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Ralf Künster

TrueTales View–Manual.
A Tool to Visualize Life Course Data
Using the Scientific Use Files of the
National Educational Panel Study NEPS,
Starting Cohort 6 – Adults

Discussion Paper

Abstract

TrueTales View is an application to visualize life courses. The tool accomplishes this in two different ways: individual life courses are displayed as bar charts and aggregated life courses are plotted as state distribution charts. The article describes the functionality and the options of TrueTales View using the example of the life course data of NEPS starting cohort 6 (adults).

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Introduction

TrueTales View is a MS Access database application for graphically representing life course data. The author developed the first version of this application in 2002 at the Max–Planck–Institute for Human Development Berlin in the context of the German Life History Study.

Since then, TrueTales View has been advanced and used in several other longitudinal surveys, including the COCON study (Jacobs Center, Zurich), the 2006 transition study of the BIBB (Federal Institute of Occupational Education, Bonn), the ALWA survey (Institute for Employment Research IAB, Nurnberg), the "The Entwined Life Courses of Academic Couples" survey (Berlin Social Science Center WZB), and, since 2011, the National Educational Panel Study NEPS (Leibniz Institute for Educational Trajectories LIfBi). In these surveys, the TrueTales View's form of visualizing life courses has been used for various purposes: as part of a data collection instrument, as a data edition tool, and as a graphical information system, as in NEPS.

TrueTales View visualizes life courses in two different ways:
On the one hand, the program represents individual life courses graphically and in tabular form (*Figure 1*). To this end, the application offers the opportunity to select individual cases and case groups based on respondent properties. Additional functions expand the information content and the interpretability of the diagram, as for example the option to change the timeline reference from historical time to age. A German language version has been implemented as well.

Figure 1:   Example of the graphical representation of an individual life course
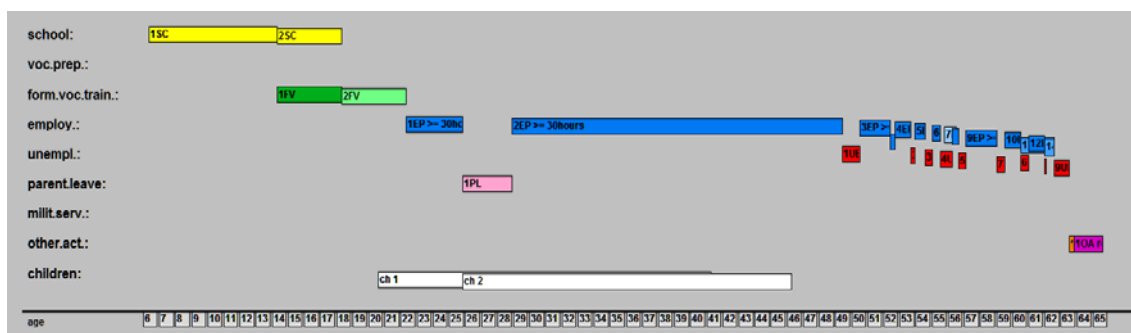
The individual case representation conveys an impression of the complexity and diversity of standardized collected life courses. By contemplating individual life courses, one discovers variations of typical life course patterns, which supports the development of hypotheses about interactions between events and phases of life. In several surveys, this tool has been used to select cases for subsequent qualitative interviews and as a source of information for interviewers in qualitative interviews. In other surveys, this type of representation has been used to edit life courses.

On the other hand, TrueTales View generates time–varying state distribution plots for selected groups and various time contexts (*Figure 2*).

Figure 2: State distribution plot of the men of NEPS starting cohort 6
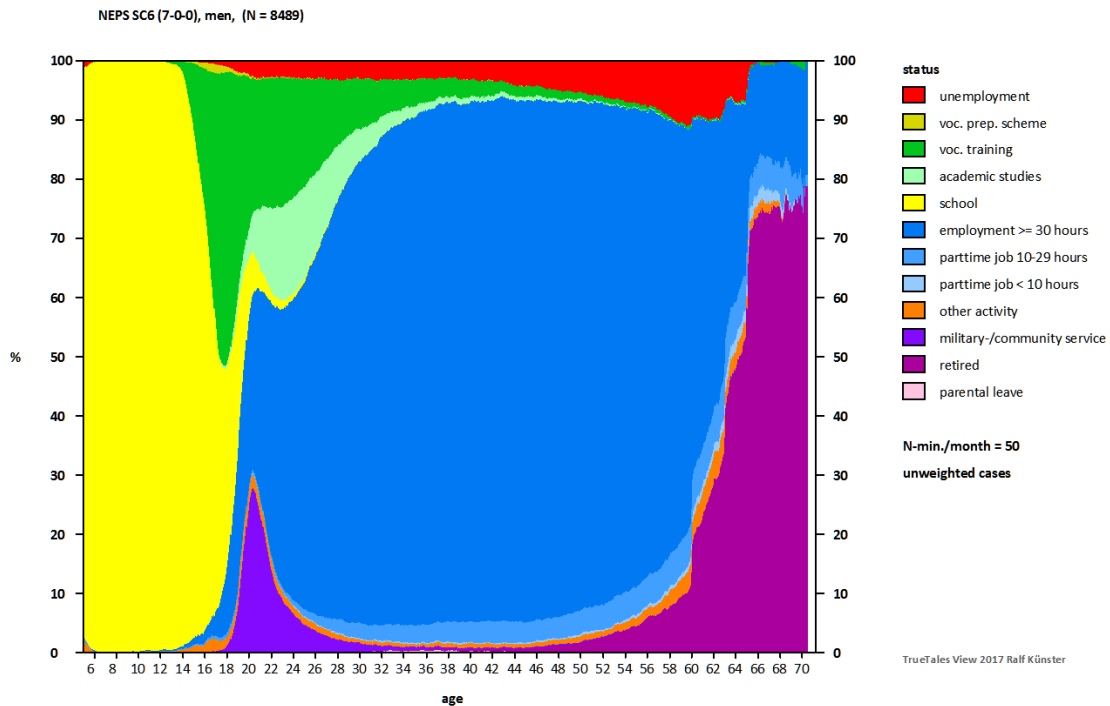
State distribution plots retrace the time–varying activity distribution of groups of respondents. Thereby it is possible to illustrate differences between groups, age, period, and cohort effects, as well as the influence of individual events on life courses and to follow–up problems such as:

- How does the activity distribution within the educational and occupational careers of a group change with increasing age?
- How does the birth of a child, a divorce, or long–term unemployment affect the life courses of a group?
- How does a historical event affect the life courses of respondents with different properties?
- How do respondent groups react differently to the same event occurring to them?

Database

For this manual, the scientific use file of waves 1 to 7 of NEPS starting cohort 6 – adults (NEPS SC6, doi:10.5157/NEPS:SC6:7.0.0, published 22 December 2016) were used. The survey contains the life courses of 17,140 persons. At the interview date, the respondents were aged 23 to 71 years.

Life courses were collected as separate episodes, that is, the start and end dates of each educational and occupational state (activity type) reported by the respondent were collected with monthly precision. The episodes of a life course were not collected in chronological order (sequential episode recording) but by different activity types, such as school episodes, vocational preparation schemes, vocational training, military and civil service, employment, unemployment, child care periods, and other activities (modular episode recording). By collecting life courses in a modular manner, simultaneous episodes are also included systematically.

Generally, life courses start with primary school enrollment and last until retirement age, depending on the respondent's age. A considerable amount of information was collected concerning the episodes, including, for instance, occupational status and various measures of salary and work hours for job episodes. Additionally, extensive cross-sectional and panel information is available for our respondents. This additional information is partly displayed by the tool.

System requirements and starting the application

The TrueTales program file (in the current program version for NEPS SC6, the program file name is „TrueTales_View_NEPS_SUF_SC6_D_7-0-0_20170102.mde") includes the program and the data of respondents. The file is a Microsoft Access database file. For running it, Microsoft Access (MS Office package 2010) must be installed on the computer used to run the program.
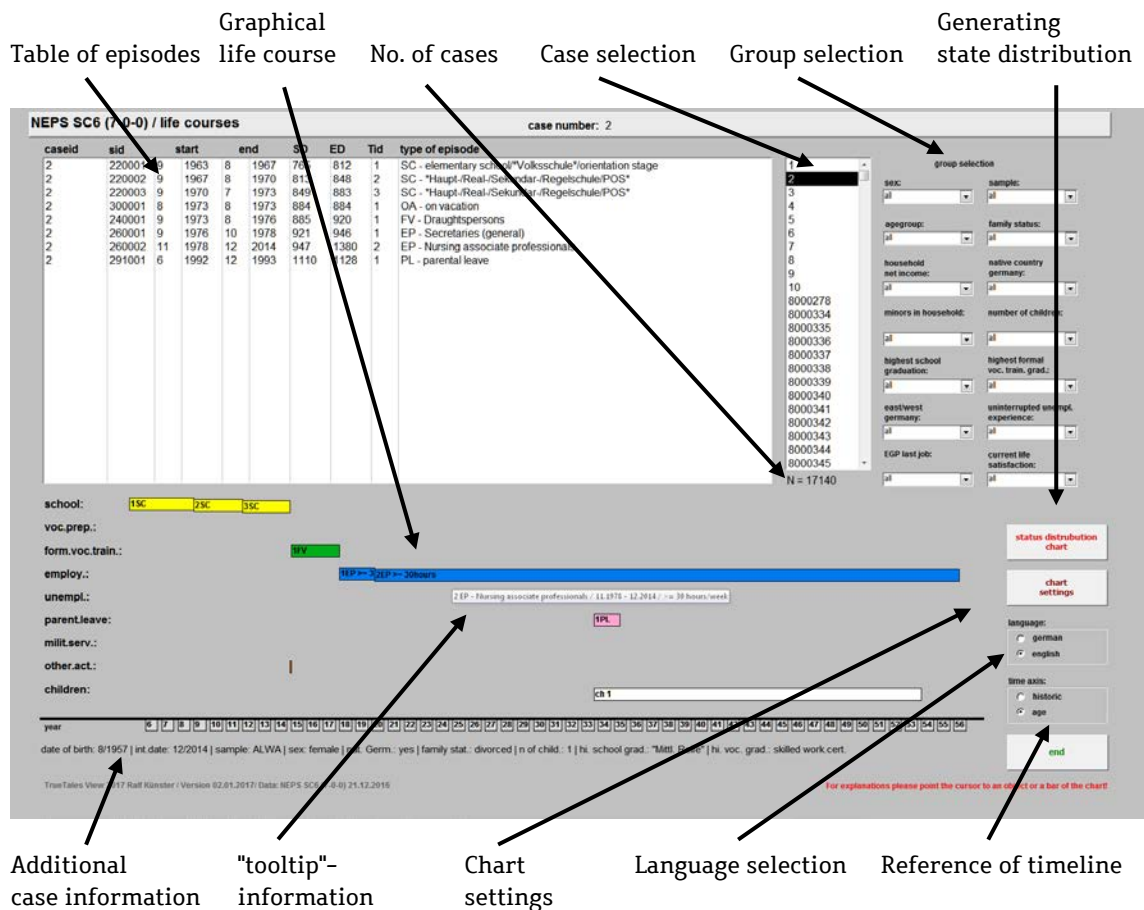
The program starts by double-clicking on the above-mentioned program file in Windows Explorer.

Functionality and handling of TrueTales View

After starting the tool, the menu for representing individual life courses is activated automatically (*Figure 3*).

Figure 3: Visualizing individual life courses

The menu is divided into two sections: The left side of the screen is used to display the case information; the right side is reserved for elements to control the program.

The left screen divides into a section for tabular representation and a section for graphical representation of an individual case, as well as a line containing additional details about the selected case.

Tabular representation of individual cases

The tabular part consists of a list of all episodes in the educational and occupational career of a given case. The episodes are sorted in temporal order. The different episode types are: general schooling system (SC), educational preparation

schemes (VP), formal vocational trainings (FT); employment (EP), unemployment (UE), parental leave (PL), military, civil and voluntary service (MS), other activities and retirement episodes (OA), and unreported activities (NR).

A list of acronyms of the episode types and their meaning can be displayed by positioning the mouse pointer on the text "type of episodes" above the table (*Figure 4*). This form of context-specific information, called "tooltip," is available for nearly all objects of the menu and the graphic.

Figure 4: Tabular representation of a life course

Context description for type of episode

For each episode, the following attributes are denoted:

Caseid: case number

Sid: general episode identification number

start: start date of the episode

end: end date of the episode

SD: number of months elapsed between January 1900 and the start date

ED: number of months elapsed between January 1900 and the end date

Tid: episode-specific identification number

type of episode: description of the type of episode (e.g., for employment and vocational training the classification of occupations of the Federal Employment Agency (KldB) and for school episodes the type of school and school degree)

There are some episodes in the table that could not be displayed in the graphical chart due to missing values in the date variables.

Graphical representation of individual life courses

The graphical representation of life courses is in the form of bar charts that plot the episodes, separated by the episode types, along a historical or age timeline (*Figure 5*).

Each episode type is shown in a distinct color. Differentiation within an episode type is displayed by gradation brightness of these colors (e.g., for occupational episodes: full-time, part-time, and marginal job; for training: academic training and vocational training). Retirement episodes are an exception to this rule: Although they belong to the orange-colored type of "other activities," they are displayed in purple to be more easily recognizable.

The bars within an episode type are shown slightly below the previous bar, controlled by their episode number. Thus concurrent episodes within an episode type cannot overlap completely (e.g., multiple concurrent employment episodes)

Figure 5: Detail from a graphical representation of a life course
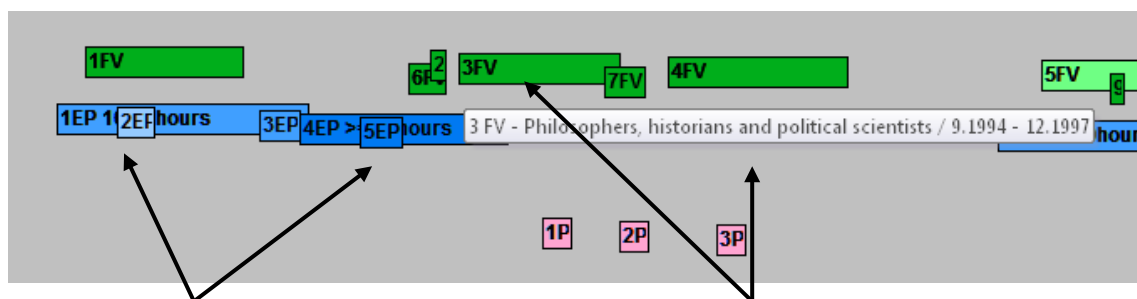
Parallel occupational episodes   Additional episode information ("tooltip")

When the mouse pointer is positioned on a bar of the plot, additional information ("tooltip") is automatically displayed for the episode represented by the bar.

In addition to educational and occupational careers, the bar chart illustrates periods of living with children (biological, adopted, or foster children). Biological children are drawn in white; adopted or foster children in pink.

The timeline reference can be switched between "historical" time and "age" using the radio buttons.

The language switch can be used to switch between German and English.

Information line

The information line below the timeline delivers additional details about the selected case:

- date of birth
- date of last interview
- sample membership
- sex
- born in Germany
- current marital status
- number of children (biological, adopted, or foster children)
- highest school degree
- highest academic or vocational training degree

Case selection

Cases are selected by marking a case number in the case selection list. The list has a vertical sliding ledge for scrolling to any desired case with the mouse or the arrow keys on the keyboard.

Group selection

Fourteen drop-down menus, situated to the right of the case selection list, provide the option to select case groups based on different respondent's properties. The specified properties are:

- sex
- sample membership
- age (grouped)
- current marital status
- current household net income (grouped)
- born in Germany
- current minor children in household
- number of biological, adopted, or foster children (grouped)
- highest school degree
- highest academic or vocational training degree
- currently living in East or West Germany

- unemployment experiences
- Erikson–Goldthorpe–Portocarero classification (EGP) of the current or last job
- current life satisfaction (grouped)

The group selection has an immediate impact on the number of cases available in the case selection list. The selection also determines the cases included in the calculation of the state distribution charts. The number of selected cases is displayed below the case selection list. The group selection via drop–down menus is additive, meaning that each selected option further reduces the number of cases.

Generating state distribution charts

State distribution charts show the temporal changes of the state composition (or the percentage activity distribution) of a selected group along a timeline for each point of time of the period under observation. For creating a state distribution chart, it is required that each person can be assigned to a unique state, or nor state at all, in the period under observation. Thus individuals shouldn't have more than one state at the same time. To take care of this, TrueTales View converts the life course data into sequence data. The relevant parameter for generating sequence data can be determined by the "chart settings" menu (see below). Only by converting life course data into sequence data is it possible to build status plots in which respondent's activities add up to 100 % for each point in time.
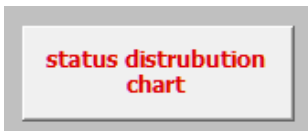
Clicking the "status distribution chart" button starts the calculation and generation of the state distribution chart.

The state distribution plot is composed of four components:

- The chart's caption describes the group that was selected for the plot via the drop–down menus. Additionally, the number of cases in the selected group is stated. The number of cases does not depend exclusively on the selected group. It also depends on the timeline reference selected in the "chart settings" menu (see below). If the reference is an event (e.g., birth of the first child or the end of a vocational training episode), then the number of cases is influenced by the occurrence of this event.
- The legend shows respondents' different states or activity types. In the initial setting, the order of activities in the legend matches the vertical order of the activities in the chart. The "chart settings" menu (see below) offers the option to sort the activities in the legend by priority if respondents perform more than one activity at the same time. Below the legend, there is a note pointing out that for a given point in time, no state distribution will

be plotted if the number of cases contributing to the information about this point of time is smaller than 50.

- The chart whose X-axis is related to time and whose Y-axis is related to the percentage distribution of states. Initially, the reference of the timeline is the age of the respondents. The reference of the timeline and several other parameters, such as the dimension and the start and end point of the timeline, can be changed via the "chart settings" menu (see below).

- The menu bar of MS Access (blue bar at the top of the screen, not shown in Figure 6). The button to close the chart and to return to the prior menu is located in the right corner (small box with a cross inside).

*Figure 6:   Composition of the state distribution chart*
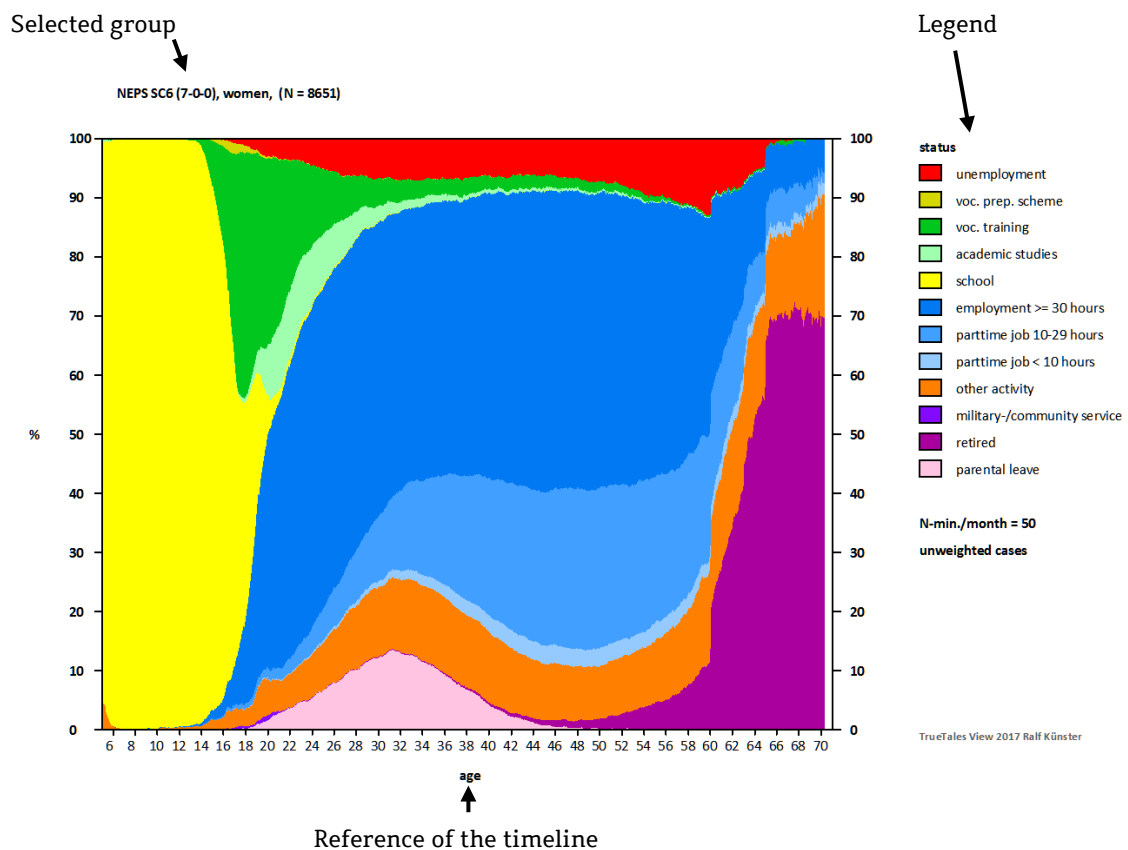
The charts can be copied to the clipboard by using the "print" button found on every keyboard. To include charts from the clipboard in Word documents, Excel spreadsheets, PowerPoint presentations, or other graphic programs, hit the key combination "CTRL"-"v".

Chart settings
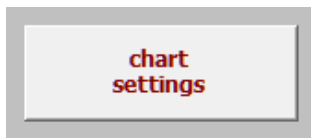
The "chart setting" button in the menu of the screen for representing individual cases opens a new screen with the option to modify the initial settings for creating state distribution charts (Figure 7).

Figure 7: Menu to modify the chart settings
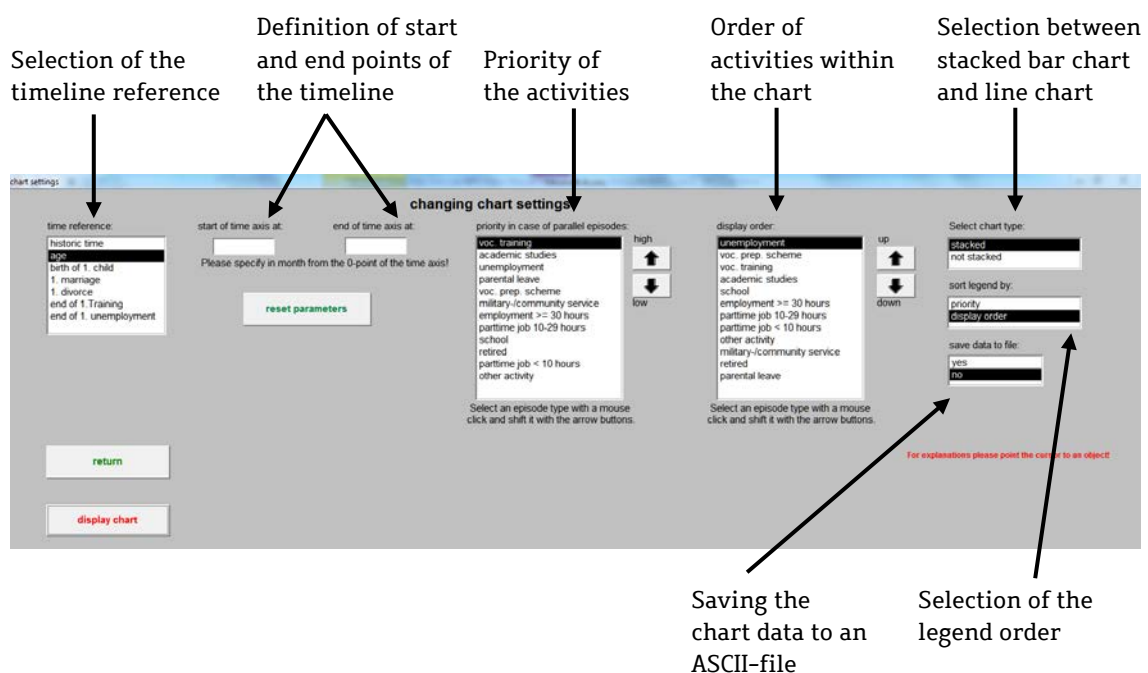
The "time reference" list enables users to choose between different references of the timeline. The available options are:

- historical time
- age
- date of the birth of the first child (biological, adopted, or foster child)
- date of the first marriage (registered same-sex couples as well)
- date of the first divorce
- date of the end of the first successfully completed academic or vocational training
- date of the end of the first unemployment

With the exception of "historical time," all other time references have a natural zero point. Concerning age, the zero point is the respondent's date of birth; for the other references, it is the time the particular event occurred. Because it is about events in the respondents' life course, there is normally a part of the life course that existed before the event and is therefore located in the negative part of the timeline, and a part that is located after the event. The reference default of the timeline is respondents' age.

With the two input boxes "start of time axis at" and "end of time axis at," users can determine where the timeline should begin and where it should end. The expected entry here is either a value for the number of months spent since the date of the respondent's birth (if the reference of the timeline is "age"), the number of months spent since January 1900 (if the reference of the timeline is "historical time"), or the number of months spent since the event (if the reference of the timeline is an event). All entries made here can either be reset by pushing the "reset parameters" button or by deleting field content. If there is no content in one or both of the input boxes, the application automatically chooses the total period for which information is available. Limiting or extending the time axis is especially helpful for comparing different cohorts at the same age period. To that end, the time axis of the older cohort can be limited to the maximum age of the younger cohort, or the time axis of the younger cohort can be expanded to the maximum age of the older cohort.

The priority of a state compared to the competing states can be changed by means of the list "priority in case of parallel episodes" and the related arrow buttons (highlight the state in the list with the mouse and move the state with the arrow buttons up or down the list to the desired position). If there is more than one state information for a respondent at a given point in time because the person pursued several activities simultaneously, the priority list determines which of the parallel states should be used for the calculation of the state distribution. The higher a state is in the list, the higher is the priority of this state.

The order of the states in the chart can be adjusted in a similar manner. The order is changed by highlighting a state in the "display order" list and moving the state up or down the list with the related arrow buttons. The position of a state in the list matches the position of this state in the chart. The position of a state in the chart has a considerable influence on the readability of the percentage value of the state on the Y-axis, because values of states positioned at the upper or lower end of the Y-axis are easiest to read.

The information about priority and order of states are stored in the database and used as the program default the next time TrueTales View is started.

The option "select chart type" provides the opportunity to change the chart type from stacked bar chart to line chart (*Figure 8*).

With this type of chart, the percentage share of an activity type at a specific point in time is more directly readable than with the stacked bar chart.

Figure 8:   Same example as Figure 6 after selecting "non stacked" in the "select chart type" menu
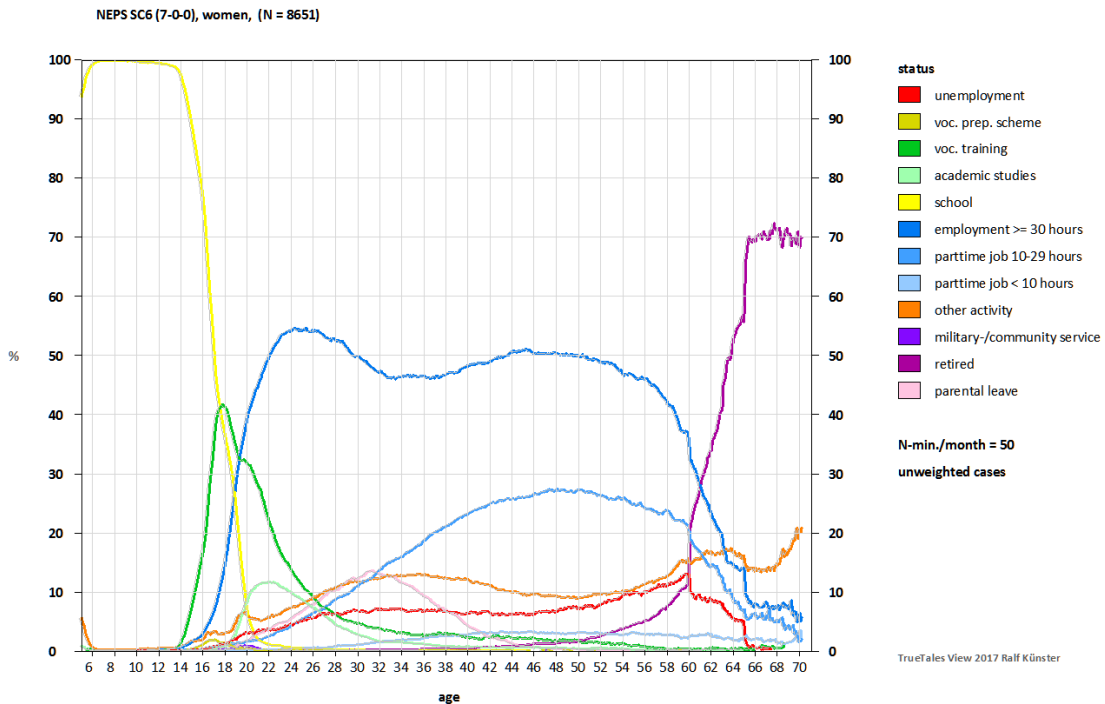
By the selection of the option "not stacked," the former "display order" list also changes to "epsidoe type selection" (see Figure 9). Twelve boxes appear on the left side of this list. Each box belongs to one of the twelve activity types. By checking or unchecking a box, the specified acitivity type will be included or excluded from the chart. Excluding some of the activity types often helps to concentrate the view on the relevant aspects of the distribution.

Figure 9:   The "chart settings" menu after selecting the option "not stacked" in the list "select chart type"
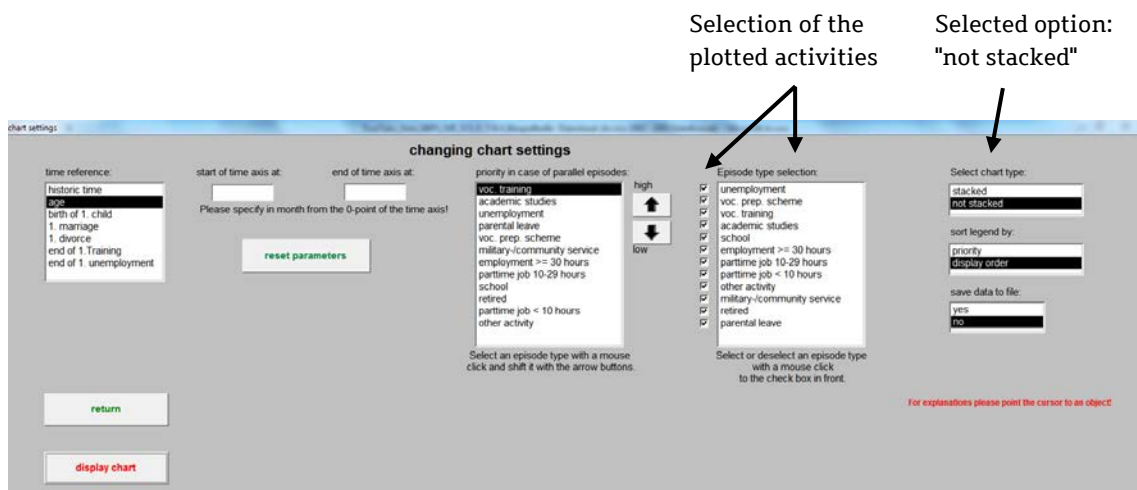
The list "sort legend by" is used to specify the order of the activities in the legend. The default setting is the order of the activities appearing in the plot. It can be changed to the order of the list "priority in case of parallel episodes". The first option is helpful for gaining an overview of the activities in the plot. The second option, by contrast, integrates the additional information of the selected prioritization into the chart.

By choosing "yes" in the "save data to file" list, the calculated values of the state distribution chart will be stored to an external ASCII–file. The name of the file has to be specified in the box that will appear. Pushing the "display chart" button creates this file in the directory where TrueTales View was started. The data is then available for imports to other applications.

Pushing the "display chart" button generates the state distribution plot, and using the "return" button closes the "chart setting" menu and starts the menu for representing individual cases.

Further developments and accessibility

The current (2017) TrueTales View version is available for the most recent NEPS scientific use data of starting cohort 4 – 9th grades, starting cohort 5 – students, and starting cohort 6 – adults. The program versions for the three starting cohorts differ in some points because the cohorts focus on different key aspects and highlight different stages of respondents' lives. The first Scientific Use File of life course data for starting cohort 3 – 5th grades will be published this year, and the graphic tool will be forthcoming for this cohort as well. The idea is to update TrueTales View whenever a new survey wave is published for any of the four cohorts. Moreover, future modifications will expand the options for selecting case groups and for designing the state distribution charts.

TrueTales View is exclusively obtainable by the author. The usage of the tool with NEPS data requires the participation of the author in a joint NEPS research project. This joint research project has to be ensured by an appropriate data use agreement with the LIfBi. All terms of the data use agreement apply also to the usage of the tool, especially the terms of temporal restrictions and scientific appropriation of data usage as well as the omission of any attempt to re–identify individuals, households or institutes and the prohibition of relaying the data to third parties. The forms of agreement are available on the website of the LIfBi research data center (https://www.neps–data.de/tabid/443/). For information on applying to get access to the NEPS data and filling out the NEPS data use agreement please contact the staff of the LIfBi reseach data center (E-Mail: fdz@lifbi.de).

TrueTales View is not a product of the NEPS or LIfBi. The author is exclusively responsible for the correct processing of the Scientific Use Files of the published NEPS data included in TrueTales View. Please contact the address below for questions concerning the tool.

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der Projektgruppe „Nationales Bildungspanel: Berufsbildung und lebenslanges Lernen"

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