREE2 data can reference to each other.<sup>76</sup> Episode data thus can be linked not only with wave-specific data, but with other principal or sub-episodes. Each episode is marked with an episode identifier and a variable regarding the type of activity (education, employment, etc.). As outlined in Section 5.2 and visualised in Figure 19, education episodes are structured at two (further) hierarchical levels. This is due to the complex institutional setting of dual vocational education and training (VET), where learners attend a vocational school while simultaneously undergoing practical training in a training firm. VET learners sign a contract with a training firm, but contracting firm and the firm providing practical training are not always one and the same.<sup>77</sup>

Figure 19: TREE2 episode reference system: overview



## 7.2 Ethical, privacy and protection standards of collected data

The TREE2 data collection, treatment and publication strictly complies with Swiss ethical and data protection legislation. A detailed data management plan has been submitted to and approved by the study's main funding institution, the Swiss National Science Foundation (SNF), (Jann & Becker, 2020).<sup>78</sup> Among other things, the plan ensures

- Strict confidentiality with regard to collection, treatment and transfer of contact and survey data;
- Strict separation of contact and survey data;
- State-of-the-art security standards as to the (physical) storage and the treatment of data;

<sup>76</sup> For more detail regarding the relation between episodic and wave-specific data, see the introductory document in the published dataset (TREE, 2023), titled "Working with the TREE2 data release: How to get started."

<sup>77</sup> This distinction is important when it comes to determine, e.g., whether a change of VET training firm is intentional/planned or due to dropout.

<sup>78</sup> The DMP can be provided on request. Furthermore, a data security concept was approved and registered by the data protection authorities of the canton of Bern, to which the study (affiliated to the University of Bern) is legally accountable. See [here](#) for details.

- Transparent communication of voluntariness of participation to respondents;
- Strict observation of respondents' consent to panel participation and data linkage;
- Thorough anonymization of published data.



## 8 Appendices

### 8.1 Appendix I: Bibliographic sources of the TREE2 survey programme

#### Survey topics

Main	Detailed	Sources
Socio demographics	Socio-demographic characteristics and housing situation	
	Age and Gender	
	Civil Status	
	Housing situation	DAB-Panelstudie (2020); Kunter et al. (2002); Mang et al. (2018); NEPS (2013); PISA 2000; PISA 2015; TREE, Verner and Helbling (2019)
	Composition of (own) family	
Education, training and employment	Migration background and nationality	
	Migration background	
	Nationality, residence status	
	Educational pathways and transitions (lower sec. level)	
	Educational biography (compulsory school)	
	Educational decisions (transitions lower => upper sec. education): perceived cost, benefit and chances of success	
	Educational objectives and aspirations	
	Plans for education and training	
	Characteristics of maths lessons (end of lower secondary education)	Baumert et al. (2008) ; Beck et al. (2008) ; BIBB (2012); DAB-Panelstudie (2020); Dunckel (1999); Ganzeboom, De Graaf, and Treiman (1992); Ganzeboom and Treiman (2019); ICILS 2013/ Jung and Carstens (2015); International Standard Classification of Education (ISCED 2011); International Standard Classification of Occupations (ISCO-88); International Standard Classification of Occupations (ISCO-08); Kunter et al. (2002); Mang et al. (2018); Meyer, Allen, and Smith (1993); NEPS (2013); Neuenschwander et al. (1998); Neuenschwander et al. (2013); Nomenclature of the Swiss learner statistics (SFSO Swiss Federal Statistical Office); PISA 2000; PISA 2006 ; PISA 2012; Prümper, Hartmannsgruber, and Frese (1995); Seidel, Prenzel, and Kobarg (2005); Semmer, Zapf, and Dunckel (1999); Swiss Labor Force Survey (SLFS); Swiss Federal Statistical Office (FSO): Business and enterprise register (BER); Swiss Standard Classification of Occupations - SSCO 2000; TREE; Zapf et al. (1983)
	Educational situation and post-compulsory pathways	
	Attended educational programmes	
	Attended schools	
	Attended training firms	
	Skills requirements for educational activities / media use	
	Absenteeism / intention to change education	
	Resources and strains (education)	
	Credentials and marks	
	Reasons discontinuing education and training	
	Employment situation (incl. internships) and pathways	
	Employment / internships	
	Conditions of employment	
	Job position within company's hierarchy	
	Salary	
	Resources and strains (employment)	
	Job tasks, requirements and job-skills-mismatch	
	Absenteeism / intention to change job	
	Reasons for termination of employment	
	Self-assessment of education and employment pathways	
	Assessment of current education and training	
	Assessment of completed education & training	
	Perceived fit and commitment: main activities	
	Desired job situation	
Other activities, job and training search	Search for education or employment	
	Search for education (end of lower secondary education)	
	Search for VET training place (upper sec.)	
	Job search (upper sec.)	
	Search for general education programme (upper sec.)	
	Other activities	Swiss Labor Force Survey (SLFS); TREE
	Unemployment (unregistered and registered)	
	Vacation / holidays	
	Military service	
	Childcare (as main activity)	
	Illness / accident	

## Survey topics

Main	Detailed	Sources
	Further activities Maternity / paternity leave Gap / missing information Reasons for non-participation in education and employment Reasons for non-participation in education and employment Reasons for non-participation in education Reasons for part-time & non-employment	
Family, significant others, social origin and networks	Family background Family climate Childcare situation (own child) Socio-economic origin Social, cultural, and economic resources Social capital (own) Cultural capital (family of origin) Cultural capital (own) Economic capital (family of origin) Financial situation (general)	Böhm-Kasper et al. (2000); Böhm-Kasper et al. (2004); DAB-Panelstudie (2020); EVS 1999/2000 / Halman (2001); Ganzeboom, De Graaf, and Treiman (1992); Ganzeboom and Treiman (2019); Girnat (2017); Hartley et al. (2016); Hobza et al. (2017); International Standard Classification of Occupations (ISCO-88); International Standard Classification of Occupations (ISCO-08); ISSP 2012/ Scholz et al. (2014); Kunter et al. (2002); Mang et al. (2018); NEPS (2013); Szydlik (2008); PISA 2000; PISA 2012; TREE; WVS/EVS / Inglehart et al. (2000)
Participation in society	Social and cultural participation Politics Leisure Media Group affiliation and sense of belonging (identity)	GESIS (2008); ICILS 2013 / Jung and Carstens (2015); MOSAiCH 2013; MOSAiCH 2015; Stadelmann-Steffen and Koller (2013); SOEP Group (2019); Ernst Stähli et al. (2014); Ernst Stähli et al. (2015); TREE;
Well-being and Health	Satisfaction and well-being Satisfaction School-related well-being Critical life events Health	Anand and Hees (2006); ch-x 2014/2015 / Huber et al. (2015); German National Educational Panel Study (NEPS); NEPS (2013); Grob et al. 1991; Hagenauer and Hascher (2012); Hascher (2004); Nagel and Ehnold (2007); PISA Pretest 2014; Renner and Schwarzer (2005); Sen (1985); The Socio-Economic Panel (SOEP); SOEP (2008); Swiss Household Panel (SHP) (2017); TREE
Self	Non-cognitive factors Motivational concepts Self-perception Emotions related to maths classes Volitional strategies Personality characteristics Global preferences (risk, time and social preferences) Values and attitudes Attitudes related to maths classes Cognitive skills (assessments) basic mathematical skills reading speed cognitive skills	Angelone & Keller (2019); Baumert et al. (2008); Eder (1995); Eder (2007); Girnat (2015); Girnat (2017); Girnat (2018); Global Preference Survey (GPS) / Falk et al. (2016) / Falk et al. (2018); Grob and Maag Merki (2001); Hackman and Oldham (1980); Hascher (2004); Heller & Perleth (2000); ICILS 2013 / Fraillon et al. (2014) / Jung and Carstens (2015); IGLU 2001 / Bos et al. (2005); Kovaleva et al. (2012); Kunter et al. (2002); Moser et al. (1997); NEPS (2013); Pekrun, Goetz, and Frenzel (2005); PISA 2000; PISA 2012; Rammstedt and John (2007); Rammstedt (2013); Rosenberg (1979); Roy (1995); Ryan and Connell (1989); Schmidt and Kleinbeck (1979); Schwarzer and Jerusalem (1999); Schwarzer (1999); Schwarzer et al. (2005); Schwarzer (2014); The Socio-Economic Panel (SOEP) (2008); Spinath et al. (2002); Swiss Household Panel (SHP) (2017); TREE Watermann (2000); Zimmerman et al. (2012)

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## 8.2 Appendix 2: Implementation of a cognitive ability test in the TREE2 panel survey

This Appendix summarises the adaptation and implementation of a figure analogies test module initially developed by Heller and Perleth (2000). Among the nine elements of Heller and Perleth's *Kognitiver Fähigkeitstest* (KFT 4-12 R+), the N2 subtest is an instrument designed to measure reasoning, a crucial component of fluid intelligence, which in turn is a core aspect of the concept of intelligence (Brunner et al., 2014). The test module will henceforth be referred to as CAT (Cognitive Abilities Test) and has been adapted by TREE from a paper-and-pencil format to a web-based instrument.

### Web adaptation of the test

The original paper-based test has been adapted for online use in the TREE2 study. Key adaptations include:

1. *Web adaptation:* Two test items were displayed per screen with navigation between the 13 screens of task pairs made possible by a "Next" button. Multiple answers and going back to previous screens were permitted, akin to the original test.
2. *Introduction:* An animated introductory section was developed for the web version, emulating the gradual revealing technique by test instructors of the paper version.
3. *Linguistic simplifications and translations:* Simplified sentences were utilised to improve understanding, and translations to French and Italian were made to increase the size of the test sample.
4. *Support:* A hotline and email addresses were provided to assist with any questions or clarifications.

These adaptations ensured that the CAT was suitable for the TREE2 study's online format and target population while maintaining the integrity of the original test. Para-data from the online test are also provided to further understanding of these adjustments and for assessing the formal validity of the completed tasks.

### Functionality and Validation of the Cognitive Abilities Test

The adaptation of the CAT to an online format posed several challenges that do not leave the test results untouched. Instructions, perceived as complex by a substantial number of respondents, led to a high rate of test discontinuation and comments, particularly in the Italian and French versions. Another aspect affecting scores was that a sizable number of respondents checked more than one answer per test item. According to the test manual, this was treated as incorrect, which resulted in a substantial number of low test scores that were possibly due to respondents' problems of comprehension regarding the test format.

The CAT's test results, instead of conforming to a normal distribution, revealed a bimodal distribution. This discrepancy might be influenced by factors such as sample composition,



heterogeneity of school achievement, and cultural variation between language regions that necessitate further investigation.

In spite of these issues, the test was validated through construct validity. Consistent with the CAT manual's criterion validity, the test yielded high correlations with mathematics grades and scores, medium correlations with parental socio-economic status and the number of books at home, and weak correlations with linguistic constructs. These findings support the validity of the online adaptation of the CAT, despite the challenges encountered.

### **Conclusion and some words of caution**

Although results should be interpreted with caution, they are in line with those from other studies (PISA 2000, TIDES<sup>79</sup> study) and confirm the robustness of the CAT despite its adaptation to an online setting and its complex introduction that had to be translated to two additional languages.

However, the lower peak of the observed bimodal distribution was more accentuated than in studies administering the test in paper-and pencil format, particularly among low-achieving students and students from Italian-speaking Switzerland. This suggests the need to yet improve the web-based format. These challenges notwithstanding, we are confident that this innovative test design will provide useful tools for in-depth analyses and contribute valuable insights to the field of educational research.

### **Data**

The data and para-data for the CAT are available in a separate dataset (file '*TREE2\_Data\_Wave\_o\_CAT\_v2*' of the 2023 TREE2 data release (TREE, 2023)). This dataset not only includes the sum score of the correctly solved tasks (*cat\_score*), but also para-data that may be used for validating the score (*cat\_status*, *cat\_rpattern*, *cat\_timeisup*, *cat\_lastpage*, *cat\_comment*) and the 25 individual test items (*cat\_item\_1-25*), which contain detailed information about respondents' handling of the test setting. In the data release, we also provide Stata syntax that document our validation and how we generated the sum score. Scholars may modify this syntax according to their individual needs and research questions (see file '*TREE2\_Syntax\_Wave\_o\_CAT\_Validation\_v2.do*' in the 2023 data release).

Additionally, the sum score (*cat\_score*) is also included in the general dataset of panel wave o (data file '*TREE2\_Data\_Wave\_o\_v2*' in the 2023 data release). For more detailed information we refer to the detailed technical paper of Krebs-Oesch, Jann & Hupka-Brunner (2023).

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<sup>79</sup> Transitions in Different Educational Systems. See <https://www.tides-study.ch/>

### 8.3 Appendix 3: Implementation of a reading speed test

#### Why implement a reading speed test?

Implementing a reading speed test is a substantial “added value” to the TREE2 panel survey for several reasons. The test provides a measurement of a fundamental aspect of reading literacy. On the one hand, it complements other skills measures (in mathematics and cognitive skills) that do not cover reading skills. On the other hand, a measurement of reading skills is also useful in view of TREE’s multi-cohort design and its potential for cohort-comparative analyses of post-compulsory trajectories and transitions. The focus of skills measurements at baseline in the first TREE cohort (TREE1) was on reading literacy (BFS & EDK, 2002), whereas in TREE2 it was on mathematics skills (AES<sup>80</sup> 2016). Although the reading speed test implemented in TREE2 can by no means replace comprehensive measures such as PISA<sup>81</sup> (Angelone & Keller, 2019), it nevertheless provides TREE data users with an instrument to control for at least basic reading skills across cohorts, thus improving the analytic value of cohort-comparative research.

#### Why is the NEPS reading speed test suitable for TREE2?

When looking for a test suitable for TREE2, design requirements were such that the instrument had to be short, validated, web-based and self-administered (CAWI/CASI). Furthermore, it should also be suitable for repeated measurement in later stages of the cohort’s educational trajectory. Against the background of these requirements, we considered the NEPS<sup>82</sup> reading speed test (Zimmermann et al., 2012) to be particularly well suited, since the assessment of individual sentences as being correct or not was easy to technically implement and to instruct. As to the requirement of suitability for repeated measurement, the test has certain limitations with respect to ceiling effects. According to results from NEPS longitudinal use of the test among different age cohorts, ceiling effects occurred with increasing age of respondents (e.g., 5.4% of the adults completed all items correctly; Zimmermann et al., 2014). However, as the test differentiates well in the lower range of reading ability at any age and is suitable for different age groups, it can be expected to lend itself well to longitudinal use for TREE2. One of the major advantages of the test is its length of only two minutes, which minimises additional survey burden for panel respondents.

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80 See Konsortium ÜGK (2019).

81 The results of the two tests are not fully comparable for two reasons. On the one hand, PISA is a comprehensive measure of reading literacy, which cannot be fully captured by a short reading speed test. On the other hand, there are slight differences as to the point in time of measure: The Swiss PISA 2000 sample (i.e., the baseline sample of the TREE1 cohort) has been tested in the last year of lower secondary education (i.e., shortly prior to the end of compulsory school), whereas the reading speed test in TREE2 has been administered one year after the cohort has left compulsory school.

82 National Education Panel Survey (Germany).



### What does the test measure?

The test primarily measures decoding speed, which contains two basic components of reading, namely reading speed and decoding accuracy. Both reading speed (number of words or sentences read within 2 minutes) and decoding accuracy (i.e., proportion of correctly comprehended words respectively correctly assessed items) are part of the automatised text processing while reading and indispensable for text comprehension. The test itself therefore consists of a list of simple statements that are to be read as quickly as possible and assessed as to their being true or false.

### How has TREE adapted the test?

The test employed by TREE is basically a literal substitution of the NEPS paper-and-pencil administration by a web-based version that we have administered in panel wave 1 and from panel wave 3 onward. We implemented two device-specific adaptations. For desktop and laptop devices, the test's 51 items are displayed on five screens linked with "next" buttons, each of which can be completed without scrolling. In the smartphone/tablet version, all items are displayed on one and the same screen that can be thumb-scrolled (see Krebs-Oesch, Sacchi, et al., 2023, Section 2.4.2 for further technical details on the web adaptation). For the German-speaking part of the sample we adopted the German NEPS version of the test, restricting adjustments of content to a few minor "helvetisms".<sup>83</sup> In order to be able to administer the test to a maximum share of the TREE2 sample, we translated the test to French.<sup>84</sup>

### What should be kept in mind when working with the test data?

Administering a reading speed test in a longitudinal design provides researchers with a wide range of analysis potential. Depending on the research objectives, the relevant data are to be found in one of the following datasets:

- For wave-specific analyses relating to panel waves 1 and 3 and to measures of intra-individual stability of reading speed, the test data are included in the respective general wave-specific data files (TREE2\_Data\_Wave\_1\_v2 and TREE2\_Data\_Wave\_3\_v2).
- Analyses pertaining to the role reading speed plays for the attainment of an upper secondary diploma and the transition from upper secondary education to post-secondary education or the labour market, we recommend drawing on the data file 'TREE2\_Data\_rs\_graduationyear\_v2'.<sup>85</sup> This file comprises test data that have been collected shortly prior to respondents' expected graduation from formal upper secondary education.

<sup>83</sup> Idiosyncratic terms in the Swiss national languages that are only in use in Switzerland.

<sup>84</sup> For reasons of research economy, we refrained from translating the test to Italian, TREE's third survey language. This concerns less than ten percent of the sample.

<sup>85</sup> See folder 1-4 'Reading Speed Test' in the TREE2 2023 data release (TREE, 2023)

## 8.4 Appendix 4: Implementation of the Social Value Orientation (SVO) Slider Measure

In the second panel wave, we implemented a module on social value orientation (SVO) adopting an approach similar to the slider measure proposed by Murphy et al. (2011). The module was placed at the end of the complementary questionnaire<sup>86</sup> and administered to the maths sample split only (N=2622 complete cases; see Section 4 for details on TREE2's sample split design).<sup>87</sup> It consisted of an introductory page containing explanations on how to proceed and a subsequent page containing six decision tasks in each of which a choice could be made among different divisions of money between oneself and another person (see Figure A8.4.1). The six tasks correspond to the six primary SVO slider items described by Murphy et al. (2011). However, to reduce cognitive burden on respondents and to make the instrument applicable for mobile devices, we used a reduced set of five possible divisions to choose from instead of nine (or even a continuous slider) as suggested by Murphy et al. (2011). The loss of precision due to using a reduced set of divisions is likely to be minor, as the responses to the single items typically cluster at the extreme points (or for some items also in the middle) of the scale. We also simplified the introductory text and explanations as much as possible to facilitate completion in self-administered mode by respondents from a heterogeneous population sample.

The instrument was incentivised. Five percent of the respondents completing the instrument were randomly chosen for release of payoff (in CHF) corresponding to the selected division in one of the six items (the used item was selected at random for each respondent). The “other person” to receive his or her share of the payoff was selected by forming random pairs among the study participants. That is, each respondent was eligible to win twice, once as a “donor” and once as a “receiver”.

In the data of panel wave 2 (TREE, 2023), the respondents' answers to the six items are captured as twelve variables, two for each item. The variables are named “*tzsv0\_#\_me*” (value of the payoff for the respondent) and “*tzsv0\_#\_you*” (value of the payoff for the other person), where “#” is the number of the item. From the answers to the items, an SVO angle can be computed, adopting the formula

$$\text{SVO}^\circ = \arctan \left( \frac{\sum_{j=1}^6 (\text{PAYOFF OTHER}_j - 50)}{\sum_{j=1}^6 (\text{PAYOFF SELF}_j - 50)} \right)$$

where  $j=1, \dots, 6$  indexes the six items. In the dataset of panel wave 2, the angle computed in this way is comprised in the variable “*tzsv0\_angle*”. Based on the angle, respondents can be classified into different SVO types (using the cut-offs proposed by Murphy et al. 2011): altruistic (angle above  $57.15^\circ$ ), prosocial (angle between  $22.45^\circ$  and  $57.15^\circ$ ), individualistic (angle between  $-12.04^\circ$  and  $22.45^\circ$ ), and competitive (angle below  $-12.04^\circ$ ). The classification according to this definition is comprised in the variable “*tzsv0\_cat*”.

<sup>86</sup> CAWI mode only.

<sup>87</sup> I.e., cases who completed the module only partially were excluded.

Figure A8.4.1: Screens of SVO module (mobile phone version, German)

### Verteil-Spiel mit Gewinn-Chancen

Bei den folgenden sechs Fragen können Sie einen Geldbetrag zwischen Ihnen selber und einer anderen Person aufteilen. Sie haben jeweils die Wahl zwischen fünf Möglichkeiten der Verteilung.

Hier ein Beispiel:

Sie erhalten	30	40	50	60	70
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die andere Person erhält	80	60	40	20	0

Wenn Sie in diesem Beispiel auf den Button zwischen 50 und 40 klicken und falls Sie ausgelost werden, dann würden Sie 50 Franken und die andere Person 40 Franken erhalten.

Es bleibt völlig Ihrem Gutdünken überlassen, welche Wahl Sie treffen. Die andere Person ist zufällig aus den Teilnehmerinnen und Teilnehmern unserer Studie ausgewählt worden. Weder Sie noch die andere Person werden voneinander erfahren.

Wer die Fragen beantwortet, nimmt an einer Gewinn-Verlosung teil. Eine von zwanzig Personen erhält dabei einen Gewinn. Falls Sie ausgelost werden, wird das Geld genau so ausbezahlt, wie Sie es in einer der folgenden Fragen angegeben haben. Und zwar an Sie und die andere Person. Ihre Antworten können also bei jeder Frage durchaus "Konsequenzen" haben. Falls die andere Person ausgelost wird, bekommen Sie als Gewinn den Anteil ausbezahlt, den sich die andere Person für Sie ausgedacht hat.

Alle Gewinnerinnen und Gewinner werden nach dem Ende der Umfrage (ca. August 2018) informiert. Der Gewinn wird per Post ausbezahlt.

Zurück
Weiter

### Welche Aufteilung würden Sie am meisten bevorzugen?

Sie erhalten

85	85	85	85	85	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Die andere Person erhält	85	68	50	33	15

Sie erhalten

85	89	93	96	100	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Die andere Person erhält	15	24	33	41	50

Sie erhalten

50	59	68	76	85	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Die andere Person erhält	100	96	93	89	85

Sie erhalten

50	59	68	76	85	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Die andere Person erhält	100	79	58	36	15

Sie erhalten

100	88	75	63	50	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Die andere Person erhält	50	63	75	88	100

Sie erhalten

100	96	93	89	85	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Die andere Person erhält	50	59	68	76	85

Zurück
Weiter

Hotline: 079 133 97 80 | [tree2@soz.unibe.ch](mailto:tree2@soz.unibe.ch)

Hotline: 079 133 97 80 | [tree2@soz.unibe.ch](mailto:tree2@soz.unibe.ch)

Note: We also implemented a desktop/laptop/tablet version with a slightly different layout. For original wording and setting of the experiment, see questionnaires in the 2023 data release.

## 8.5 Appendix 5: Study choice experiment

This appendix documents an experiment on gender-specific choice of fields of study. The experiment was conducted in panel wave 2 among respondents who were enrolled in general education baccalaureate schools<sup>88</sup> at the time of the survey – and thus potentially eligible to transition to university (N = 1734).

### *Rationale and theoretical background*

To date, research on field of study choice has mainly relied on observational data to measure field of study preferences. In contrast, we have developed a survey-based stated choice experiment (Street & Burgess, 2007).<sup>89</sup> This approach allows to construct artificial subjects consisting of counterfactual combinations of subject characteristics for (or against) which respondents can express their preferences. More precisely, students' preferences for (stereotyped) subject characteristics are measured by asking them to choose among two artificial subjects (the choice set) the one they would like to study (see table 8.3.2). Combining subject characteristics in different ways in each artificial subject allows us to identify men's and women's preferences for these characteristics. Since the artificial subjects combine different levels of sets of characteristics, it is possible to estimate the importance of these characteristics in relation to each other. This is not possible with real fields of study because the presence of subject characteristics is not independent. The results of the experiment can be interpreted as the preferences of an average student for certain characteristics, since responding students are randomly allocated to these choice sets and consequently differences between students assessing the choice sets are minimized.

### *Design and operationalisation*

In the choice sets, the following attributes were systematically varied:

- 1) a preference for math-related subjects, for employing an analytical way of thinking (versus an associative and creative thinking approach) and for jobs involving technical tasks (rather than tasks involving empathy and social skills);
- 2) a preference for materialistic job characteristics (high salary and high prestige) and jobs with family-friendly features (measured as the possibility to work part-time);
- 3) a preference for competition and risk (the latter measured by the risk of being unemployed after graduation).

<sup>88</sup> German: Gymnasium, Kantonsschule, Maturitätsschule; French: lycée, gymnase, école de maturité; Italian: liceo.

<sup>89</sup> In collaboration with Benita Combet.

Table A8.3.1: Detailed description of choice set dimensions

Preference	Choice set attributes	Variable name	Phrasing of attribute	Levels of the attributes	Phrasing of attribute	Levels of the attributes	Phrasing of attribute	Levels of the attributes	Phrasing of attribute	Levels of the attributes
			English		German		French		Italian	
			Introductory text: I'm sure you've already thought about what you'd like to do after graduating from high school. Below you will find two descriptions of potential fields of study. Which of these subjects would you be more interested in, A or B?		Bestimmt haben Sie sich schon Gedanken gemacht, was Sie nach dem Abschluss des Gymnasiums machen möchten. Nachfolgend finden Sie zwei Beschreibungen von möglichen Studienfächern. Welches dieser Studienfächer würde Sie mehr interessieren, A oder B?		Vous avez certainement déjà réfléchi à ce que vous souhaitez faire après avoir terminé le gymnase. Ci-dessous, vous trouverez deux descriptions de matières d'études possibles. Laquelle des deux matières vous intéresserait davantage, A ou B ?		Lei avrà sicuramente già pensato a quello che desidera fare dopo aver concluso il liceo. Qui sotto troverà due descrizioni di possibili materie di studio. Quale delle due materie la interesserebbe di più, la A o la B?	
<b>Systemizing skills</b>	Mathematics	vechoice_math*	Mathematics is an important part of the subject ...	0: rather no 1: rather yes	Mathematik ist ein wichtiger Bestandteil des Studienfachs.	0: eher nein 1: eher ja	Les mathématiques forment une partie importante de la matière	0: plutôt non 1: plutôt oui	La matematica occupa una parte importante della materia	0: piuttosto no 1: piuttosto sì
	Reasoning style	vechoice_reas*	The subject primarily requires ...	0: associative and creative thinking 1: analytical and systematic thinking	Das Studienfach erfordert in erster Linie ...	0: assoziatives und kreatives Denken 1: analytisches und systematisches Denken	La matière demande en première ligne ...	0: De penser par association et un esprit créatif 1: Une pensée analytique et systématique	La materia richiede soprattutto...	0: Di pensare per associazione e uno spirito creativo 1: Un pensiero analitico e sistematico
	Affinity for work tasks	vechoice_task*	Important professional skills are ...	0: empathy and social skills 1: affinity for technology and engineering	Wichtige Fähigkeiten im Beruf sind ...	0: Einfühlungsvermögen und Sozialkompetenz 1: Flair für Technik und Technologie	Des facultés importantes dans le métier sont ...	0: l'empathie et les compétences relationnelles 1: une affinité pour la technique et la technologie	Delle capacità importanti nella professione sono...	0: l'empatia e le competenze relazionali 1: un'affinità per la tecnica e la tecnologia
<b>Job characteristics</b>	Salary	vechoice_sala*	In comparison to other subjects, the monthly salary is ...	0: below average 1: above average	Der monatliche Lohn im Beruf ist im Vergleich zu anderen Studienfächern ...	0: unterdurchschnittlich 1: überdurchschnittlich	En comparaison avec d'autres matières, le salaire mensuel, une fois en emploi, est ...	0: inférieur à la moyenne 1: supérieur à la moyenne	In confronto ad altre materie il salario mensile, una volta impiegato, è...	0: inferiore alla media 1: superiore alla media
	Prestige	vechoice_pres*	The reputation of the profession in Switzerland is ...	0: average 1: high	Das Ansehen des Berufs in der Schweiz ist ...	0: durchschnittlich 1: hoch	Le prestige du métier en Suisse est ...	0: dans la moyenne 1: élevé	Il prestigio della professione in Svizzera è...	0: nella media 1: elevato
	Part-time work	vechoice_part*	Levels of occupation below 60% are...	0: hardly possible 1: possible most of the time	Arbeitspensen bis 60% sind ...	0: kaum möglich 1: meistens möglich	Des postes jusqu'à 60% sont ...	0: à peine possibles 1: possibles la plupart du temps	Dei posti fino al 60% sono...	0: difficilmente possibili 1: possibili la maggior parte del tempo
<b>Behavioral preferences</b>	Competition aversion	vechoice_comp*	Competition among students is ...	0: low 1: high	Das Konkurrenzdenken zwischen den Studierenden ist ...	0: niedrig 1: hoch	L'esprit de compétition entre les étudiant(e)s est ...	0: faible 1: fort	Lo spirito di competizione tra gli studenti è...	0: debole 1: forte
	Risk aversion	vechoice_risk*	The chances of finding a suitable initial job within one year are ...	0: high 1: average	Die Wahrscheinlichkeit, innerhalb eines Jahres einen zum Studienfach passenden Einstiegsjob zu finden, ist ...	0: hoch 1: durchschnittlich	La probabilité de trouver en l'espace d'un an un premier emploi qui correspond aux études est ...	0: haut 1: dans la moyenne	La probabilità di trovare un primo lavoro che corrisponda agli studi entro il primo anno è...	0: elevato 1: nella media

\* 1 = subject A, 2=subject B

The precise operationalization of the dimensions and levels, developed after several rounds of cognitive pretests with Swiss baccalaureate students, is presented in Table A8.3.1. The choice set contains a short introductory text, presents the two fields of study (unlabelled, titled subject A and subject B) with their attributes in a tabular form, and concludes with a question asking students which of the two subjects they would choose (see Table A8.3.2, which shows an example of the choice set). The translation of the choice sets between the three survey languages (German, French and Italian) was carried out by a professional translation service.

The choice experiment was administered in panel wave 2 (2018) among respondents who were enrolled in general education baccalaureate schools at the time of the survey – and thus potentially eligible to transition to university (N = 1734). Out of this (sub)sample, 1551 individuals completed the experiment. At the time of the survey, students were on average 17 to 18 years old, and transition to university was approximately two years ahead of them.

*Table A8.3.2: Example for a choice set*

I'm sure you've already thought about what you'd like to do after graduating from high school. Below you will find two descriptions of potential fields of study. Which of these subjects would you be more interested in, A or B?		
	Subject A	Subject B
<b>Characteristics of the subject:</b>		
Mathematics is an important part of the subject	rather no	rather yes
The subject primarily requires ...	associative and creative thinking	analytical and systematic thinking
Competition among students is ...	low	high
<b>Characteristics of the profession the subject is preparing for:</b>		
The chances of finding a suitable initial job within one year are ...	average	high
Important professional skills are ...	empathy and social skills	affinity for technology & engineering
In comparison to other subjects, the monthly salary is ...	below average	above average
The reputation of the profession in Switzerland is ...	average	high
Levels of occupation below 60% are...	possible most of the time	hardly possible
Which of these subjects would you be more interested in?	A <input type="checkbox"/>	B <input type="checkbox"/>

As a full factorial based on a design with eight dimensions and two levels consists of 256 choice sets, a selection of choice sets was obtained by means of an optimal orthogonal in the differences (OOD) design. A major advantage of the OOD design approach is that it forces respondents to make trade-

offs among attributes in a choice set, as there is a minimal overlap of attribute levels between the alternatives (Street and Burgess 2007). This approach resulted in 24 choice sets (D-optimality 100%), identifying all the main effects and two-way interactions of the choice attributes (see Table A8.3.3). The dimensions were chosen to avoid illogical cases and hence exclusion of some sets. Efficiency is improved by using a stratified random assignment of choice sets by respondents' gender and language region. As the experiment was conducted in CAWI mode, each respondent completed only one choice set, which was randomly allocated within blocks. All choice sets were evaluated between 55 and 73 times (female subsample: average number of ratings: 40 (range: 32–45); male subsample: average number of ratings: 24 (range: 21–28). To check for random treatment allocation, balancing tests were conducted, showing that none of the choice sets was completed more frequently by one gender. Similarly, other important respondent characteristics, such as parental ISEI and mathematical ability, are well balanced (see Combet, 2023, for more detail).

Table A8.3.3: Optimal orthogonal in the differences (OOD) design

Choice set	Mathematics		Reasoning		Competition		Risk		Tasks		Salary		Prestige		Part-time	
	math1 A	math2 B	reas1 A	reas2 B	comp1 A	comp2 B	risk1 A	risk2 B	tasks1 A	tasks2 B	salar1 A	salar2 B	pres1 A	pres2 B	part1 A	part2 B
1	I	O	I	O	O	I	I	O	O	I	O	I	I	O	O	I
2	I	O	O	I	I	O	O	I	O	I	O	I	I	O	I	O
3	O	I	I	O	O	I	I	O	O	I	O	I	O	I	I	O
4	I	O	O	I	I	O	I	O	I	O	O	I	O	I	O	I
5	O	I	O	I	O	I	O	I	I	O	O	I	I	O	I	O
6	O	I	I	O	I	O	O	I	I	O	O	I	O	I	O	I
7	O	I	I	O	I	O	O	I	O	I	I	O	I	O	O	I
8	O	I	O	I	I	O	I	O	O	I	I	O	O	I	I	O
9	I	O	O	I	O	I	O	I	O	I	I	O	O	I	O	I
10	I	O	I	O	O	I	O	I	I	O	I	O	O	I	I	O
11	O	I	O	I	O	I	I	O	I	O	I	O	I	O	O	I
12	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O
13	O	I	O	I	I	O	O	I	I	O	I	O	O	I	I	O
14	O	I	I	O	O	I	I	O	I	O	I	O	O	I	O	I
15	I	O	O	I	I	O	O	I	I	O	I	O	I	O	O	I
16	O	I	I	O	O	I	O	I	O	I	I	O	I	O	I	O
17	I	O	I	O	I	O	I	O	O	I	I	O	O	I	O	I
18	I	O	O	I	O	I	I	O	O	I	I	O	I	O	I	O
19	I	O	O	I	O	I	I	O	I	O	O	I	O	I	I	O
20	I	O	I	O	O	I	O	I	I	O	O	I	I	O	O	I
21	O	I	I	O	I	O	I	O	I	O	O	I	I	O	I	O
22	O	I	O	I	I	O	I	O	O	I	O	I	I	O	O	I
23	I	O	I	O	I	O	O	I	O	I	O	I	O	I	I	O
24	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I

## 8.6 Appendix 6: Composite variables on activity status

Given the complex data structure with regard to respondents' main activities, we provide simple, easy-to-use and (internationally) state-of-the-art aggregate information on educational and labour market status. To this end, we calculated the following three composite variables:

- 1) a trichotomous variable on labour market status according to ILO standards;
- 2) a dichotomous variable (yes/no) on educational status;
- 3) a NEET<sup>90</sup> variable.

Except for the NEET variable, which is a function of educational and labour market status, the variables are constructed independently of each other.

The variables are included in the wave-specific datasets of the released TREE2 data package (TREE, 2023).<sup>91</sup>

### Ad 1) Labour market status

The LMS composite variable *lms\_ilo\_comp* provided by TREE is leaning on (though not strictly complying with) the definitions of the International Labour Organization (ILO; for detailed technical operationalization, see the Stata script below):<sup>92</sup>

Categories	ILO definition	Remarks
In employment	In gainful employment for $\geq 1$ hour per week	<ul style="list-style-type: none"> <li>- Includes dual VET trainees receiving an apprenticeship salary;<sup>93</sup></li> <li>- Includes paid internships;<sup>94</sup></li> <li>- Includes individuals doing military service.</li> </ul>
In unemployment	<ul style="list-style-type: none"> <li>- Without a job during a given week;</li> <li>- Available to start a job within the next two weeks;</li> <li>- Active search of employment during past four weeks or having already found a job that starts within the next three months.</li> </ul>	TREE captures unemployment on grounds of respondents' self-reporting. It includes both registered and unregistered unemployment (but no partial unemployment in case of partial employment/internship). <sup>95</sup>
Not in the labour force	Neither in employment nor in unemployment	

<sup>90</sup> NEET is the acronym for "Not in Education, Employment or Training".

<sup>91</sup> Datasets 'TREE2\_Data\_Wave\_1\_v2', 'TREE2\_Data\_Wave\_2\_v2' and 'TREE2\_Data\_Wave\_3\_v2' in TREE (2023).

<sup>92</sup> See [http://www.ilo.ch/wcmsp/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms\\_230304.pdf](http://www.ilo.ch/wcmsp/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_230304.pdf).

<sup>93</sup> According to the Swiss "domestic" definition of dual VET (adopted by TREE), apprentices are not considered to be in employment, but (only) in education.

<sup>94</sup> According to the Swiss "domestic" definition of dual VET (adopted by TREE), individuals in internships which are part of a formal education programme are considered to be in education (irrespective of whether the internship is paid or not).

<sup>95</sup> TREE captures temporal information on activity spells (beginning, duration, end) to the month.



**Ad 2) Educational status (yes/no)**

The aggregate variable *educ\_yes* is a binary information on whether an individual is enrolled in formal education or not. It draws on more detailed capture of educational status categorised according to ISCEDII<sup>96</sup> (for detailed technical operationalization, see the Stata script below).

**Ad 3) NEET (Not in Education, Employment or Training)**

The composite variable *neet\_yes* is a binary variable combining the two previous variables 1) and 2). By definition, its value is “yes” if an individual is neither in employment nor in (formal) education, and “no” if otherwise. The operationalisation may partially conflict with more detailed “domestic” NEET categorisations.<sup>97</sup>

The syntax for the construction of the three composite variables on activity status is available in the 2023 data release (TREE, 2023).

---

<sup>96</sup> ISCED = International Standard Classification of Education (UNESCO, 2012).

<sup>97</sup> I.e., partial (registered) unemployment, attendance of programmes funded by the unemployment insurance scheme, military service, etc.

## 8.7 Appendix 7: Composite variable on parental educational attainment

Valid and exhaustive information on parental educational attainment is indispensable and crucial in many fields of social research. In order to minimise missing and inconsistent data on parental education collected in the baseline survey, we have continued to administer the respective items throughout the follow-up panel waves 1 to 3 if respondents had failed to provide valid data in previous waves. We have used these data to construct composite variables that aggregate information on parental education across all measured waves. The following algorithm specifies the rules adopted for this aggregation and how inconsistencies due to repeated measurement were treated.

### Detailed rules of coding and treatment of inconsistencies

#### **meduc\_comp (composite variable on mother's educational attainment)**

meduc\_comp is constructed with information from successive survey waves (T0-T3) according to the following rule:

```
meduc_comp (T) = meduc (T0)  --initial value equals T0
meduc_comp (T) = value meduc (T+1) --update with information from subsequent waves if
if
  value meduc (T+1) > 0 and --new value is not missing
  mother (T0) <is not> 7 and --mother figure is present in the respondent's life
  (
    meduc_comp (T) = 8 --current value is: "Other education"
  or
    meduc_comp (T) < 0 --current value is: missing
  )
```

Following these rules, there are inconsistencies with the data arising from repeated measurement. Below is a list of these issues per wave and their accompanying solution.

#### T0x:

Issue #1: 484 rows with different values in meduc (T0 vs. T0x)

Solution: Prioritise value meduc (T0)

Issue #2: Three rows with meduc (T0x) > 0 and mother (T0) = 7 (Person does not exist)

Solution: Prioritise value meduc (T0): missing

#### T1:

Issue #1: 355 rows with different values in meduc (T0+T0x vs. T1)

Solution: prioritise value meduc (T0+T0x)

Issue #2: 27 rows with meduc (T1) > 0 and mother (T0) = 7 (Person does not exist)

Solution: Prioritise value meduc (T0): missing

#### T2:

Issue #1: 18 rows with different values in meduc (T0+T0x+T1 vs. T2)

Solution: prioritise value meduc (T0+T0x+T1)

Issue #2: Two rows with meduc (T2) > 0 and mother (T0) = 7 (Person does not exist)

Solution: Prioritise value meduc (T0): missing

#### T3:

Issue #1: Six rows with different values in meduc (T0+T0x+T1+T2 vs. T3)

Solution: prioritise value meduc (T0+T0x+T1+T2)

#### **meduct\_comp**

meduct\_comp is constructed after meduc\_comp using information from successive survey waves (T0-T3) according to the following rule:

```
meduct_comp (T) = meduct (T0)  --initial value equals T0
meduct_comp (T) = value meduct (T+1) --update with information from subsequent waves if
if
  meduct (T+1) > 0 and  --new value is not missing
  mother (T0) <is not> 7 and --mother figure is present in the respondent's life
  (
    meduct_comp = 7  --mother has tertiary education
  or
```

```

        meduc_comp < 0  --information on mother's education is missing
    ) and
    (
        meduct_comp (T) = 4  --current value is: "Other type of higher education"
    or
        meduct_comp (T) < 0  --current value is: missing
    )

```

Following these rules, there are inconsistencies with the data arising from repeated measurement. Below is a list of these issues per wave and their accompanying solution.

#### T0x:

Issue #1: 46 rows with different values in meduct (T0 vs. T0x)

Solution: Prioritise value meduct (T0)

Issue #2: 67 rows with meduct (T0x) > 0 and meduc\_comp <> 7 (No tertiary education)

Solution: Prioritise value meduct (T0): missing

#### T1:

Issue #1: 30 rows with different values in meduct (T0+T0x vs. T1)

Solution: Prioritise value meduct (T0+T0x)

Issue #2: 55 rows with meduct (T1) > 0 and meduc\_comp <> 7 (No tertiary education)

Solution: Prioritise value meduct (T0): missing

Issue #3: Four rows with meduct (T1) > 0 and mother (T0) = 7 (Person does not exist)

Solution: Prioritise value meduct (T0): missing

#### T2:

Issue #1: Four rows with meduct (T2) > 0 and meduc\_comp <> 7 (No tertiary education)

Solution: Prioritise value meduct (T0): missing

#### T3:

Issue #1: One row with meduct (T3) > 0 and meduc\_comp <> 7 (No tertiary education)

Solution: Prioritise value meduct (T0): missing

### **feduc\_comp (composite variable on father's educational attainment)**

feduc\_comp is constructed with information from successive survey waves (T0-T3) according to the following rule:

```

feduc_comp (T) = feduc (T0)  --initial value equals T0
feduc_comp (T) = value feduc (T+1)  --update with information from subsequent waves if
if
    value feduc (T+1) > 0 and --new value is not missing
    father (T0) <is not> 7 and --father figure is present in the respondent's life
    (
        feduc_comp (T) = 8  --current value is: "Other education"
    or
        feduc_comp (T) < 0  --current value is: missing
    )

```

Following these rules, there are inconsistencies with the data arising from repeated measurement. Below is a list of these issues per wave and their accompanying solution.

#### T0x:

Issue #1: 516 rows with different values in feduc (T0 vs. T0x)

Solution: Prioritise value feduc (T0)

Issue #2: Seven rows with feduc (T0x) > 0 and father (T0) = 7 (Person does not exist)

Solution: Prioritise value feduc (T0): missing

#### T1:

Issue #1: 240 rows with different values in feduc (T0+T0x vs. T1)

Solution: Prioritise value feduc (T0+T0x)

Issue #2: 88 rows with feduc (T1) > 0 and father (T0) = 7 (Person does not exist)

Solution: Prioritise value feduc (T0): missing

#### T2:

Issue #1: 15 rows with different values in feduc (T0+T0x+T1 vs. T2)

Solution: Prioritise value feduc (T0+T0x+T1)

Issue #2: Six rows with feduc (T2) > 0 and father (T0) = 7 (Person does not exist)

Solution: Prioritise value feduc (T0): missing

#### T3:

Issue #1: Six rows with different values in feduc (T0+T0x+T1+T2 vs. T3)

Solution: Prioritise value feduc (T0+T0x+T1+T2)

Issue #2: Two rows with feduc (T3) > 0 and father (T0) = 7 (Person does not exist)

Solution: Prioritise value feduc (T0): missing

feduct\_comp

feduct\_comp is constructed after feduc\_comp using information from successive survey waves (T0-T3) according to the following rule:

```

feduct_comp (T) = feduct (T0)  --initial value equals T0
feduct_comp (T) = value feduct (T+1)  --update with information from subsequent waves if
if
    feduct (T+1) > 0 and  --new value is not missing
    father (T0) <is not> 7 and --father figure is present in the respondent's life
    (
        feduct_comp = 7 --father has tertiary education
        or
        feduct_comp < 0  --information on father's education is missing
    ) and
    (
        feduct_comp (T) = 4 --current value is: "Other type of higher education"
        or
        feduct_comp (T) < 0  --current value is: missing
    )

```

Following these rules, there are inconsistencies with the data arising from repeated measurement. Below is a list of these issues per wave and their accompanying solution.

T0x:

Issue #1: 121 rows with different values in feduct (T0 vs. T0x)

Solution: Prioritise value feduct (T0)

Issue #2: 69 rows with feduct (T0x) > 0 and feduc\_comp <> 7 (No tertiary education)

Solution: Prioritise value feduct (T0): missing

T1:

Issue #1: 32 rows with different values in feduct (T0+T0x vs. T1)

Solution: Prioritise value feduct (T0)

Issue #2: 32 rows with feduct (T1) > 0 and feduc\_comp <> 7 (No tertiary education)

Solution: Prioritise value feduct (T0): missing

Issue #3: 15 rows with feduct (T1) > 0 and father (T0) = 7 (Person does not exist)

Solution: Prioritise value feduct (T0): missing

T2:

Issue #1: 19 rows with different values in feduct (T0+T0x+T1 vs. T2)

Solution: Prioritise value feduct (T0)

Issue #2: One row with feduct (T2) > 0 and feduc\_comp <> 7 (No tertiary education)

Solution: Prioritise value feduct (T0): missing

Issue #3: One row with feduct (T2) > 0 and father (T0) = 7 (Person does not exist)

Solution: Prioritise value feduct (T0): missing

T3:

Issue #1: One row with feduct (T3) > 0 and feduc\_comp <> 7 (No tertiary education)

Solution: Prioritise value feduct (T0): missing

Issue #2: One row with feduct (T3) > 0 and father (T0) = 7 (Person does not exist)

Solution: Prioritise value feduct (T0): missing

## 8.8 Appendix 8: Pathway-dependent “pre-graduation” administration of survey instruments

Some survey instruments used by TREE2 are selectively administered at a pre-defined point on the individual pathways, i.e., about one year before the expected completion of an accredited formal upper secondary education. Limiting the administration to this specific point of measurement reduces respondents’ survey burden and, at the same time, is expected to yield particularly accurate and valid measurements when it comes to analysing the transitions at the end of upper-secondary education. Given the timing of the measurements about one year prior to this transition, they can also be used to model search and orientation processes (e.g., job search), which often begin well before the actual completion of training. This type of pathway-dependent “pre-graduation” measurement seems particularly promising for characteristics that are subject to substantial change during post-compulsory education and likely to be relevant for the transition from upper-secondary education to the labour market or to further education. Based on these criteria – and partly supported by results on intra-individual stability during post-compulsory education (Sacchi & Krebs-Oesch, 2023b) – a limited number of psychological characteristics has been selected for “pre-graduation” administration. They are listed in the following table:

*Table A8.8.1: Administration of survey instruments with “pre-graduation” measurements*

Survey instruments	Variable name(s)	Number of items	Baseline survey (2016)	Wave 1 (2017)	Wave 2 (2018)	Wave 3 (2019)	Wave 4 (2020)	Wave 5 (2021)	Wave 6 (2022)
			----- in this release -----			---- not in this release ----			
Realistic educational aspiration	<i>aspreal</i>	1	UM	UM	PGM	UM	UM	PGM	PGM
Technical self-concept	<i>techself#</i>	3	/	UM	PGM	PGM	UM	PGM	PGM
Math self-concept	<i>matself#</i>	3	/	UM	PGM	PGM	UM	PGM	PGM
Verbal self-concept	<i>langself#</i>	3	/	UM	PGM	PGM	UM	PGM	PGM
Embodied cultural capital		6	UM	/	UM	PGM	PGM	PGM	PGM
Subscale 'verbal skills'	<i>verbskill#</i>	3	UM	/	UM	PGM	PGM	PGM	PGM
Subscale 'manners'	<i>manners#</i>	3	UM	/	UM	PGM	PGM	PGM	PGM

Variable names (wave prefix “tX” is omitted here): # is a placeholder for the item numbers. PGM: Pre-graduation measurement. UM: Unrestricted measurement in predefined waves (full wave sample). /: Not administered.

To the exception of realistic educational aspirations, this includes item-based scales whose properties are described in the scale documentation of TREE2 (Sacchi & Krebs-Oesch, 2023a, 2023b). The pathway-dependent “pre-graduation” measurements (“PGM” in the table and below) are administered as part of the complementary questionnaire, provided that the study participants have reported, in the preceding CATI, to be currently in the second last year of an upper-secondary programme. This includes, above all, firm- and school-based VET, baccalaureate schools (*‘gymnasiale Maturität’/‘maturité gymnasiale’*) as well as upper-secondary specialised schools (*‘Fachmittelschulen’/‘Ecoles de culture générale’*).<sup>98</sup> The PGMs are always a complement to

<sup>98</sup> Specifically, this includes categories 30 to 95 of the detailed education typology from the CATI (variable *tXeduc\_typ\_\**; X stands for the wave number, \* for the index of education programs attended in wave X).

unrestricted measurements covering the full wave samples (“UM” in the table) of previous and sometimes also of subsequent waves.

In the 2023 TREE2 data release (TREE, 2023), the PGMs from the different panel waves are compiled in the data file ‘*TREE2\_Data\_Pregraduation\_v2*’. The file includes all respondents who, at some point up to the third panel wave, claimed to be enrolled in the second last year of training of a given upper-secondary programme. If the measurement was scheduled to be administered without restriction among all respondents of a given panel wave (“UM” in the table above), it is also included in the pre-graduation data set. Conversely, however, the data from the “PGM” in the table are not included in the wave-specific data sets. The pre-graduation dataset only includes the PGMs that were collected in the panel waves of the 2023 data release (i.e., up to panel wave 3). In addition to the survey items listed in the table above, the pre-graduation dataset also contains information on the panel wave in which the PGMs were collected, as well as the exact date of the measurement.<sup>99</sup> The vast majority of PGMs (almost 98%) are collected between March and July of a given year, i.e., on average about 11 months before the final examinations in the following year (approximate median of the time interval).<sup>100</sup> The time span between PGM and completion of programme may also be individually calculated by taking the date of graduation into account (included in the episode data file, ‘*TREE2\_Data\_Episodes\_v2*’).

In contrast to the wave data sets, the pre-graduation data set does not currently include factor scores for the latent dimensions involved, i.e., the self-concepts and the incorporated cultural capital.<sup>101</sup> There is also no separate codebook for the pre-graduation data set; in this regard, we refer to the code books of the waves in which the survey instruments were used cross-sectionally (according to the table above).

In addition, it should be mentioned that the administration of the reading speed test implemented in TREE2 is also partially aligned with the completion of upper-secondary education. However, the pathway-dependent test administration takes place one year later, i.e., almost simultaneously with graduation.<sup>102</sup>

It is also worth mentioning that for some survey instruments without a targeted pre-graduation administration, it is nevertheless possible to reconstruct comparable pre-graduation measurements from the collected data. This applies in principle to all survey instruments that are administered at yearly intervals (i.e., in each panel wave; e.g., self-esteem or self-efficacy). The variables controlling

<sup>99</sup> In most cases, this corresponds to the date on which the complementary questionnaire was completed (variable *tXcqdate*). In wave 1, however, the date of the base questionnaire (*tribqdate*) is also relevant in some cases, because the PGMs were partly collected with its paper version.

<sup>100</sup> Formal upper-secondary education programmes are typically completed between April and June (see e.g., for the canton of Zurich: Paragraph 16 of the cantonal regulations on qualification procedures for VET [RQV BBG] of 20 December 2013).

<sup>101</sup> As long as the PGM survey is ongoing, a tailored scaling of the respective items (in analogy with Sacchi & Krebs-Oesch, (2023b)) does not make sense.

<sup>102</sup> It should be noted that this is restricted to a randomised split-half sample; for details see Krebs-Oesch, Sacchi & Jann (2023).

the pre-graduation administration of survey instruments have been collected in the CATI of the respective panel waves: If respondents reported to be in the second-last year of their upper-secondary programme (as defined in footnote 100), a PGM was conducted. However, the original CATI variable used to control pre-graduation administration at the time will not always match the corresponding cleaned variable in the data release.<sup>103</sup> This is why the wave datasets also include the original wave-specific variables used to control pre-graduation administration (variable *tXcqass\_pregraduation*, *X* stands for the wave number). These variables can be used, among other things, to reconstruct additional pre-graduation measurements by drawing on regular yearly measurements of any type.

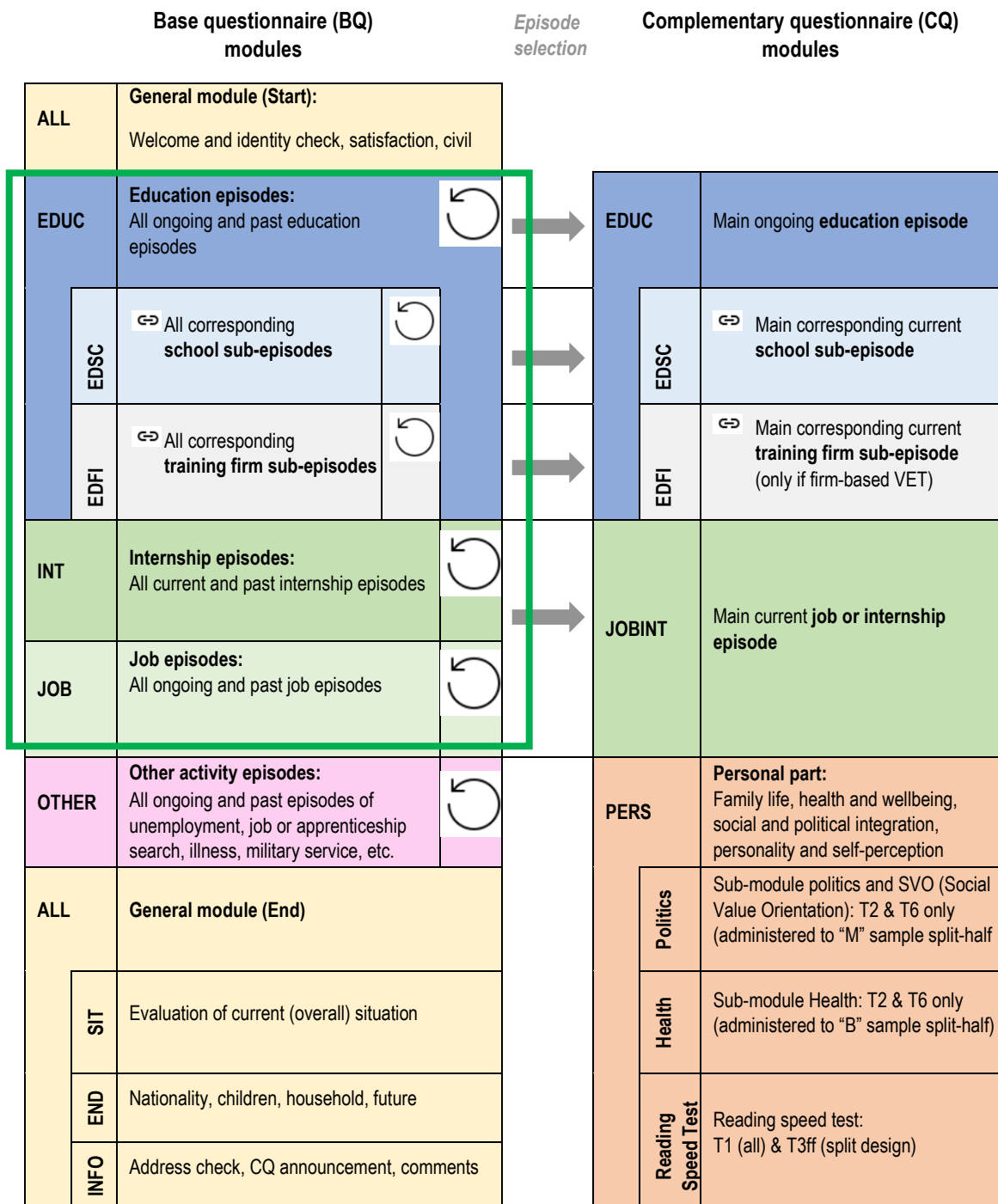
---

<sup>103</sup> The cleaned information on the expected year of completion is contained in the variables *tXedendexp\_\** in the wave data sets (*X* stands for the wave number, *\** for an index of training programmes attended in wave *X*).

## 8.9 Appendix 9: Content of the episode modules in the base questionnaire

As outlined in Sections 5.1 and 5.2, the base questionnaire (BQ) collects key data on education, employment, internship and other activities, along with satisfaction in various life domains as well as socio-demographic data and information on respondents' household and family situation. The main objective of this first part of the TREE questionnaire is to collect a complete and seamless episodic record of all relevant activity spells (episodes) since the last interview.

Figure A8.9.1: Overview structure and modules of the panel waves (episode modules)



- ↔ This symbol indicates that there is a reference to the principal episode from the school and firm sub-episodes.  
 ↻ This symbol indicates that all episodes of a particular type are captured within a module, as many as there are.



This Appendix provides data users with an overview of what episode-related information has been collected (within the green frame in Figure A8.9.1) and describes some selected topics that we consider important to better understand the specifics of the episode data and their structure. The tabular overviews are intended to provide a bridge between the descriptions of the basic questionnaire in Section 5.2 and the further item-related documentation (see technical variable list and codebooks in the 2023 data release; TREE, 2023). For each episode type, the main follow-up-questions are summarised in a table, along with information on the temporal context in which the items were administered (i.e., first-time, recurrent and/or retrospective context; see below). Important filters and sample restrictions are marked in the last column of each table and described in the table footer. For a complete illustration of all the items administered and the references to the waves and contexts, we refer to the technical variable list of the 2023 data release (TREE, 2023) and the links to the codebook entries there.<sup>104</sup>

## A) Education and training module

As shown in Figure A8.9.1 above and outlined in Section 5.2 (Figure 10: Episode types and definition), education episodes contain various elements (including school and training firm sub-episodes). Table A8.9.2 provides an overview of a) the specific items/concepts administered in the education and training module, including the school sub-module; b) if collected items are related to a new, ongoing and/or retrospective episode, and c) where specific filters or sample restrictions apply. The items administered in the training firm sub-module (and thus in the three different types of training firm sub-episodes contract firm, training firm or non-VET training firm) are described in Table A8.9.3.

**Capture of education and training episodes:** In the education module we cover all types of education and training episodes, namely certifying education at upper-secondary or tertiary levels of education, further education and training, school- or firm-based interim solutions for young people who failed to gain direct access to VET programmes, motivation semesters (part of the unemployment scheme) and all kinds of reported courses such as, for instance, language courses or au-pair stays. As far as continuing education courses are concerned, we limit the capture (from panel wave 4 onwards)<sup>105</sup> to courses in which participants have spent a total of at least 40 hours. However, we also collect data on obtained diplomas, so even short episodes (with the technical minimum duration of one month) are recorded if a certificate has been acquired.

<sup>104</sup> However, the exact filters for the base questionnaire items are not mentioned in these documents. Further information on the detailed programming is available on request.

<sup>105</sup> In return, from panel wave 4 onwards, we have added items on the financing of (further) education and training.

Table A8.9.2: BQ education module (including school sub-module): structure and content

		Only in new episodes	ongoing episodes	Retrospective episodes	Sample restriction / Filter
Items/concepts of episode core definition / preload					
Type of education: Principal education episode versus attached education episode (vocational baccalaureate I)	<i>educ_typ</i>	X	[X] <sup>106</sup>	[X]	
Educational programme: type of educational programme, training profession / field of study)	<i>educ_class, edo1ac</i>	X	[X]	[X]	
Start date (month/year)	<i>edum_begin, edny_begin, epim_begin, epiy_begin</i>	X			
End date (month/year)	<i>epim_end, epiy_end</i>			X	
Items/concepts administered in all education episodes (that meet the criteria listed in the columns)					
Information source education	<i>edinfosource</i>	X			a
Organisation of education (with regard to practical part)	<i>sc_fi_presence, fi_prac</i>	X			b
Usual duration, standard duration according to regulations	<i>durareg, duram, duray</i>	X			(d)
Further specification of educational programme (specialisation, profile)	<i>educ_spez, b_educ_spez, e_educ_spez, educ_profile, b_educ_profile, e_educ_profile</i>	X	X	X	
Hours per week spent on self-study / in total	<i>edhself, edhtotal</i>		X	(X) <sup>107</sup>	c
Satisfaction with education and training	<i>sateduc</i>		X		
Year of study/training, repetition of a year	<i>syea, syrep</i>		X		
Expected final year of the educational programme	<i>edendexp</i>		X		
Perceived probability of successful completion	<i>edsuccexp</i>		X		
Expected educational term equivalent to regular duration	<i>duranotreg</i>		X		d
Items/concepts administered at the end of each education episode					
Completion of educational programme	<i>educfincert</i>			X	
Decision / reasons for discontinuing education	<i>edreasend*</i>			X	
Diploma/certificate: type/degree, final grade, number of points, type of evaluation scale and its maximum	<i>certtype, diplnot*, diplpoint*, diploth_a*</i>			X	e
Realised educational term equivalent to regular duration	<i>duranotregfin</i>			X	d,e
Number of attempts to take final examination, repetition planned, final examination attempted	<i>examtrialnbp, exam2, ecamtrial, examtrialnbf</i>			X	
Retrospective evaluation of programme: choose again	<i>certedeval</i>			X	e
Items/concepts administered in attached sub-episodes school					
School code (BER <sup>108</sup> encrypted), including spatial data	<i>sc_cod</i>	X	[X]	[X]	
Start date (month/year)	<i>scm_begin, scy_begin, epim_begin, epiy_begin</i>	X			
End date (month/year)	<i>epim_end, epiy_end</i>			X	
VB1: School for VET diploma and/or vocational bacc.	<i>sc_vmat</i>	X			
Satisfaction with classes at school	<i>satschool</i>		X		f
Hours per week at school	<i>scprh</i>		X	X	
Decision / reasons for discontinuing school	<i>screasend*</i>			X	
Items/concepts administered in attached sub-episodes training firm (>> see Table A8.9.3)					
a) IF educ_class<=29 (interim solutions); b) IF educ_class<=29 OR educ_class >=1000 (interim solutions or “ other “ education and training). Not in the 2023 data release. c) IF educ_class<=29 OR educ_class>=50 (not/outside upper-secondary education) d) IF educ_class>=30 AND educ_class<=43 (standard duration defined only for national upper-secondary education, except for 37,42) e) IF education programme successfully completed f) IF educ_class<39 OR educ_class>41 (not in baccalaureate, upper-sec. specialised school or specialised baccalaureate)					

<sup>106</sup> [X] Here and in the following, X in square brackets marks items that are part of the core definition of an episode and are checked in each wave. They may be corrected retrospectively, but do not vary between waves within the same episode.

<sup>107</sup> (X) Here and in the following, X in round brackets indicates that there may be discrepancies between the items listed.

<sup>108</sup> Swiss Federal Statistical Office (FSO): Business and Enterprise Register (BER).

**Coding of education and training:** Whenever possible, the definition of the episode (*educ\_class*, *edotac*) and the diploma to be obtained (*certtype*) coincide (see Section 5.2 for the core episode definitions). A wide range of variables are provided to classify education or training episodes. They include both national code systems (*educ\_class*, *edotac*, *educ\_spec*<sup>109</sup>) and international classifications such as ISCED<sup>110</sup> levels (ISCED 2011) and ISCED fields (ISCED-F2013). Vocational education and training (VET) programmes are additionally coded according to the Swiss Standard Classification of Occupations (SSCO 2000; CH-ISCO-19) and the International Standard Classification of Occupations (ISCO-08 / ISCO-88) in order to allow, e.g., comparisons to later occupations or job aspirations (*jobat30*).

**Follow-up questions within the education episode:** Some variables that are expected to be stable over time or to be primarily relevant at the beginning of an episode are only administered when an episode is newly captured (*edinfosource*, *dura\**). However, most of the follow-up questions are asked when the episode is still ongoing at the time of the interview, such as satisfaction with education (*sateduc*), the year of study (*syea*) or the repetition of a programme year (*syrep*), the expected final year of the educational programme (*edendexp*) or perceived probability of successful completion (*edsuccexp*).<sup>111</sup>

**Hours spent:** Data on the number of hours per week spent on a programme are collected only if the educational programme is not part of standard (i.e., full-time) upper-secondary education. Data on reported hours are therefore incomplete. Hours spent on these programmes as well as hours in firms/schools are technically relevant insofar as they contribute to determining which type of complementary questionnaire (CQ) respondents will be assigned (see Appendix 8.10 for detail).

**Standard and usual duration:** For all newly captured education and training episodes, we ask for the usual duration of the programme (*duram*, *duray*), which should correspond to the official standard duration (*durareg*) defined for most upper secondary education programmes. Duration of the programme (2, 3 or 4 years) is regulated for each of the approximately 250 VET training occupations as well as for general education programmes.<sup>112</sup> This allows to identify individual deviation from the standard duration of education (*duranotreg*, *duranotrefin*).<sup>113</sup>

<sup>109</sup> The variables *\*educ\_spec\** and *edotac* are helpful to build the “Bildungsart” of the Swiss Federal Statistical Office (FSO), which is the official education classification at the most detailed level.

<sup>110</sup> International Standard Classification of Education.

<sup>111</sup> Note that the largest part of concepts administered for current education and training episodes are found in the complementary questionnaire (see Section 5.3)

<sup>112</sup> Except for the academic baccalaureate, which varies from canton to canton and is therefore not (yet) included in the variable (available on request).

<sup>113</sup> When analysing this information, however, it is important to bear in mind that deviations from the standard duration must always be seen in the overall context of the episode definition. For example, there are individuals in the data who received a federal *VET certificate* (2-year VET programme) after only one year. These are usually individuals who had originally started a 3- or 4-year VET programme with the educational goal of obtaining a federal *VET diploma*, but then had to switch to a lighter 2-year programme (start of a new episode). In such cases, sometimes 1 year of training from the previous programme can be credited to the new programme, so that looking only at a second episode leads to wrong conclusions. The same applies if the 2-year VET programme (standard duration 2 years) is followed by an apprenticeship leading to a federal *VET diploma* (standard duration 3

**Follow-up questions at the end of the episode / diploma:** The education and training episode ends with either a qualification (e.g., receipt of a diploma or certificate) or the end, interruption or discontinuation of the programme. For all these events there is a set of follow-up questions to further clarify their circumstances and reasons (*certtype*, *diplnote*, *edreasend\**, etc.). In the case of programmes leading to more than one qualification, there is an attached education episode (subtype 2) to the principal episode. This is always the case for professional baccalaureate 1, which can be obtained in parallel with a VET programme.

**School sub-episodes:** All schools that are attended in the course of a training programme are captured individually as an episode, regardless of whether they are attended in parallel or consecutively. We capture satisfaction with the school as well as the number of hours of attendance in order to prioritise the schools if there are several. If a school is left before the end of education and training, we collect data on the circumstances and reasons for the discontinuation. On the basis of the schools' location, we also enrich the collected data by matching regional characteristics such as labour market areas, urban/rural typologies, typology of municipality, language region and canton (see page 87 and technical variable list of the 2023 data release).

Table A8.9.3: BQ module education: structure and content of sub-episodes training firm

		Only in new episodes	ongoing episodes	Retrospective episodes	Fibu_typ=1 VET training firm	Fibu_typ=2 VET contract firm	Fibu_typ=3 training firm non-VET
Items/concepts administered in attached sub-episodes training firm							
Type of training firm episode	<i>fibu_typ</i>	X	[X]	[X]	X	X	X
Firm code of training firm (BER encrypted), including information on spatial and firm context	<i>ficobur</i>	X	[X]	[X]	X	X	X
Start date (month/year)	<i>fim_begin</i> , <i>fiy_begin</i> , <i>epim_begin</i> , <i>epiy_begin</i>	X			X	X	X
End date (month/year)	<i>epim_end</i> , <i>epiy_end</i>			X	X	X	X
Information source VET training place	<i>ficinfosource</i>	X				X	
Selection procedure of training firm	<i>ficselectact*</i>	X				X	
Firm or department change planned during VET training, type of change planned	<i>ficorg</i> , <i>ficorgm</i>	X				X	
Training firm identical to firm with VET contract	<i>ficcontract</i>	X			X		
Relation of training firm to the firm with VET contract (if not identical)	<i>fitype</i>	X			X		
Satisfaction with training at training firm	<i>satfirm</i>		X		X		X
Salary (amount, unit, currency, 13th month of pay)	<i>fitsala*</i> , <i>foreign_currency</i>		X			X	X
Change of department within training firm	<i>fisec</i>		X	X	X		X
Working hours per week at training firm	<i>edfib</i>		X	X	X		X
Atypical working hours	<i>fiworkingtime*</i>		X	X	X		X
Decision / reasons to terminate VET contract or discontinue training at firm	<i>ficreasend*</i> , <i>fireasend*</i>			X	X	X	X

or 4 years), which can then – under certain conditions – be shortened by 1 apprenticeship year. In this case, the later episode is shorter than the standard duration of the VET-programme, but the total time to obtain the federal *VET diploma* (both episodes together) is one year longer than the standard duration.

**Training firm sub-episodes:** Table A8.9.3 shows which items are administered in the firm-type episodes. As described in Section 5.2, there are three different firm sub-episodes that can be linked to a principal education episode. Note that VET contract firm episodes are technically nested within an education episode (mapped by referencing them to the principal education episode), and VET training firms are nested within a VET contract firm episode. This allows us to inquire, at the appropriate (sub-)episode level about the circumstances and, if applicable, the reasons for an interruption or dropout whenever it occurs (*edreasend\** if the education episode is interrupted at the same time, *ficreasend\** if the episode with the contract firm ends, *fireasend\** if only the (practical) training firm ends/changes). The third sub-type, “training company (non-VET)”, refers to training that is not part of a standard dual VET programme, but which nevertheless includes work placements in training companies as an integral part of the training. Despite the varying training firm context, we strive to parallelise the respective items (satisfaction with the company, working hours or wages) as much as possible.

**Firm and regional characteristics:** Based on the SFO’s Business and Enterprise Register (BER),<sup>114</sup> the data are further enriched with register data covering firm characteristics such as firm size, branch, legal form. Furthermore, regional characteristics (e.g., labour market area, urban/rural, typology of municipality, language region, canton) are derived from SFO’s socio-spatial register data and matched by the location (municipality) of the firm.<sup>115</sup>

## B) job/internship module

Table A8.9.2 provides an overview of the specific items/concepts administered in the job/internship module, if collected items are related to a new, ongoing and/or retrospective episode, and where specific filters or sample restrictions apply.

**Jobs and internships:** Although jobs and internships represent different episode types in the data<sup>116</sup>, they are implemented and captured in the same base questionnaire module. They are identical with a few exceptions: type of internship and expected duration are only administered for internships (*predurc*, *preduzc*, *prac\_dura*, not shown in Table 8.9.2). Contrariwise, items related to fixed-term employment, reasons for terminating a job, supervisory function or on-call work are only administered for jobs, as they are very unlikely to be relevant for internships. It’s also worth noting that the episode type internship exclusively refers to spells of internships that take place independently of any formal training. Internships that are required to complete an education programme and to obtain a degree are captured in the education module as a non-VET training firm sub-episode (*fibu\_typ=2*).

<sup>114</sup> Business and Enterprise Register (BER), managed by the Swiss Federal Statistical Office (FSO).

See <https://www.bfs.admin.ch/bfs/en/home/registers/enterprise-register/business-enterprise-register.html>.

<sup>115</sup> See <https://www.bfs.admin.ch/bfs/en/home/statistics/cross-sectional-topics/regional-analyses/spatial-divisions.html>.

<sup>116</sup> In the data, internships are marked by the variable prefix ‘p’.

Table A8.9.4: BQ modules job and internship: structure and content

		Only in new episodes	ongoing episodes	retrospective episodes	Sample restriction / Filter
Items/concepts of episode core definition / preload					
Occupation (codes)	<i>jobac, jobsnb, job_isco*, job_isei</i>	X	[X]	[X]	
Firm code (BER encrypted), including information on spatial and firm context	<i>cobur</i>	X	[X]	[X]	
Start date (month/year)	<i>jobm_begin, joby_begin, epim_begin, epiy_begin</i>	X			
End date (month/year)	<i>epim_end, epiy_end</i>			X	
Items/concepts administered in all job-episodes (that meet the criteria listed in the columns)					
Information source job opening	<i>jobinfosource</i>	X			
Type of employment relationship	<i>jobs, pracs</i>		X	X	
Working hours	<i>jobh</i>		X	X	
Level of employment	<i>jobgradcat, jobgrad</i>		X	(X)	
Contractual working hours	<i>joconh</i>		X		
Atypical working hours	<i>jworkingtime*</i>		X		
Work on call	<i>jbflex</i>		X		b
Satisfaction with job	<i>satjob</i>		X		
Fixed-term employment (incl. type and expiry date)	<i>jobt, jobt3, jobt4, jobtx*</i>		X		b, (a)
Supervisory function (subordinates, member of the board) currently	<i>jpos3, jpos3a, jposlev</i>		X		a
at the beginning of the job	<i>jpos3_init, jpos3a_init, jposlev_init</i>	X			
at the end of the job	<i>jpos3_end, jpos3a_end, jposlev_end</i>			X	e
Salary (amount, unit, currency, 13th month of pay) currently	<i>sala*, foreign_currency</i>		X		
at the beginning of the job	<i>sala_init_eq, sala*_init</i>	X			
Reason for job end	<i>jobreasend</i>			X	
Items/concepts administered only for the main job/internship episode (in the end-module of the BQ-questionnaire)					
Educational requirements (level), specificity of skills required, instruction period required, Qualification match (vertical)	<i>jreq_cert, jreqcerttype, jreqcertspec, jreqnstr, jqualmtchv</i>		X		c
... only if person has completed sec-II-education-level					
Job match with education (horizontal), reason for not working in domain trained for	<i>jskmtch / jskmtch3</i>		X		c,d
Usefulness of previous education for job / usefulness of things learned at school / at training firm / at branch courses for current job (questions referenced to specific diplomas)	<i>jedevalprep, jedeval*, jedeval_cert_epinr</i>		X		c,d

a) not administered if mini-job (*jobgradcat*=3);b) not administered if self-employed (*jobs* =3,4);

c) administered only for the main (substantial) job episode according to the selection criteria described in Appendix 8.10)

d) administered only if education at upper secondary level has been completed;

e) only if job duration &gt;6 months

**Capture of job episodes:** In the job module, we basically capture all employment episodes according to the standards of the International Labour Organisation (ILO; see also Appendix 8.6). This includes employed or self-employed work (full-time or part-time), employment programmes for (re)integration into the labour market and work in family enterprises. Jobs are treated as continuous even in the case of temporary absences, e.g., due to illness, holidays, maternity leave, military service, etc. It should also be noted that, contrary to ILO standards, we do not classify firm-based “dual” VET as a job (episode), even though VET trainees work in their training firm. As the VET system is an integral part of the Swiss education system at upper-secondary level, VET episodes are classified as education episodes within the education module.

**Firm and regional characteristics:** Based on the SFO’s Business and Enterprise Register (BER),<sup>117</sup> the data are further enriched with register data covering firm characteristics such as firm size, branch, legal form). Furthermore, regional characteristics (e.g., labour market area, urban/rural, typology of municipality, language region, canton) are derived from SFO’s socio-spatial register data and matched by the location (municipality) of the firm.<sup>118</sup>

**Initial wage and initial/final position:** In addition to the wave-specific questions on current wage (*sala\**) and job position (*jpos\**, e.g., number of subordinates/supervisory function), the initial wage (*sala\*\_init*) and initial position (*jpos\*\_init*) are captured when the episode is first recorded. In addition, the position at the end of the job (*jpos\*\_end*) is captured retrospectively if the episode lasted more than 6 months. This survey strategy provides a broader basis for the analysis of virtually all jobs, even if they fall between survey periods.

**Restricted information for low-hour jobs:** In order to keep the survey burden on respondents at an acceptable level, low-hour jobs (i.e., jobs with less than 8 working hours per week according to *jobgradcat*.) are captured with a restricted number of job specification items.<sup>119</sup> In addition, some other items are not administered for second jobs, even if the hours per week are higher than 8 hours (see immediately below).

**Items administered only for main jobs/internships:** All items on job requirements (*jreq\**), job-skills match (*jskmtch*) and the assessment of the usefulness of acquired skills (*jedeval\**) are administered only for the current main job/internship (see Appendix 8.10 for a description of how job episodes are prioritised). For technical reasons (selection of the main episode and cross-referencing to education episodes, see below), these items are only captured after the complete recording of all episodes and thus outside the episode module, but are still linked to the specific (main) episode.

<sup>117</sup> Business and Enterprise Register (BER), managed by the Swiss Federal Statistical Office (FSO).

See <https://www.bfs.admin.ch/bfs/en/home/registers/enterprise-register/business-enterprise-register.html>

<sup>118</sup> See <https://www.bfs.admin.ch/bfs/en/home/statistics/cross-sectional-topics/regional-analyses/spatial-divisions.html>.

<sup>119</sup> E.g., type of fixed-term contract or supervisory function; see Table A8.9.4.

### Reference to specific diplomas when assessing the usefulness of previous education for the job:

Items assessing the usefulness of acquired skills for the current job (*jedevalprep*, *jedeval*) are referring to specific upper-secondary education diplomas previously obtained. In the 2023 data release, the reference to the respective education episode is captured in the variable *jedeval\_cert\_epinr*.<sup>120</sup>

## C) Other activity module

Table A8.9.5 provides an overview of the specific items/concepts administered in the Other Activities module, if collected items are related to a new, ongoing and/or retrospective episode, and where specific filters or sample restrictions apply.

**Capture of other activity episodes:** Whether an episode is captured depends on the type of activity. Most of the other activities are actively captured (e.g., “Did you at any time since [*dateLastInterview*] actively search for an apprenticeship place? .... a job? ....” etc.). Some sub-types such as “vacation” or “no activity/information” are only passively captured, as categories to fill a gap in the gap check (variables *ntyp7*, *ntyp9*, *ntyp16*). Some sub-types (military service, illness, maternity /paternity leave; variables *ntyp10*, *ntyp15*, *ntyp17*) are only actively captured as of panel wave 3. However, their capture is limited to activities that of at least one month’s duration (see notes below Table A8.9.5 for details).

Only a few of the other activity episode types have follow-up questions:

**(Registered) unemployment:** For episodes representing registered unemployment (*ntyp1*), we capture the degree (percentage) of being registered as unemployed,<sup>121</sup> participation in and type of programme funded by the unemployment insurance scheme, current receipt of unemployment benefits and the reason for the end of previous unemployment spells (e.g., found a job). Contrary to registered unemployment episodes, episodes capturing a subjective measure of unemployment (see *ntyp21* in Table 8.9.5) do not entail any follow-up questions.

**Search episodes for jobs or apprenticeships:** Job search episodes and apprenticeship search episodes are structured in a similar way. In addition to the duration, resulting from the start and end of the search episode, we also ask about the number of jobs or apprenticeship places (firms) applied for, the types of search activities and the number of interview invitations. In the case of apprenticeships, we also ask about the type of apprenticeship and the VET occupation mainly searched for, so that it can be compared with later education episodes or even jobs by using the same coding system (e.g., ISCO).

<sup>120</sup> The same reference is also relevant for the CQ items *jedevaldet1-jedevaldet9*.

<sup>121</sup> In Switzerland, one can be in “part-time” unregistered unemployment.



Table A8.9.5: BQ module other activity types: episode structure and content

		Only in new episodes	ongoing episodes	Retrospectiv e episodes	Sample restriction / Filter
Items/concepts of episode core definition / preload					
Type of other activity/situation	<i>ntyp</i>	X	[X]	[X]	
Start date (month/year)	<i>neetm_begin*, neety_begin*, epim_begin, epiy_begin</i>	X			
End date (month/year)	<i>epim_end, epiy_end</i>			X	
Items/concepts administered in the other activity type episodes (that meet the criteria listed in the columns)					
<b>Other activity type: search for an apprenticeship place</b>	<b><i>ntyp18</i></b>	<b>X</b>			
Primarily searched VET-type: certificate versus diploma	<i>appsearchtype</i>		X	X	
Primarily searched VET occupation	<i>appsearchocc</i>		X	X	
Number of different VET occupations searched	<i>appsearchocnb</i>		X	X	
Apprenticeship search activities	<i>appsearchact*</i>		X	X	
Number of training firms applied to for an apprenticeship	<i>appsearchappnb</i>		X	X	g
Number of invitations to interview from training firms	<i>appsearchhintnb</i>		X	X	g
Reason for the end of apprenticeship search	<i>appsearchstopreas</i>			X	
<b>Other activity type: search for employment</b>	<b><i>ntyp2</i></b>	<b>X</b>			
Type of job searched: job or internship	<i>jsearchrange</i>		X	X	h
Type of job searched: full/part time (3-level)	<i>jsearchtype</i>		X	X	
Job search activities	<i>jsearchact*</i>		X	X	f
Number of jobs applied for	<i>jsearchappnb</i>		X	X	g
Number of invitations to job interview	<i>jsearchhintnb</i>		X	X	g
Availability to start working	<i>jsearchav</i>		X	X	i
Number of job offers received during this job search	<i>jsearchsuccess</i>		X	X	f,h
Reason for the end of job search	<i>jsearchstopreas</i>			X	f
<b>Other activity type: registered as unemployed</b>	<b><i>ntyp1</i></b>	<b>X</b>			
Degree (percentage) registered as unemployed	<i>neet1rh</i>		X	X	
Participation in programme funded by the unemployment insurance scheme, type of programme	<i>neet1lmm, neet1lmmtype</i>		X	X	
Unemployment payments: received last month / amount	<i>neet1salaq, neet1salaam</i>		X	(X)	e
Reason for end of registration as unemployed	<i>neet1endreas</i>		X	X	
<b>Other activity type: military service</b>	<b><i>ntyp10</i></b>	<b>X</b>			a,b
<b>Other activity type: illness</b>	<b><i>ntyp15</i></b>	<b>X</b>			a,b
<b>Other activity type: maternity / paternity leave</b>	<b><i>ntyp17</i></b>	<b>X</b>			a,b
<b>Other activity type: mainly childcare</b>	<b><i>ntyp5</i></b>	<b>X</b>			c
<b>Other activity type: unemployed</b>	<b><i>ntyp21</i></b>	<b>X</b>			
<b>Other activity type: on vacation</b>	<b><i>ntyp7</i></b>	<b>X</b>			d
<b>Other activity type: other</b>	<b><i>ntyp9</i></b>	<b>X</b>			d
<b>Other activity type: gap (missing information)</b>	<b><i>ntyp16</i></b>	<b>X</b>			d

- a) Only actively asked from panel wave 3 onwards, capture limited to phases that actually lasted at least one month. Before wave 3: Only (passively) asked in the gap check module, i.e., if there is an information gap of 1 month or more in the data
- c) Only actively asked from panel wave 2 onwards, only asked if *childyn*=1
- d) Only (passively) asked in the gap check module, i.e., if there is an information gap of 1 month or more in the data.
- e) Retro: only if interview month = current month
- f) Only if looking for a full-time job or part-time job of at least 8 hours per week searched (IF *jsearchtype*<>3)
- g) Only if actively applied for jobs (IF *jsearchact*7=1 OR *jsearchact*8=1; IF *appsearchact*7 =1 OR *appsearchact* 8=1)
- h) Only administered from t3 onwards
- i) Collected within search episode in panel waves 1 and 2; as of wave 3: administered outside the episode module (variable *t3njhan*)

## 8.10 Appendix 10: Rules of assignment of complementary questionnaires

The individualised assignment of the complementary questionnaire is geared to collecting, in the CQ, further in-depth data on the main education and/or employment/internship episode that respondents report in the base questionnaire (BQ). If respondents report more than one education or job/internship spell, the main education episode is selected by drawing on the classification of attended educational programmes (*educ\_class*, see table A8.10.3), while the main employment or internship episode relies on the number of weekly working hours (*jobh\_efb*, see table D).<sup>122</sup>

Selection of the main (ongoing) episode among the following groups:

- Employment and/or internship episodes
- Education episodes
- School sub-episode (related to an education)
- VET training firm sub-episode (related to an education)

The most important episode of each group is included in the following five complementary questionnaire types:

CQ type 1: Education, School, Personal (EDUC\_PERS)

CQ type 2: Education, School, Firm, Personal (EDUC\_FI\_PERS)

CQ type 3: Job/Internship, Personal (JOBINT\_PERS)

CQ type 4: Education, School, Job/Internship, Personal (EDUC\_JOBINT\_PERS)

CQ type 5: Personal (PERS)

### 1st step: Identify the main current episode per group

In this step, the main (ongoing) episode is determined for each group. If the respondent specifies only one episode per group, this episode is used. However, if the person indicates several activities per group (e.g., one internship and two jobs), the most important activity must be defined. After this first consolidation, a maximum of one education (with one school and/or one VET training firm, if any) and/or one employment/internship per respondent is selected.

Table A8.10.1: Criteria to define the main activity per group

Episode type	Criteria
Employment / internship	<ul style="list-style-type: none"> <li>- If there is only one job / internship, this is selected.</li> <li>- If several jobs / internships: Job with the most hours (<i>jobh_efb</i>, see table A8.10.4, missing (&lt;0) is not considered).</li> <li>- If several jobs / internships have the same number of hours (<i>jobh_efb</i>): the job with the most recent start date will be selected (missing (&lt;0) is not considered).</li> <li>- If several jobs have the same start date: the first-named job will be selected (missing (&lt;0) is not considered).</li> <li>- several jobs / internship that only specified missings (&lt;0): no job</li> </ul>

<sup>122</sup> The variable names specified in this appendix correspond to those in the datasets of the published TREE2 data (TREE, 2023).

Episode type	Criteria
Education (principal episode)	<ul style="list-style-type: none"> <li>- If there is only one education, this is selected.</li> <li>- If there is more than one education, the most important education is determined according to <i>educ_class</i> ranking. (Ranking selection from top to bottom, see table A8.10.3):</li> <li>- Education with highest ranking in block 1 is selected.</li> <li>- If none of this education is in block 1, but all are in block 2, the education with the most hours is selected (<i>edhtotal</i>).</li> <li>- If all these educations have the same number of hours, the most important education is selected according to <i>educ_class</i> ranking in block 2.</li> <li>- If there is more than one education with the same <i>educ_class</i>: first mentioned is selected.</li> </ul>
School (sub-episode)	<ul style="list-style-type: none"> <li>- If there is only one school, this is selected.</li> <li>- If there are several schools: School with the most hours (<i>scprh</i>)</li> <li>- Several schools with the same hours: first named school is selected.</li> </ul>
Training Firm (sub-episode)	<ul style="list-style-type: none"> <li>- If there is only one firm of <i>fibu_typ</i>=1 or <i>fibu_typ</i>=3: this is selected.</li> <li>- If there are several training firms of <i>fibu_typ</i>=1 or <i>fibu_typ</i>=3: firm with the most hours is selected (<i>edfih</i>)</li> <li>- Several firms with the same hours: first named firm is selected</li> <li>- No training firm <i>fibu_typ</i>=1 or <i>fibu_typ</i>=3: if firm <i>fibu_typ</i>=2 exists, this is selected</li> </ul>

## 2nd step: Assignment of the complementary questionnaire

Since several of the same activity types were reduced to one in the first step, the allocation is now based on a maximum of two main activities (education and job/internship). Table A8.10.2 shows the algorithm to composite the 5 CQ types.

Table A8.10.2: Composition of CQ types

Criteria	Complementary Questionnaire	EDUC_PERS	EDUC_FI_PERS	JOBINT_PERS	EDUC_JOBINT_PERS	PERS
<b>IF Education:</b>						
	Module Education					
	+ sub-module school					
<b>IF training firm:</b>						
	+ sub-module firm					
<b>ELSE IF Job / Internship and jobh_efb&gt;=8:</b>						
	+ Module Job / Internship					
<b>ENDIF</b>						
	+ Module Person					
<b>ELSE IF Job / Internship and jobh_efb&gt;=8:</b>						
	Module Job / Internship					
	+ Module Person					
<b>ELSE</b>						
	Module Person					
<b>ENDIF</b>						

Table Table A8.10.3: Ranking order of education activities (variable *educ\_class*)

Code (educ_class)	Description of programme
<b>BLOCK 1</b>	
203	Doctoral degree / PhD [university / Federal Institute of Technology]
700	Admission to the bar / notary license (additional non-university certification for barristers and notaries)
701	Federal exams for university-based medical occupations (MedBG)
702	Medical specialist qualification
750	Other postgraduate specialisation
202	Master's degree [university / Federal Institute of Technology]
302	Master's degree [university of applied sciences]
402	Master's degree [university of teacher education]
222	Post-diploma MAS / eMBA [university / Federal Institute of Technology]
322	Post-diploma MAS / eMBA [university of applied sciences]
422	Post-diploma MAS / eMBA [university of teacher education]
221	Post-diploma DAS [university / Federal Institute of Technology]
321	Post-diploma DAS [university of applied sciences]
421	Post-diploma DAS [university of teacher education]
220	Post-diploma CAS [university / Federal Institute of Technology]
320	Post-diploma CAS [university of applied sciences]
420	Post-diploma CAS [university of teacher education]
223	Post-diploma other [university / Federal Institute of Technology]
323	Post-diploma other [university of applied sciences]
423	Post-diploma other [university of teacher education]
201	Bachelor's degree [university / Federal Institute of Technology]
301	Bachelor's degree [university of applied sciences]
401	Bachelor's degree [university of teacher education]
250	Other diploma [university / Federal Institute of Technology]
350	Other diploma [university of applied sciences]
450	Other diploma [university of teacher education]
121	Advanced federal diploma of higher education
120	Federal diploma of higher education
101	Post-diploma studies [college of higher education]
102	Post-diploma course of professional education [college of higher education]
110	Other diploma [college of higher education]
131	Post-diploma studies of professional education (not regulated by the Vocational and Professional Education and Training Act)
132	Post-diploma course of professional education (not regulated by the Vocational and Professional Education and Training Act)
150	Professional education [tertiary level]: non-specific, other
100	Advanced Federal Diploma of Higher Education [college of higher education]
130	Diploma of professional education (not regulated by the Vocational and Professional Education and Training Act)
70	Passerelle federal vocational baccalaureate - university (supplementary examination UAT)
71	Passerelle specialised baccalaureate – university (supplementary examination UAT)
39	Baccalaureate (high-school, college, etc.)
41	Specialised baccalaureate
40	Upper-secondary specialised school – specialised school diploma
50	International Baccalaureate (IB)
42	German-speaking Switzerland: Integrative upper-secondary school Rudolf Steiner (Waldorf school)
43	Ticino: Cantonal baccalaureate in commerce and business + federal VET diploma (cantonal high school of commerce)
36	Upper-secondary health school (VET diploma with / without FVB)
35	Upper-secondary IT school (VET diploma with / without FVB)
34	Upper-secondary commercial / business school (VET diploma with / without FVB)
31	3–4-year full-time school-based vocational education and training (VET diploma with / without FVB) at (another) vocational school / vocational training centre
30	3–4-year firm-based vocational education and training (VET diploma with / without FVB) (training contract with a firm or training network)
38	Federal vocational baccalaureate 2 (FVB 2), after completing a federal VET diploma
33	2-year full-time school-based vocational education and training at a vocational school / vocational training centre
32	2-year firm-based vocational education and training (training contract with a firm or training network)
16	Motivation semester
15	Social year (Sozialjahr)
14	Housekeeping training year
12	10th language school year / school exchange year (in a foreign-language region)
11	10th school year (12th year HarmoS) / one-year preparatory programme for choice of occupation / VET, integration year (for recently immigrated youths with insufficient command of the native language), preparation for upper-secondary school etc.

Code (educ_class)	Description of programme
10	Pre-apprenticeship
<b>BLOCK 2</b>	
210	further education and training course [university / Federal Institute of Technology]
310	Further education and training course [university of applied sciences]
410	further education and training course [university of teacher education]
1000	Office administration diploma / commercial diploma (Swiss Association of Commercial Schools [VSH])
17	Preparatory course
1010	Preparatory course
29	Other bridge-year programmes / interim solutions
9000	Other education / further education and training / course
1040	Language course
1050	Computer course
1020	Language stay / language course or language school (in a different language region)
13	Au pair / language stay
1030	Au pair
2000	other firm-based education, further education and training

*Table A8.10.4: Module employment: assignment of hours jobh\_efb*

The criterion *jobh\_efb*  $\geq$  8 hours (working hours per week in a job / internship) must be fulfilled to assign the CQ module job/internship. In order to obtain information for each episode, the variable *jobh\_efb* is filled with valid information from several variables if the standard information on normal working hours is missing. The variable *jobh\_efb* is created from the following information in descending order: normal working hours (*jobh*), contractual working hours (*joconh*), minimum working hours in the absence of a fixed level of employment (*jobhmin*), 8.1 hours if working part-time but more than 8 hours (*jobgradcat*=2), 40.1 hours if working full-time (*jobgradcat*=1).

```

IF jobh $\geq$ 8
                                SET jobh_efb=jobh
ELSEIF joconh $\geq$ 8
                                SET jobh_efb=joconh
ELSEIF jobhmin $\geq$ 8
                                SET jobh_efb=jobhmin
ELSEIF jobh_efb=jobgradcat=2
                                SET jobh_efb=8,1
ELSEIF jobgradcat=1
                                SET jobh_efb=40,1
ELSE
                                SET jobh_efb=jobh
ENDIF

```

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