

A Case Study in Large Scale Variable Harmonization

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- 1 The case: Media-Analysis Data
- 2 The Challenge: large scale & unstructured data
- 3 The solution: CharmStats Pro
- 4 The solution: 4 steps to success
- 5 The software: more features
- 6 Synopsis

- yearly gathered cross-sectionally by ag.ma measuring media use for commercial purpose since 1954
- two main datasets: pressmedia (1954-2015) & radio (1977-2015)
 - Pressmedia: ~7.600 Variables, < 1,2 Mio cases
 - Radio: ~25.000 Variables, < 1,6 Mio cases
- One „new“ dataset: online
- One combined dataset: Intermedia (Plus) (1999-2014-2017)
 - since 2014: ~18.600 Variables (downsized), < 1,2 Mio cases
 - Intermedia Plus is a result of a joint venture of ag.ma, agof & AGF/GfK

Variables

- Socio-demographic variables
- variables regarding the daily routine (per hour and more detailed), e.g. sleeping, eating, driving to work, taking the bus, housekeeping, etc.
- free time activities, e.g. read books, do sports, go out, go to cinema, etc.
- habits of household and respondent, e.g. have a Laptop, a car, mobile, telephone, TV-Abo (e.g. Sky), a flat, pets, etc.
- media use, e.g. reading newspapers (SZ, FAZ, tz, ...), magazines (Automobil, AutoBild, Lisa, Bravo, ...), listening to radio per hour and more detailed (Antenne Bayern, Hessischer Rundfunk 1-3, WDR, 1 Live, KissFM)

Variables for media use

- 100 radio broadcasts, usage per hour
- 150 magazines & 100 newspapers (incl. local newspapers)
- 10 TV-channels, usage per 30 minutes
- ~ 3000 Online sites (net coverage on a daily, weekly, monthly basis; gross coverage on a monthly and quarter basis)

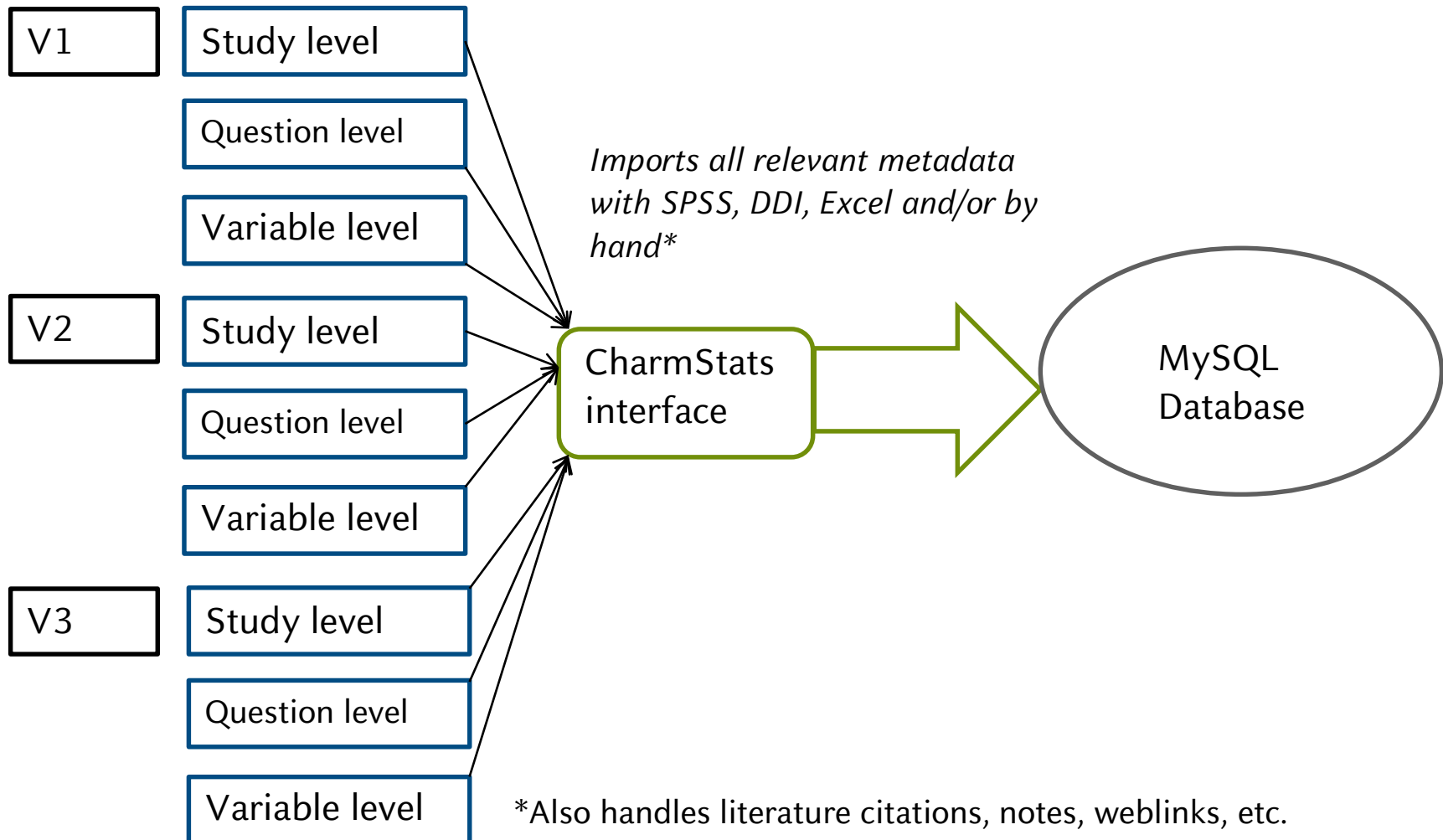
Relevant for harmonization in 2014:

- ~ 733 overall online media
- 335 single online sites
- 52 homepages

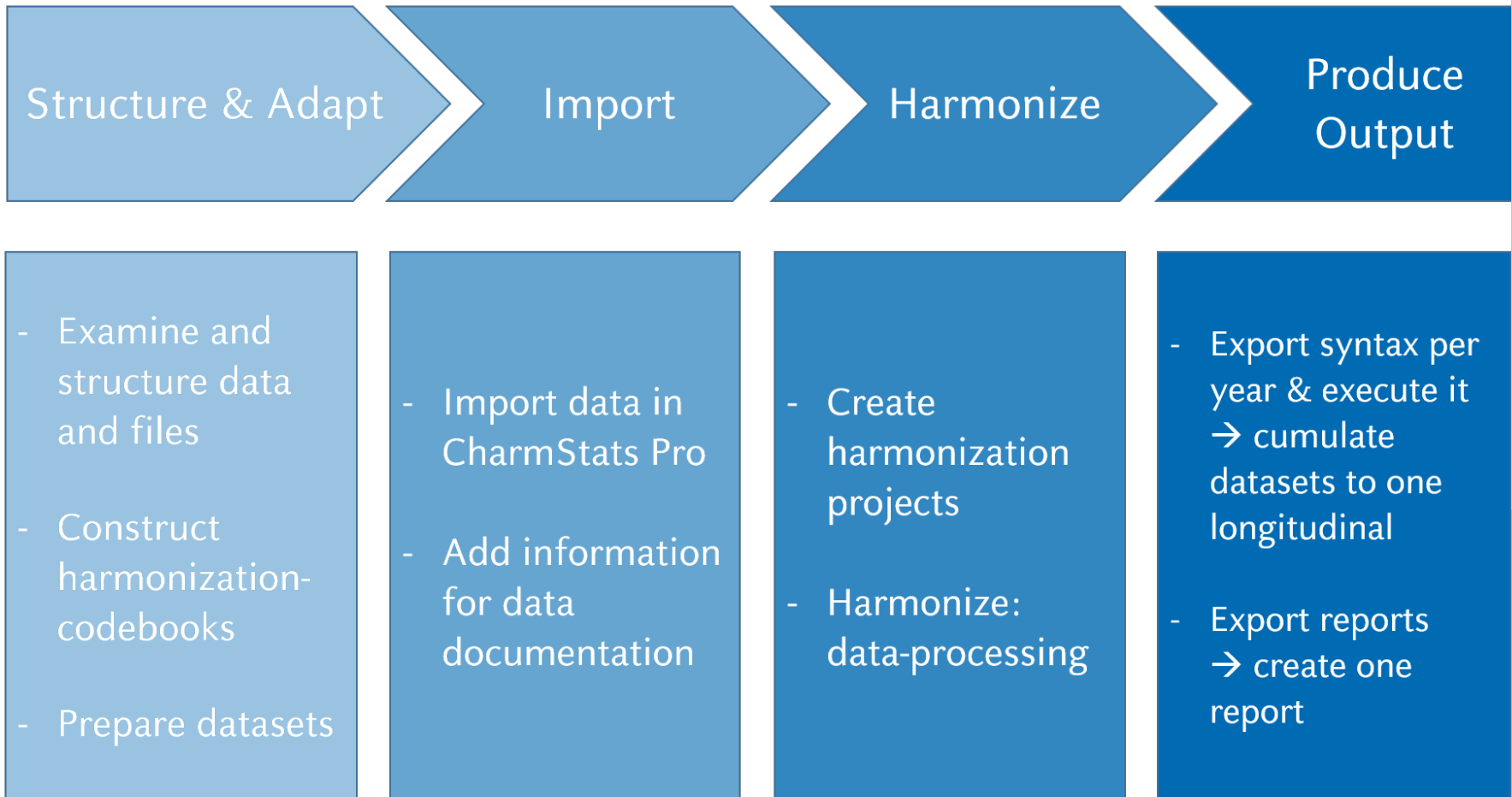
Initial situation

- **Goal:** harmonization of Intermedia Plus 2014 to 2017 & create a pleasant documentation to ensure traceability
- **Challenge:**
 - huge data sets with an insufficient structure
 - different sources of documentation information
- **Solution:** CharmStats Pro
 - giving a structure to work with,
 - while making data processing traceable & easier
 - plus creating syntaxes

A digital solution



The solution: 4 Steps to success



Step 1: Find a structure

The case: MA Intermedia Plus, online-tranche

PI-Summen		Felder			Ausweisungs- einschränkung	
3 Monate		Monat	Woche	Tag		
von	bis				T = Nur Woche und Monat	
					F = Fallzahlgrenze nicht erreicht (351 ung. WNKs)	
					L = Leerfelder	Angebotsnamen
321	322	323	324	325		babyclub.de Gesamt
326	327	328	329	330		Baby-Vornamen.de Gesamt
331	332	333	334	335		Baden Online Gesamt
336	337	338	339	340		OMS Badische Zeitung Online Gesamt
341	342	343	344	345		Basketball Bund Gesamt
346	347	348	349	350	F	OMS Kreiszeitung Böblinger Bote Gesa
351	352	353	354	355	F	OMS bbv-net Gesamt
356	357	358	359	360		Bergfex.de Gesamt
361	362	363	364	365		OMS Berliner Kurier Online Gesamt
366	367	368	369	370		OMS Berlin.de Gesamt
371	372	373	374	375		OMS BerlinOnline Gesamt
376	377	378	379	380	F	OMS Berliner Rundfunk.de Gesamt
381	382	383	384	385		OMS Berliner Zeitung Gesamt
386	387	388	389	390		Best of Home Gesamt
391	392	393	394	395		OMS bigFM.de Gesamt
396	397	398	399	400		bigpoint.com Gesamt
401	402	403	404	405		bike-magazin.de Gesamt
406	407	408	409	410		BILD.de Gesamt
411	412	413	414	415		Bild der Frau Gesamt
416	417	418	419	420		billiger.de Gesamt
421	422	423	424	425	L	
426	427	428	429	430		Bisafans.de Gesamt
431	432	433	434	435	F	OMS Backnanger Kreiszeitung Gesamt
436	437	438	439	440	L	
441	442	443	444	445		boerse-frankfurt.de Gesamt
446	447	448	449	450		BOERSE.de Gesamt
451	452	453	454	455		BOERSE-ONLINE.de Gesamt
456	457	458	459	460		boersennews.de Gesamt
461	462	463	464	465		Boerse Stuttgart Gesamt
466	467	468	469	470	F	BOOTE-Magazin online Gesamt
471	472	473	474	475	F	OMS Borkener Zeitung Gesamt
476	477	478	479	480	F	brainguide.de Gesamt
481	482	483	484	485	L	
486	487	488	489	490		BRAVO Online Gesamt
491	492	493	494	495		bremen.de Gesamt

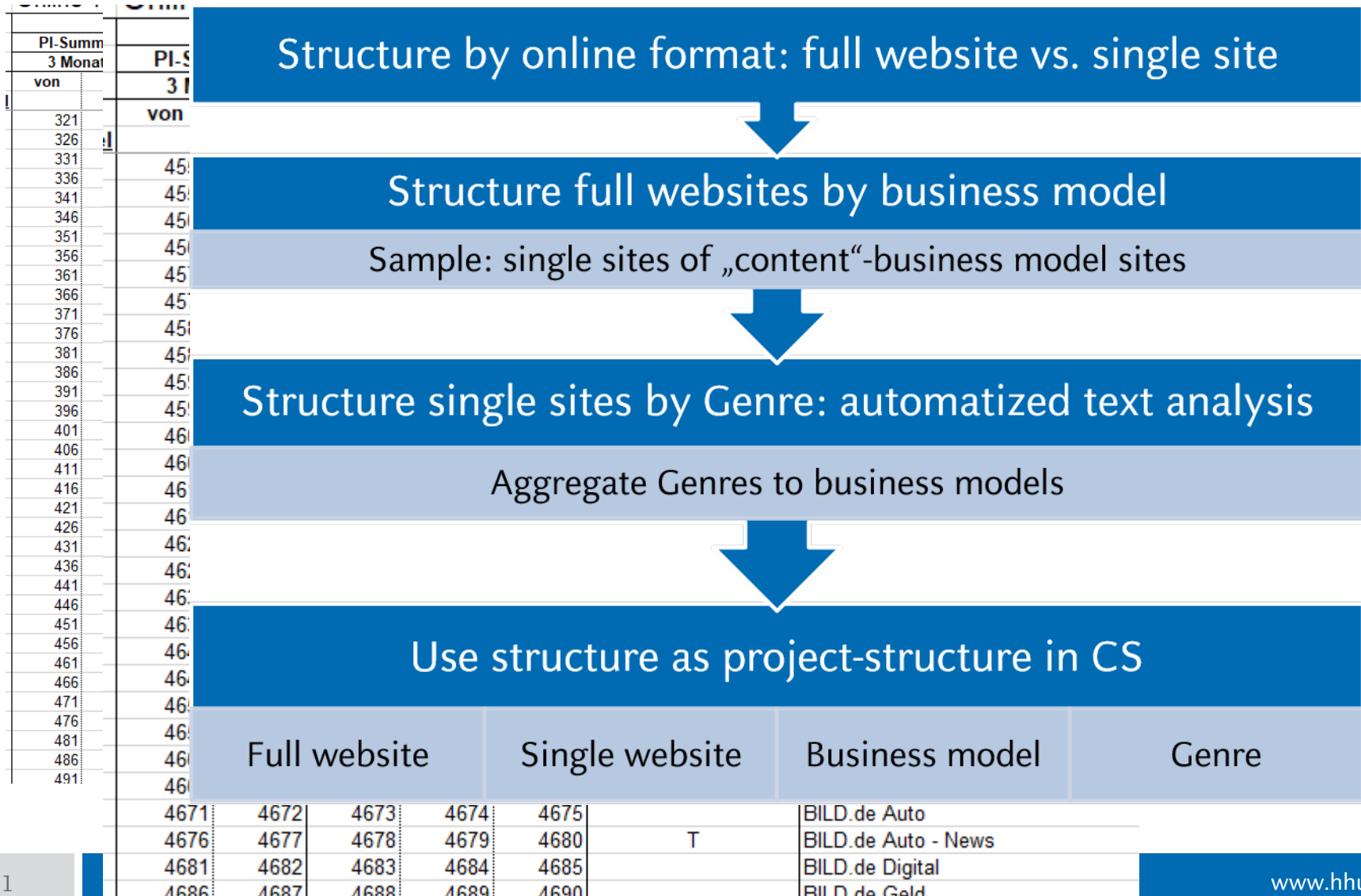
Step 1: Find a structure

The case: MA Intermedia Plus, online-tranche

PI-Summ 3 Monat von	Felder					Ausweisungs- einschränkung	Angebotsnamen
	PI-Summen		Tagesbasis				
	3 Monate	Monat	Woche	Tag			
	von	bis				T = Nur Woche und Monat F = Fallzahlgrenze nicht erreicht (351 ung. WNKs) L = Leerfelder	
321						F	Netzwelt.de Home
326						T	Netzwelt.de Internet
331	4551	4552	4553	4554	4555	T	Netzwelt.de Mobile
336	4556	4557	4558	4559	4560	T	Netzwelt.de Software
341	4561	4562	4563	4564	4565	T	Netzwelt.de Video
346	4566	4567	4568	4569	4570	L	
351	4571	4572	4573	4574	4575	L	
356	4576	4577	4578	4579	4580	L	
361	4581	4582	4583	4584	4585	L	
366	4586	4587	4588	4589	4590	L	
371	4591	4592	4593	4594	4595	L	
376	4596	4597	4598	4599	4600	L	
381	4601	4602	4603	4604	4605	F	vorname.com - Startseite
386	4606	4607	4608	4609	4610	L	vorname.com - Suche
391	4611	4612	4613	4614	4615	L	
396	4616	4617	4618	4619	4620	L	
401	4621	4622	4623	4624	4625	F	BILD.de Digital - Downloads
406	4626	4627	4628	4629	4630	T	BILD.de Digital - Handy
411	4631	4632	4633	4634	4635	T	BILD.de Digital - Internet
416	4636	4637	4638	4639	4640	T	BILD.de Digital - Computer
421	4641	4642	4643	4644	4645	F	BILD.de Auto - Tuning & Zubehör
426	4646	4647	4648	4649	4650	T	BILD.de Auto - Service
431	4651	4652	4653	4654	4655	T	BILD.de Auto - Tests
436	4656	4657	4658	4659	4660	T	BILD.de Auto - Gebrauchtwagen
441	4661	4662	4663	4664	4665	F	BILD.de Auto - Neuwagen
446	4666	4667	4668	4669	4670		BILD.de Auto
451	4671	4672	4673	4674	4675	T	BILD.de Auto - News
456	4676	4677	4678	4679	4680		BILD.de Digital
461	4681	4682	4683	4684	4685		BILD.de Geld
466	4686	4687	4688	4689	4690		

Step 1: Find a structure

The case: MA Intermedia Plus, online-tranche



Step 2: Import to CharmStats

The case: add the information you want

The screenshot shows the 'Edit Variable' dialog box with the following fields and content:

- Name:** S9B
- Text:** Welches ist Ihr höchster allgemeiner Schulabschluß?
- Instruction:** INT.: Alle Vorgaben vorlesen:
Nur EINE Nennung erlaubt/Mögliche Antwort NULL
- Intention:** (This field is highlighted in yellow)
- Definition:** (Empty field)

At the bottom of the dialog, there are search and navigation controls:

- Ready
- Find
- Replace
- all
- Backward
- Case sensitive
- Literature
- Apply Changes
- Exit "Edit Variable"
- Help

Step 2: Import to CharmStats

The case: add the information you want

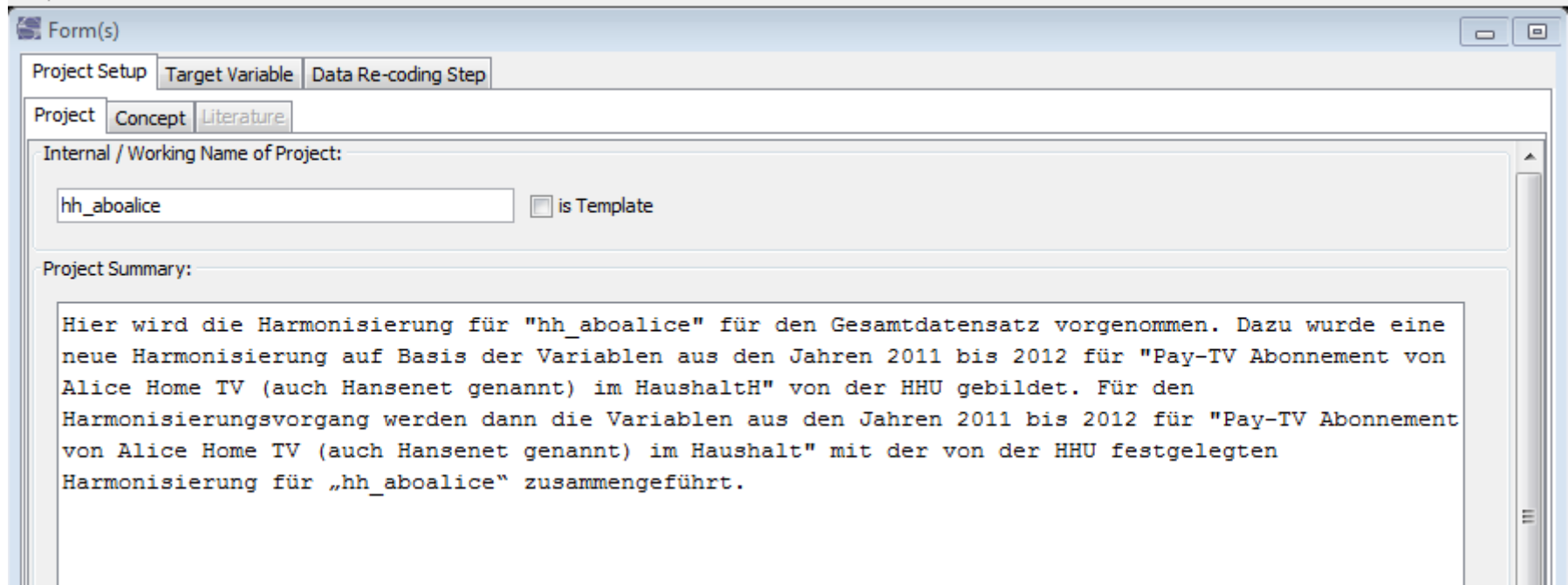
The screenshot shows two overlapping 'Edit Variable' dialog boxes. The background window is partially obscured by a foreground window. Both windows have tabs for 'Variable', 'Question', and 'Study'. The foreground window's 'Study' tab is active, displaying the following fields:

- Study title: MA 2010 Radio II UPDATE
- DOI: (empty)
- Study area: (empty)
- Date of Collection: (empty)
- Population: (empty)
- Selection: (empty)
- Collection method: (empty)
- Collectors: (empty)
- Source file: (empty)
- Dataset: ma10rtu (highlighted in yellow)
- Definition: (empty)

The 'Intention' field in the background window is highlighted in yellow and contains the text 'INT.: Alle Vorgaben v'. The 'Ready' status is displayed at the bottom of the foreground window. At the bottom of the dialog, there are buttons for 'Apply Changes', 'Exit "Edit Variable"', and 'Help', along with search and replace options.

Step 3: data-processing with CharmStats Pro

Categorical & nominal Variables



The screenshot shows the 'Form(s)' window in CharmStats Pro. The 'Project Setup' tab is active, with sub-tabs for 'Project', 'Concept', and 'Literature'. The 'Internal / Working Name of Project' field contains 'hh_aboalice' and the 'is Template' checkbox is unchecked. The 'Project Summary' field contains the following text:

Hier wird die Harmonisierung für "hh_aboalice" für den Gesamtdatensatz vorgenommen. Dazu wurde eine neue Harmonisierung auf Basis der Variablen aus den Jahren 2011 bis 2012 für "Pay-TV Abonnement von Alice Home TV (auch Hansenet genannt) im HaushaltH" von der HHU gebildet. Für den Harmonisierungsvorgang werden dann die Variablen aus den Jahren 2011 bis 2012 für "Pay-TV Abonnement von Alice Home TV (auch Hansenet genannt) im Haushalt" mit der von der HHU festgelegten Harmonisierung für „hh_aboalice“ zusammengeführt.

Step 3: data-processing with CharmStats Pro

Categorical & nominal Variables

The screenshot displays the 'Form(s)' window in CharmStats Pro, showing the 'Project Setup' tab. The project is named 'Literature'. The 'Concept / Definition' section is active, displaying the following text:

Concept: Pay-TV Abonnement von Alice Home TV (auch Hansenet genannt) im Haushalt

Die Variable umfasst das Pay-TV Abonnement von Alice Home TV (auch Hansenet genannt) im Haushalt des/der Befragten mit den Kategorien 1 = „ja“ 2 = „nein“ 3 = "nicht im Abfragesplit empfangbar" 4 = "kein Fernsehgerät" -7 = „nicht erhoben“ -8 = "weiß nicht" -9 = „keine Angabe“.

Die Harmonisierung wurde von der HHU auf Basis der Variablen aus den Jahren 2011 bis 2012 für "Pay-TV Abonnement von Alice Home TV (auch Hansenet genannt) im Haushalt" neu gebildet.

Step 3: data-processing with CharmStats Pro

Categorical & nominal Variables

The screenshot shows the CharmStatsPro software interface. The main window is titled "CharmStatsPro (c)2017 by GESIS - Logged in as: user - hh_aboalice". The menu bar includes File, Edit, User, Data, Project, Basket, Search, Extra, and Help. The toolbar contains icons for file operations and navigation. The main workspace is divided into several panes. On the left, there is a "Project" pane showing a tree structure with folders like "Interna" and "Project", and a list of variables including "hh_a", "Hie", "neu", "Ali", "Har", "von", and "Har". The main workspace is titled "Form(s)" and contains a "Data Re-coding Step" pane. This pane has tabs for "Project Setup", "Target Variable", and "Data Re-coding Step". Under "Data Re-coding Step", there are sub-tabs for "D.R. Instance", "Variable(s)", "Map Instance(s)", "Map Attribute(s)", and "Map Value(s)". The "Map Value(s)" tab is active, showing a table with "Target Value" and "Source Value" columns. The table contains the following rows:

Target Value	Source Value
1 ja_p	1 ja
2 nein_p	2 nein
4 kein Fernsehgeraet_p	3 kein Fernsehgerät
3 nicht im Abfragesplit empfangbar_p	4 nicht im Abfragesplit empfangbar
-8 weiss nicht_p	5 weiß nicht
-9 keine Angabe_p	6 keine Angabe

Below the table, there is a list of target values: "1 ja_p", "2 nein_p", "3 nicht im Abfragesplit empfangbar_p", "4 kein Fernsehgeraet_p", "-7 nicht erhoben_p", "-8 weiss nicht_p", and "-9 keine Angabe_p". The "-9 keine Angabe_p" row is selected. At the bottom of the "Map Value(s)" pane, there are two dropdown menus: "Instance pairing: di-default=>oi-default" and "Attribute pairing: A669 => hh_aboalice_i". To the right of these dropdowns are two buttons: "Identical Assignment" and "Reverse Assignment". At the bottom of the main workspace, there are several navigation buttons: "Back", "Comment", "Literature", "Alternate", "Confirm", and "Next". The status bar at the bottom of the window shows "mod_mod" and a search bar with "Find", "Replace", and "all" options, along with checkboxes for "Backward" and "Case sensitive".

Step 3: data-processing with CharmStats Pro

metric Variables

Edit Measurement ×

Measurement Question

Name	Label	Sampling level	Source	Measurement type	is Template
O_GA_rtlb_CT	full website: RTL 104.6	Aggregate / Macrodata	Imported	Continuous	<input type="checkbox"/>

Code	Label	Missing?
-7	nicht ermittelt	<input checked="" type="checkbox"/>

Complete + Add Category

Comment Definition Dataset Literature Reset Changes

Apply Changes Exit "Edit Measurement" Help

Step 3: data-processing with CharmStats Pro

metric Variables

The screenshot displays the CharmStats Pro software interface. The main window is titled "CharmStatsPro (c)2018 by GESIS - Logged in as: user - Gesamtangebote Online". The interface is divided into several panes:

- Project(s) pane:** Shows a tree view of project folders. The "Gesamtangebote" folder is selected, and its sub-items include "Geräte im Haushalt" (with sub-items like hh_garten, hh_hund, etc.) and "Zusatzinfo Befragter" (with sub-items like lesorta, lesortb, etc.).
- Form(s) pane:** Contains a "Project Setup" tab and a "Data Re-coding Step" tab. The "Data Re-coding Step" tab is active, showing a table for mapping source values to target values.
- Basket pane:** Shows a "Temp Basket" containing a "Stored Object(s)" with items "O_GA_rtb_CT" and "G11".

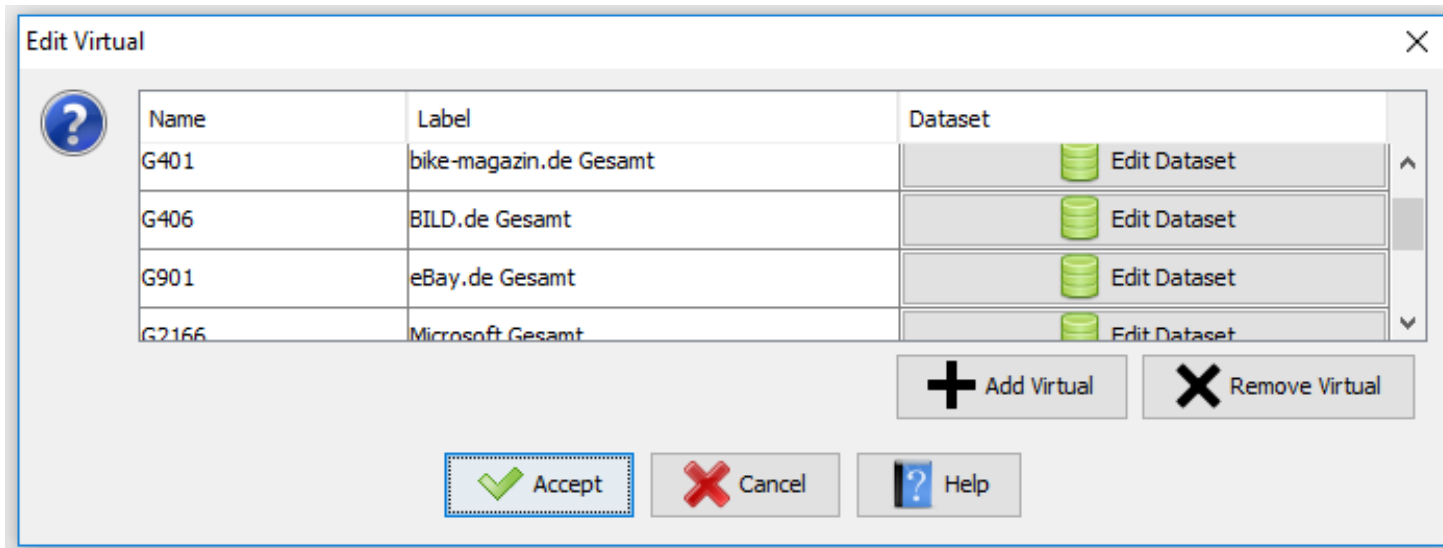
The "Data Re-coding Step" table is as follows:

D.R. Instance	Variable(s)	Map Instance(s)	Map Attribute(s)	Map Value(s)
	Target Value			Source Value
	-7 nicht ermittelt_p			-7 nicht ermittelt
	-7 nicht ermittelt_p			

At the bottom of the interface, there are buttons for "Identical Assignment" and "Reverse Assignment", along with "Instance pairing" and "Attribute pairing" dropdowns. The status bar at the bottom shows "cmd.prj.open_project" and search options like "Find", "Replace", "Backward", and "Case sensitive".

Step 3: data-processing with CharmStats Pro

The case of virtual Variables (text based)



Step 3: data-processing with CharmStats Pro

The case of virtual Variables (text based)

New Variable (For Export only)

Name Label

O_GA_bld_CT

```
RECODE G406 (-7=-7) (ELSE=COPY) INTO O_GA_bld_CT.  
VARIABLE LABELS O_GA_bld_CT 'full website: BILD.de'.  
VALUE LABELS  
O_GA_bld_CT  
-7 'nicht ermittelt'.  
EXECUTE.
```

O_GA_ebay_CT

```
RECODE G901 (-7=-7) (ELSE=COPY) INTO O_GA_ebay_CT.  
VARIABLE LABELS O_GA_ebay_CT 'full website: EBAY.de'.  
VALUE LABELS  
O_GA_ebay_CT  
-7 'nicht ermittelt'.  
EXECUTE.
```

O_GA_micro_CT

```
RECODE G2166 (-7=-7) (ELSE=COPY) INTO O_GA_micro_CT.  
VARIABLE LABELS O_GA_micro_CT 'full website: Microsoft'.  
VALUE LABELS
```

di-default
G11:
"OMS 104.6rtl.com Gesamt"

Edit Print Save Close Help

Step 4: Produce output

Syntax

Export Syntax

New Variable (For Export only)
Name Label

```
RECODE A669 (1=1) (2=2) (3=4) (4=3) (5=SYSMIS) (6=SYSMIS) INTO hh_aboalice.  
VARIABLE LABELS hh_aboalice 'Pay-TV Abonnement von Alice Home TV (auch Hansenet genannt) im Haushalt'.  
VALUE LABELS  
hh_aboalice  
-9 'keine Angabe'  
3 'nicht im Abfragesplit empfangbar'  
1 'ja'  
4 'kein Fernsehgeraet'  
-8 'weiss nicht'  
2 'nein'.  
EXECUTE.
```

di-default
A669:
*Abonnement von Pay TV: H

hh_aboalice 2012
A669:
*Abonnement von Pay TV: V

Step 4: Produce output

Syntax

Export Syntax

New Variable (For Export only)

Name Label

di-default
G11:
"OMS 104.6rtl.com Gesamt"

xTab SPSS
 xTab STATA
 SAS
 MPlus
 MA CATEGORY MA METRIC

```
RECODE G406 (-7=-7) (ELSE=COPY) INTO O_GA_bld_CT.  
VARIABLE LABELS O_GA_bld_CT 'full website: BILD.de'.  
VALUE LABELS  
O_GA_bld_CT  
-7 'nicht ermittelt'.  
EXECUTE.  
  
RECODE G901 (-7=-7) (ELSE=COPY) INTO O_GA_ebay_CT.  
VARIABLE LABELS O_GA_ebay_CT 'full website: EBAY.de'.  
VALUE LABELS  
O_GA_ebay_CT  
-7 'nicht ermittelt'.  
EXECUTE.  
  
RECODE G2166 (-7=-7) (ELSE=COPY) INTO O_GA_micro_CT.  
VARIABLE LABELS O_GA_micro_CT 'full website: Microsoft'.  
VALUE LABELS
```

Report as data documentation

- The **report** feature is used to output project content. Templates allow **user-defined** extraction of content, using an html formatted document inter-spersed with keywords.

- Keywords and their interactions with the template are provided by plugins.

Step 4: Produce output

Report as data documentation

- T
- K

Gesamtangebote Online

Variablenname:

- O_GA_airl_CT - Full website: airliners.de
- O_GA_yh_CT - Full website: Yahoo! Deutschland
- O_GA_micro_CT - Full website: Microsoft
- O_GA_mtv_CT - Full website: MTV
- O_GA_vge_CT - Full website: VOGUE.DE
- O_GA_bike_CT - Full website: bike-magazin.de
- O_GA_bld_CT - Full website: BILD.de
- O_GA_ebay_CT - Full website: eBay.de

Kodierung:

-7, nicht ermittelt

Übersichtstabelle der Variable und Harmonisierung für die Jahre 2010 bis 2015

	2014	2015
Variablenname	G11 G111, G401, G406, G901, G2166, G2191, G3586, G19046	G11 G111, G401, G406, G901, G2166, G2191, G3586, G19046

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using an
s.
are

Report as data documentation

Gesamtangebote Online

Übersichtstabelle der Variable und Harmonisierung für die Jahre 2010 bis 2015

	2014	2015	2016
Variablenname	G11 G111, G401, G406, G901, G2166, G2191, G3586, G19046	G11 G111, G401, G406, G901, G2166, G2191, G3586, G19046	G11 G111, G401, G406, G901, G2166, G2191, G3586, G19046
Frage			
Interviewer- anweisung			
Kodierung	-7, nicht ermittelt	-7, nicht ermittelt	-7, nicht ermittelt
Harmonisierungs- Syntax	RECODE G11 (-7=-7) (ELSE=COPY) INTO O_GA_rtlb_CT. MISSING VALUES O_GA_rtlb_CT (-7). VARIABLE LABELS O_GA_rtlb_CT 'full website: RTL 104.6'. VALUE LABELS O_GA_rtlb_CT -7 'nicht ermittelt'. EXECUTE.	RECODE G11 (-7=-7) (ELSE=COPY) INTO O_GA_rtlb_CT. MISSING VALUES O_GA_rtlb_CT (-7). VARIABLE LABELS O_GA_rtlb_CT 'full website: RTL 104.6'. VALUE LABELS O_GA_rtlb_CT -7 'nicht ermittelt'. EXECUTE.	RECODE G11 (-7=-7) (ELSE=COPY) INTO O_GA_rtlb_CT. MISSING VALUES O_GA_rtlb_CT (-7). VARIABLE LABELS O_GA_rtlb_CT 'full website: RTL 104.6'. VALUE LABELS O_GA_rtlb_CT -7 'nicht ermittelt'. EXECUTE.
Vermerk			

Übersicht Virtuelle Variablen siehe Anhang 1

Further Features

- CS Library as an archive and exchange platform
- Literature
- Work in Teams
 - In Mail
 - User-specified „tracking“ and reports
- Usage for experiments: Make Intensions, concepts and tretments visible

Further Features

- CS Li
- Litera
- Work
 - In M
 - Use
- Usage
treatment

The screenshot shows a 'Literature' form with the following fields and controls:

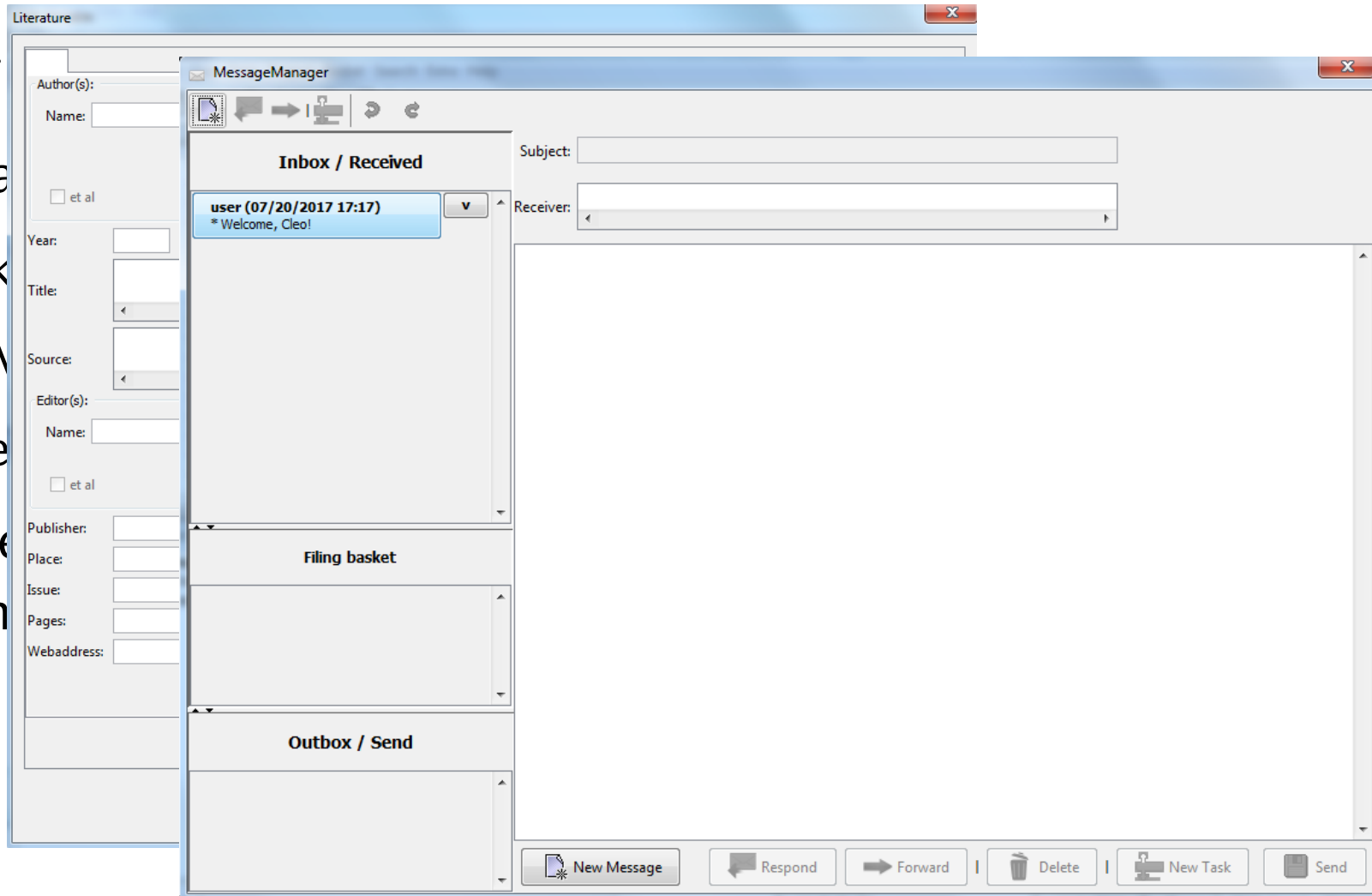
- Author(s):** Name: [text input] * +
- et al
- Year:** [text input]
- Title:** [text input]
- Source:** [text input]
- Editor(s):** Name: [text input] * +
- et al
- Publisher:** [text input]
- Place:** [text input]
- Issue:** [text input]
- Pages:** [text input]
- Webaddress:** [text input]
- Buttons:** Remove Reference (X), Add Reference (+), Import Lit. (book icon)
- Footer:** Close (checkmark icon), Help (question mark icon)

m

cepts and

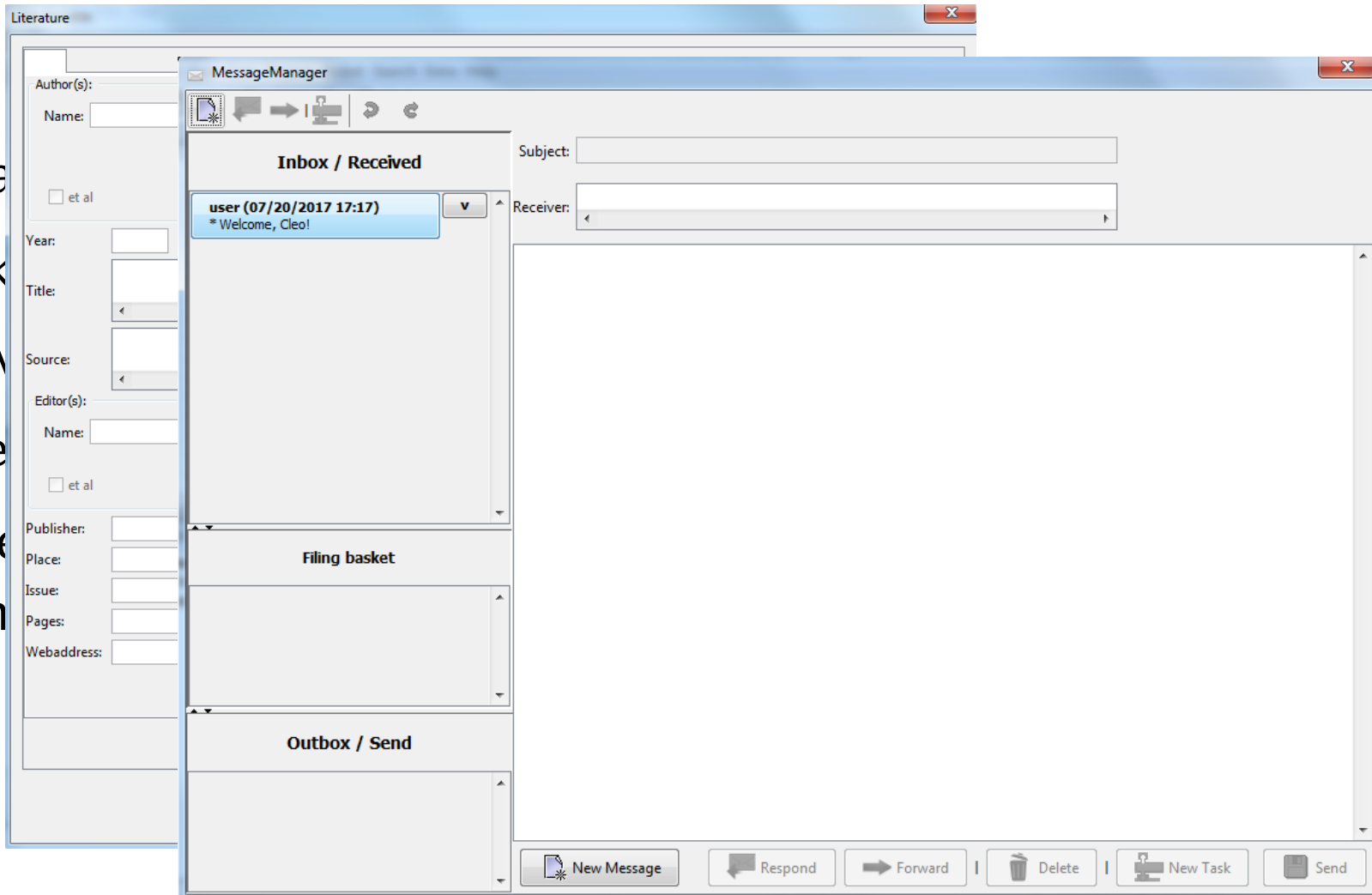
Further Features

- CS Li
- Litera
- Work
 - In M
 - Use
- Usage
treatment



Further Features

- CS Li
- Litera
- Work
 - In M
 - Use
- Usage
treatment



What is CharmStats for?

Situation in (social) science: **lack of tracability** through insufficient data-documentation, esp. in case of big data

Advantages of CharmStats:

- 1) Documentation of measurements (*shown today*)
- 2) Documentation of stimulus, treatments like pictures, questionnaire (*not shown today*)
- 3) Documentation of data processing and syntax (*shown today*)
→ esp. through CharmStats-Library (*launched for 2019*)
- 4) Output for different statistical programs (*shown today*)

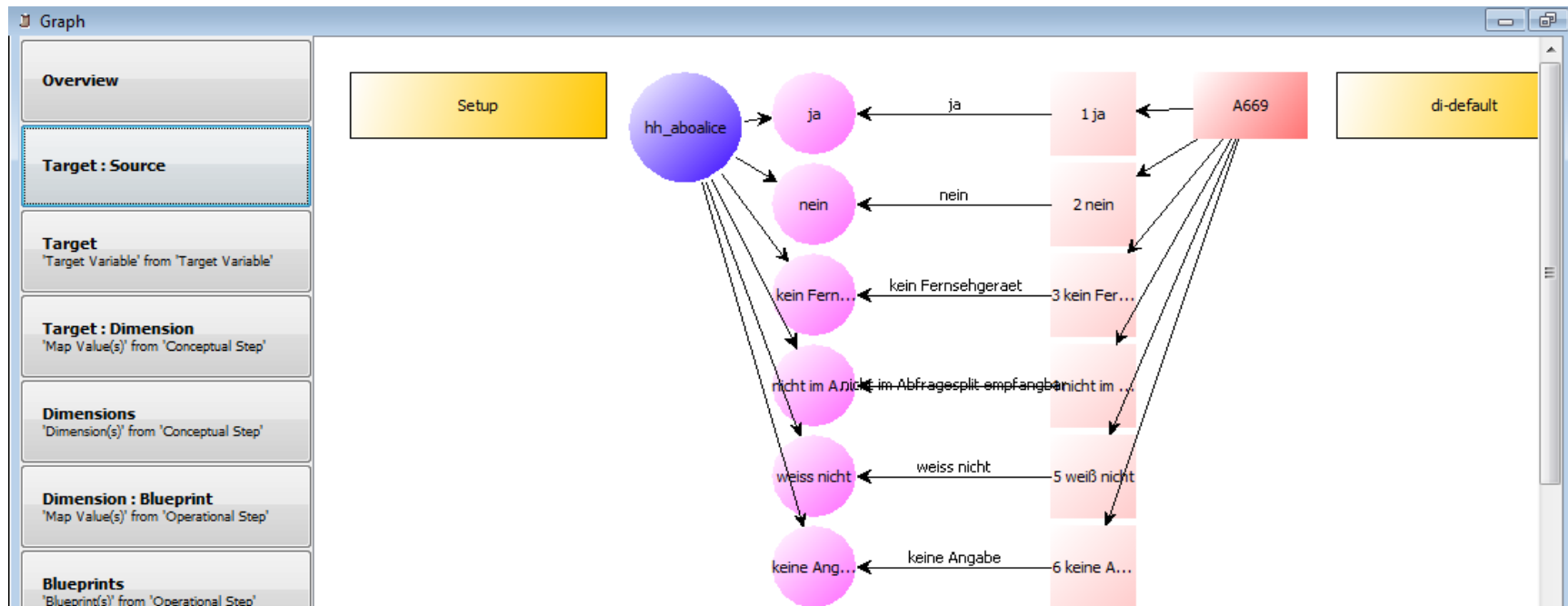
BACK-UP Slides

Steps for data processing with CharmStats Pro

- 1) think about the output you want/need and the structure of „projects“
- 2) import variables
 - have data – in smaller parts – in SPSS-format & information for variable questions (wording, interviewer instruction, ...) ready
- 3) import relevant variables in project & do your data processing
- 4) export syntax & reports
 - in case of syntax you need to choose your type of variable in the syntax generator before exporting it

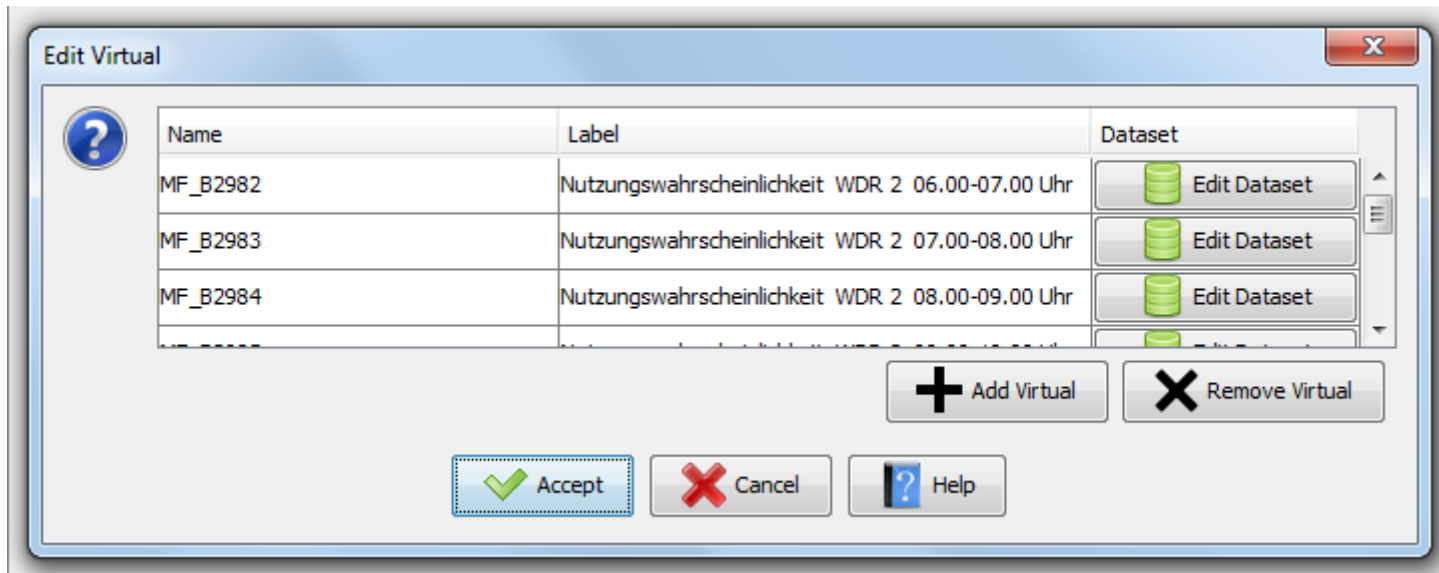
Output

- The graph feature outputs additional project content. Multiple pre-defined views display metadata connections.



Step 3: data-processing with CharmStats Pro

The case of virtual Variables (number based)



Step 3: data-processing with CharmStats Pro

The case of virtual Variables (number based)

Edit Virtual

Name	Label	Dataset
MF_B2982	Nutzungswahrscheinlichkeit WDR 2 06.00-07.00 Uhr	Edit Dataset

Export Syntax

New Variable (For Export only)

Name: wdr2nw05 Label: Nutzungswahrscheinlichkeit WDR 2 05.00-06.00 Uhr

```
RECODE MF_B2981 (ELSE=COPY) INTO wdr2nw05.  
MISSING VALUES wdr2nw05 (-7).  
VARIABLE LABELS wdr2nw05 'Nutzungswahrscheinlichkeit WDR 2 05.00-06.00 Uhr'.  
VALUE LABELS  
wdr2nw05  
-7 'nicht erstellt'.  
EXECUTE.  
  
RECODE MF_B2982 (ELSE=COPY) INTO wdr2nw05.  
MISSING VALUES wdr2nw05 (-7).  
VARIABLE LABELS wdr2nw05 'Nutzungswahrscheinlichkeit WDR 2 06.00-07.00 Uhr'.  
VALUE LABELS  
wdr2nw05  
-7 'nicht erstellt'.  
EXECUTE.  
  
RECODE MF_B2983 (ELSE=COPY) INTO wdr2nw05.
```

di-default
MF_B2981:
"05.00-06.00 Uhr: WDR 2"

Edit Print Save
Close Help

virtual Variables

So-called „loop variables“ are essentially identical, differing only in one aspect (time or text of variable labels and names).

Instead of inefficiently repeating work, virtual variables offer a shortcut: altering only the name and label stored and connected to the „original“ variable.

The syntax editor and the report feature were modified to handle virtual variables like regular ones.