

# Do Web and Telephone Produce the Same Number of Changes and Events in a Panel Survey?

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## Abstract

Measuring change over time is one of the main purposes of longitudinal surveys. With an increase in the use of web as a mode of data collection it is important to assess whether the web mode differs from other modes with respect to the number of changes and events that are captured. We examine whether telephone and web data collection modes are comparable with respect to measuring changes over time or experiencing events. Using experimental data from a two-wave pilot of the Swiss Household Panel, we investigate this question for several variables in the domain of work and family.

We find differences for the work-related variables, with web respondents more likely to report changes. These differences do not disappear once the socio-demographic composition of the sample is taken into consideration. This suggests that these differences are not driven by observed different characteristics of the respondents who may have self-selected into one or the other mode. Contrary to work-related variables, a termination of a relationship was more common in the telephone group. This shows that one mode does not necessarily measure more change or events than another; it may depend on the variable in question. In addition, the difference in the protocol mattered: a web respondent in a household that participated fully by web sometimes differed from a web respondent in a household that had a household interview by phone. Nonetheless, the telephone group differed more from the various web protocols than the web protocols among themselves.

With more household panel surveys introducing web questionnaires in combination with more traditional face-to-face and telephone interviews, this study adds to our understanding of the potential consequences of mixing modes with respect to longitudinal data analysis.

**Keywords:** reporting change, reporting events, mode effects, household panel, mixed-mode, measurement, selection



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One of the main purposes of longitudinal surveys is to measure change over time. For example, many studies in the social sciences focus on changes in circumstances and the occurrence of events in people's lives and assess their consequences for the individuals experiencing them. By following people over time, it becomes possible to analyze how a wide variety of changes such as for example a change in employment situation or civil status affects people's lives in a multitude of ways (see Chandola & Zhang, 2018; Choi, Chung & Breen, 2020; Leopold, 2018; Rözer et al., 2020 for recent examples).

To reduce costs while keeping response rates and representativeness on an acceptable level, an increasing number of longitudinal studies rely on web as one of the modes of data collection (Voorpostel, Lipps & Roberts, 2021). This is also the case for long-running household panel studies: traditionally often relying on face-to-face (e.g., the UK Understanding Society (UKHLS), the Household, Income and Labour Dynamics in Australia (HILDA) Survey) or telephone interviews (e.g., the US Panel Study of Income Dynamics (PSID), the Swiss Household Panel (SHP)) as their main mode of interview. While most switch already participating households to web at a later wave (e.g., UKHLS), some use web already from the first wave of interview, as is the case for the latest refreshment sample of the SHP.

With an increasing role of the web mode in longitudinal studies it is important to understand to what extent longitudinal data collected include a comparable number of events in different modes. If data collected with one mode produces fewer events and changes over time than data collected with another mode, this affects the analytical potential of such data and should be taken into consideration when deciding upon a design for a longitudinal study.

Whereas there is increasing research attention to measurement differences by mode of specific target variables, both in cross-sectional and longitudinal surveys, we know very little about the extent to which modes vary in how they capture changes over time in longitudinal surveys. As the measurement of intra-individual change is the main purpose of longitudinal surveys, it is of great importance to assess the relationship between survey mode and the measurement of change over time.

Comparing telephone to web, we argue that the same factors that drive mode differences in measurement of target variables may also drive differences in the measurement of change and event occurrence over time. Web and telephone are two modes that differ in important ways. With respect to survey *participation*, web and telephone differ in coverage, reachability of respondents, and their willingness to participate (De Leeuw, 2018; Nagelhout et al., 2010). As certain transitions and

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events tend to be more common in specific subgroups of the population, a different sample composition may produce different reporting of change over time.

With respect to *measurement*, an important difference between telephone and web is the presence of an interviewer in telephone interviews. Interviewers affect different aspects of the survey data collection process (Brady & Blom, 2017). Interviewers on the one hand increase data quality as they can guide the respondent through complicated questions and burdensome parts of the questionnaire, motivate respondents to complete the task and may check whether (intended or unintended) reported or not reported changes are plausible. Reduced effort by web respondents is evidenced by the fact that item nonresponse tends to be higher in web surveys (Groves et al., 2011) although findings regarding satisficing behavior in web surveys is mixed (Bowyer & Rogowski, 2017; Fricker et al., 2005; Chang & Krosnick, 2010). On the other hand, the presence of an interviewer tends to increase socially desirable responding (Chang & Krosnick, 2010). The mode of interview also affects responses through variation in other characteristics, such as the pace of the interview, presentation (visual or auditory), and the timing of the interview (Christian, Dillman & Smyth, 2008). These differences in reporting may lead to different rates of change and event occurrence measured in telephone and web surveys.

We formulate the following two research questions: (1) Do telephone and web respondents differ in the likelihood of reporting status changes and events in the work and family domain? And (2) Does any difference persist after controlling for differential sample composition by mode? As this is a first exploration of this topic, we refrain from formulating hypotheses on the specific events. Rather, we assess whether the mode in which a survey is administered is associated with the frequency with which respondents report specific changes in circumstances and event occurrence, and if so, in a second step, whether these differences remain after controlling for known differences between the modes in sample composition. If differences by mode remain, this gives some indication of different response behavior by mode. Although this remains speculative as there is no population data on such changes and it will not be possible to validate reported changes, it does suggest that the mode of interview has consequences for longitudinal analyses of the studied changes and events that go beyond sample composition with respect to socio-demographic characteristics.

We examine several common changes and events in the work and family domain and include events and changes that have received research attention. More precisely, we include the following events and changes: change in employment situation (employed, unemployed or inactive), change in jobs, experience of unemployment, change in partnership status, civil status or household size, termination of a relationship, death of a close person, and residential moves.

## Data and Method

### Data

#### *Design of the Swiss Household Panel mode experiment*

For this study we use data from a two-wave pilot for the Swiss Household Panel (SHP) comparing telephone to web. The SHP is a longitudinal household study that follows randomly sampled households in Switzerland over time since 1999. The SHP interviews all household members on an annual basis, predominantly by telephone (Tillmann et al., 2016). In preparation of the third refreshment sample which was launched in 2020, a mode experiment conducted in 2017-2018 compared the standard telephone-based recruitment and fieldwork strategy with two web alternatives.

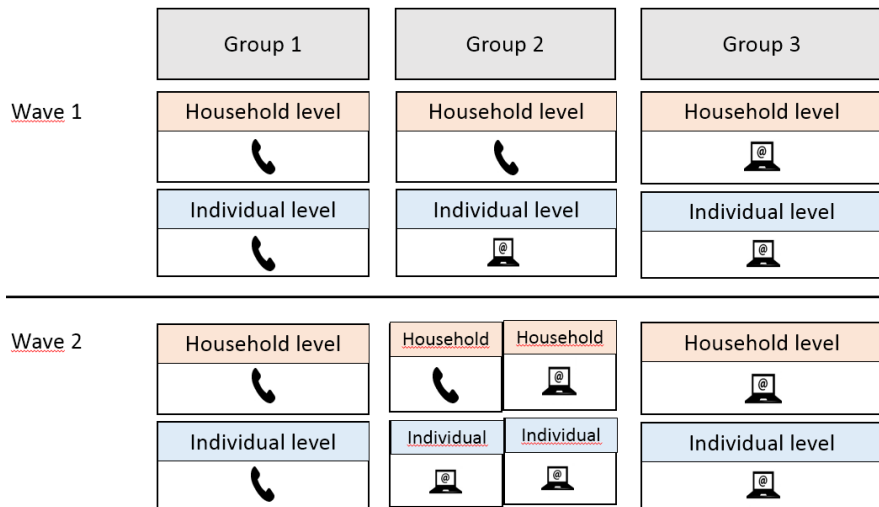
In the SHP, each household assigns a household reference person (HRP), who completes the household grid and the household questionnaire (household level) in each wave. Based on the household grid, the HRP and all household members of at least 14 years old complete an individual questionnaire (individual level). The standard SHP protocol involves telephone interviews on the household level, and with all household members to complete an individual questionnaire, also by telephone. In the mode experiment this group was referred to as the *telephone group*. The first web alternative tested was a mixed-mode protocol combining a telephone interview with the HRP on the household level, with the HRP and household members completing their individual questionnaires via web (*mixed-mode group*). The second web alternative tested was a web-only protocol using web for the grid, the household, and all individual questionnaires (*web-only group*) (see Voorpostel et al., 2020).

The sample for the study was a simple random sample of individuals which was stratified by region, drawn from a sampling frame based on population registers maintained by the Swiss Federal Statistical Office. The households of the sampled individuals were randomly assigned to one of the three experimental groups. The sampled individual was approached first as a HRP.<sup>1</sup>

The sampling frame included landline telephone numbers for 60 percent of the sampled individuals. In both the telephone group and the mixed mode group, face-to-face and web were offered as alternatives if no telephone number was available and to initial refusals. HRPs in the *web-only group* (3) received a login code with their invitation letters and completed all questionnaires by web. Household

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1 An exception was made for the web group: if the sampled person was a young adult child presumably living with their parents (deduced from auxiliary frame data), a parent was selected at random to act as the HRP instead. In both waves, in all three treatment groups household members were free to select an alternative HRP than the one initially approached.



*Figure 1* Illustration of the research design for the two-wave pilot study of the SHP\_IV (adapted from figure 1 in Voorpostel et al., 2020)

members in the *mixed mode* (2) and the *web-only group* (3) received login codes for their individual questionnaires after the HRP had provided information on the household composition. Upon request, respondents could be interviewed by telephone. In both experimental groups, two reminders were sent two weeks apart to decrease nonresponse to the web questionnaire. If a telephone number was available, the second reminder was replaced by a telephone contact.

Wave 2 followed the same protocols, but with 30 percent of the mixed-mode group switched to the protocol of the web-only group (*mixed-mode-to-web group*). This means that while 30% of the mixed-mode group switched on the household level from the telephone to the web, the remaining 70% kept the telephone on the household level. Due to splitting the sample at wave 2, the mixed-mode group started out with a larger sample size (2192 households) at wave 1 than the telephone group (790 households). As response rates tend to be lower in web surveys, the web group was also larger than the telephone group (1213 households). Figure 1 illustrates the research design.

Response rates in the first wave on the household level varied between 47% for the web group and 53% for the telephone group (the mixed-mode group obtained 52%). Of all household members included in the grid of participating households 69% (n=707) participated in wave 1 in the telephone group, 67% (n=1798) in the mixed-mode group, and 62% (n=879) in the web group. All households that completed at least the grid in the first wave and that had not left the study were re-approached at wave 2. Wave 2 also included 42 newly formed households from

split households. Response rates on the household level in wave 2 were 77% for the telephone group (332 households) and the mixed-mode group (621 households), 74% for the mixed-mode-to-web group (263 households), and 76% (459 households) for the web group. Individual level participation in wave 2 was 73% (n=570) in the telephone group, 72% (n=1006) in the mixed-mode group, 75% (n=460) in the mixed-mode-to-web group and 76% (n=807) in the web group.

### *Analytical sample*

As we analyse changes on the household level and on the individual level, we define analytical samples for households and individuals. We include only households and individual respondents who answered in the assigned mode. These comprise in the first wave 328 households including 603 individuals who participated by telephone in the telephone group (excluding 44 households (comprising 65 household members) who participated by face-to-face and 39 web respondents), 800 households (by telephone; excluding 79 households who participated by face-to-face) and 1579 individuals (by web; excluding 24 face-to-face respondents and 195 telephone respondents) in the mixed-mode group, and 349 households including 792 individuals who participated by web in the web group (excluding 74 households who participated by telephone with 87 household members who participated by telephone). In the second wave, these figures amount to 274 households (460 individuals) in the telephone group, 482 households (776 individuals) in the mixed-mode group, 211 households (431 individuals) in the mixed-mode-to-web group, and 342 households (713 individuals) in the web group. We imputed all independent variables used in the regression analyses using chained equations implemented in the iterative chain equations (ice) procedure in Stata (Royston and White 2011) and disregard cases with missing values for the dependent variables. All analyses are done using Stata 16 SE.

## **Measures**

### *Dependent variables: changes and events*

We examine nine dependent variables in the domains of work and family. All dependent variables refer to changes or event occurrence but were measured in different ways and sometimes refer to different time points. Most variables are based on questions asked to the respondent and some are constructed variables from multiple questions and may include information provided by the household reference person (which is then verified by the respondent). Changes and events were measured either directly by asking the respondent about them or indirectly by comparing the response provided in both waves. Except for change in the number of household members and whether the household moved, all variables are measured on

the individual level. For a change in jobs only employed respondents were included and for the experience of unemployment only respondents who were employed for at least one month in the year prior to the interview entered the analyses. Table 1 provides an overview of the dependent variables and gives details of how they are measured. As a result of these differences, the number of observations included in the analyses varies. All dependent variables in the regression analyses are dichotomous, indicating whether an event or change occurred.

### *Independent and control variables*

The main independent variable is the survey mode. We include the survey mode by distinguishing between the different experimental groups (telephone group (reference), mixed-mode group, mixed-mode-to-web group, web group). The mixed-mode group used telephone on the household level and web on the individual level. The mixed-mode-to-web group only refers to wave 2 (hence it equals 0 for all households in wave 1 and for households not part of the mixed-mode-to-web group in wave 2). This group completed all questionnaires by web and included those households that were moved from the mixed-mode group to the web group in the second wave. For the models estimating the dependent variables that were measured at both waves we pool observations from both waves and include a dummy variable indicating whether the observation came from wave 1 or wave 2 (1=wave 1, 2=wave 2). For the dependent variables on the individual level, we include whether the respondent was the HRP or another household member (1=HRP, 0=other respondents).

The regression models further control for the following socio-demographic variables associated with survey participation and panel attrition (Roberts & Vandeplass, 2017; Voorpostel et al., 2020). First, whether the household has a registered landline (information from the registry data, 1=yes, 0=no). The remaining control variables were measured in the survey, but consistency with information from the registry was very high (Voorpostel et al., 2020), indicating that there was hardly any measurement error in these variables: gender (1=male, 0=female), age in categories (14-30, 31-49, 50-60, 61-92), first nationality (Swiss, neighboring country, other country), education (1=tertiary level, 0=lower than tertiary level). Descriptive statistics for all dependent and independent variables are included in the Appendix.

Table 1 Overview of dependent variables

	Question formulation/other details	Person asked	Measurement of change/ event occurrence
<i>Work domain</i>			
Change in employment status	Constructed from detailed variables about working, distinguishing between working, unemployed and inactive	Individual	Change between waves
Change in jobs <sup>a</sup>	“Since (month, year), have you changed jobs or employers?”	Individual	Reported in both waves
Experience of at least one episode of unemployment <sup>b</sup>	“We are going to review the months since (month, year) and for each month you should tell me whether your main activity was: full-time employee, part-time employee, full-time self-employed, part-time self-employed, unemployed, retired, training/education, housework, or any other situation?”	Individual	Reported in both waves
<i>Family/household domain</i>			
<i>Individual level</i>			
Change in partnership status	“Do you have a partner?” (yes, living together/ yes, not living together/ no	Individual	Change between waves
Change in civil status since last wave	Civil status of household members is provided by HRP in grid questionnaire, respondent confirms in individual questionnaire	HRP Individual	Change between waves
Termination of relationship	“Since (month-year), has a close and important relationship ended?” (yes/no)	Individual	Reported in both waves
Death of close other	“Since (month-year), has a person closely related to you died?” (yes/no)	Individual	Reported in both waves



	Question formulation/other details	Person asked	Measurement of change/ event occurrence
<i>Household level</i>			
Change in household size <sup>c</sup>	Constructed from information on household composition	HRP	Change between waves
Residential move <sup>d</sup>	“Did you move to another accommodation since (date of the last interview)?”	HRP	Reported in second wave

<sup>a)</sup> Only employed respondents answered these questions

<sup>b)</sup> Only respondents who experienced a change in employment situation answered these questions. We included respondents who worked at least one month.

<sup>c)</sup> In case a household splits, we define this change to be missing for the newly established household.

<sup>d)</sup> In case a household splits and both new households remain in the study, the HRP of both households are asked whether they moved or not.

## Results

We first explore bivariate differences by mode in the reporting of changes and events. Table 2 presents the distribution of the dependent variables by mode. The table shows the percentage of respondents who reported the change or event, who reported no change or event, and who had a missing value on the item, meaning they replied with “don’t know” or “no answer” (item nonresponse, INR). A clear pattern that emerges for all variables, and that is in line with previous studies, is that the respondents who replied by web had a higher percentage of INR.

When we disregard the INR and only include substantive responses, we find significant differences only in the work domain, where web respondents were more likely to report a change in jobs or a change in employment status. For none of the other events and changes we find significant differences between telephone and web.

Tables 3.1 to 3.3 present the results of the regression models using linear probability regression models predicting probability of experiencing the event or the change. We control for experimental group (which take the complete experimental design into account), wave and whether the respondent is the HRP (base model) and add in a second step all independent variables to assess whether significant mode effects change upon controlling for selection. The experimental group determines the mode on each level (household or individual) such that including mode is not necessary.

In the domain of employment (change in jobs, experience of unemployment, change in employment status), we find significant effects for the experimental groups for all three dependent variables in the multivariate models, although effect sizes are modest. These significant effects remain unaltered after controlling for the composition of the sample. The distinction between the experimental groups reveals that the differences are not only related to the mode (as analyzed in Table 2) but vary by the combination of modes used on the household and individual level in different ways. Table 2 shows that a change in employment status is more often reported in the web group than in the telephone group (with a significantly higher probability of .04). Yet, while comparable in magnitude, Table 3.2 shows that the difference to the telephone group (between .03 and .04) is only significant (5%) for the web group. To simplify interpretation, we find from the models in Table 3.2 predicted probabilities of a changed employment status in the controlled model of 10.4% in the telephone group, 13.0% in the mixed mode group, 14.4% in the mixed mode to web group, and 14.8% in the web group. For a change in jobs (Table 3.1) it is the opposite: respondents in the mixed-mode groups are more likely to report job changes (the probability is .06 higher) than respondents in the telephone group, whereas the web group does not differ significantly. Another association emerges for the experience of unemployment (Table 3.1): the mixed-mode-to-web group,

*Table 2* Distribution of the variables measuring change and event occurrence by mode and wave (significant (5% level) differences by mode in bold)

	Wave 1				Wave 2 change between waves			
	N	No (%)	Yes (%)	INR (%)	N	No (%)	Yes (%)	INR (%)
Change in employment situation <sup>#</sup>	Tel.				428	<b>90.0</b>	<b>10.0</b>	0.0
	Web				1640	<b>86.0</b>	<b>14.0</b>	0.0
Change in jobs	Tel.	383	<b>91.1</b>	<b>8.1</b>	290	<b>91.4</b>	<b>8.6</b>	0.0
	Web	1642	<b>83.5</b>	<b>13.1</b>	1287	<b>82.0</b>	<b>14.5</b>	3.6
>=1 month unemployed <sup>*</sup>	Tel.	434	97.2	2.8	319	97.5	2.5	0.0
	Web	1681	96.5	3.5	1350	96.7	3.3	0.0
Change in partnership status	Tel.				427	93.0	7.0	0.0
	Web				1619	93.0	5.9	1.1
Change in civil status	Tel.				428	97.9	2.1	0.0
	Web				1640	98.4	1.5	0.1
Termination of close relationship	Tel.	603	93.5	6.5	460	91.1	8.9	0.0
	Web	2371	91.3	6.8	1920	88.4	8.9	2.7
Death of closely related person	Tel.	603	75.1	24.9	460	78.5	21.1	0.4
	Web	2371	76.4	21.5	1920	77.3	20.2	2.4
Change in household size <sup>#</sup>	Tel.				713	91.4	8.6	0.0
	Web				483	88.8	11.2	0.0
Residential move	Tel.				756	94.6	5.4	0.0
	Web				553	91.5	6.1	2.4

*Note:* Significance calculated by means of t-tests excluding possible item nonresponse (INR). Probability tests provided almost identical values to the t-tests.

<sup>#</sup> constructed variable, therefore no missing values.

<sup>\*</sup> Of the 12 months before the first interview (or the months since the last interview in the 2018 survey) a valid response about the type of employment (working, inactive, unemployed) is given for 92% of respondents in the telephone mode and 84% in the web mode. Only these valid responses are taken into account here.

Table 3.1 Regressions results: Coefficients from linear probability (OLS) models (marginal effects), individual level, dependent variable measured at both waves

Model	Change in jobs		Experience of unemployment		Termination of relationship		Death of close other	
	base	controlled	base	controlled	base	controlled	base	controlled
Registered landline		-0.0254*		-0.000478		0.0120		0.0106
Male		0.00207		-0.00725*		-0.0356**		-0.0194
Age 31-49 (Ref.: 18-30)		-0.150**		-0.0121**		-0.103**		0.0171
Age 50-60		-0.200**		-0.0189**		-0.124**		0.0522**
Age 61-92		-0.182**		-0.0209**		-0.137**		0.0660**
Neighboring country (Ref.: Swiss)		0.0772**		0.0185**		-0.0101		-0.0278
Other country		-0.0192		0.00293		-0.00804		-0.0581*
Tertiary education		0.0292*		-0.00223		-0.0172*		0.00299
Reference person		-0.0423**		-0.000678		-0.0270**		0.000695
Wave		-0.0187		-0.00373		0.0252*		-0.0232
web group (Ref.: telephone)	0.0168	0.0190	0.00926*	0.00959*	-0.0181*	-0.0183*	-0.0156	-0.0129
mixed mode group	0.0640**	0.0670**	0.0102	0.0114	0.00135	-0.00134	0.0219	0.0207
mixed mode to web group	0.0620*	0.0657**	0.0210**	0.0221**	-0.0136	-0.0140	-0.00609	-0.00194
Constant	0.160**	0.272**	0.0108	0.0238**	0.0609**	0.142**	0.253**	0.239**
N (Observations)	3,497	3,497	3,700	3,700	5,257	5,257	5,256	5,256
R-squared	0.008	0.061	0.003	0.012	0.005	0.047	0.001	0.008

Note: \*\* p<0.01, \* p<0.05

Table 3.2 Regressions results: Coefficients from linear probability (OLS) models (marginal effects), individual level, dependent variable measured as change between waves

Model	Change in employment status		Change in partnership status		Change in civil status	
	base	controlled	base	controlled	base	controlled
Registered landline		0.0131		-0.0119		-0.0214**
Male		-0.0227		-0.00926		-0.00459
Age 31-49 (Ref.: 18-30)		-0.162**		-0.168**		-0.00137
Age 50-60		-0.161**		-0.180**		-0.00582
Age 61-92		-0.119**		-0.196**		-0.0150
Neighboring country (Ref.: Swiss)		0.00288		-0.0259		-0.0114
Other country		0.0767*		-0.0633**		-0.00499
Tertiary education		-0.0308		0.0177		0.00845
Reference person	-0.0519**	-0.00622	-0.0169	0.0288**	0.0207**	0.0202**
web group (Ref.: telephone)	0.0436*	0.0436*	-0.00777	-0.0139	-0.00283	-0.00574
mixed mode group	0.0255	0.0260	-0.0119	-0.0183	-0.00302	-0.00461
mixed mode to web group	0.0386	0.0401	-0.0179	-0.0236	-0.00653	-0.0100
Constant	0.131**	0.229**	0.0801**	0.216**	0.00896	0.0322**
N (Observations)	2,068	2,068	2,029	2,029	2,067	2,067
R-squared	0.009	0.048	0.002	0.091	0.007	0.018

Note: \*\*\* p<0.01, \* p<0.05

*Table 3.3* Regressions results: Coefficients from linear probability (OLS) models (marginal effects), household level, dependent variable measured as change between waves (household size) or at wave 2 (residential move)

Model	Change in household size		Residential move	
	base	controlled	base	controlled
Registered landline		-0.0409*		-0.0565**
Male		0.00827		0.0230
Age 31-49 (Ref.: 18-30)		-0.0796*		-0.0673**
Age 50-60		-0.0201		-0.110**
Age 61-92		-0.0899*		-0.123**
Neighboring country (Ref.: Swiss)		-0.0508		-0.0220
Other country		-0.0584		0.0147
Tertiary education		0.0305		0.00611
web group (Ref. : telephone)	0.0284	0.0198	0.000175	-0.0123
mixed mode group	-0.00458	-0.00183	-0.0180	-0.0157
mixed mode to web group	0.0157	0.00556	-0.00744	-0.0177
Constant	0.0885**	0.173**	0.0657**	0.187**
N (Observations)	1,196	1,196	1,296	1,296
R-squared	0.002	0.024	0.001	0.051

Note: \*\*  $p < 0.01$ , \*  $p < 0.05$

and to a lesser extent the web group are more likely to report unemployment than the telephone group with a probability that is .02 (mixed-mode-to-web group) and .01 (web group) higher, whereas the mixed-mode group does not differ significantly from the telephone group. In sum, changes and events in the domain of employment are more often reported by web respondents, although within the web respondents some variation by experimental group exists (i.e., if the household level is answered by web or telephone in one or both waves).

Among the changes and events in the family domain (change in partnership status, change in civil status since last wave, termination of relationship, death of close other), we find little evidence of differences in reporting by mode. Only for the termination of a relationship we find that respondents in the web group reported this event less frequently than telephone respondents, although the size of the effect was small (-.02). For the two dependent variables on the household level, a change

in the number of household members and whether the household moved, we find no difference by experimental group.

## Conclusion

Using the two-wave pilot of the Swiss Household Panel collected in 2017 and 2018, we examined whether there were any differences between the use of telephone and web as a mode of data collection with respect to the reporting of changes over time or the experience of events. Although there is a growing body of research indicating measurement differences by mode, mode differences in longitudinal measurement have so far not received much attention (but see, e.g., Brown & Hancock, 2015). As a first exploratory step, this study assesses differences in reporting by telephone and web mode for several variables in the domain of work and family. These variables either measure change or event occurrence directly by asking the respondent about it (e.g., the experience of unemployment), or by capturing differences in response in the two waves (e.g., a change in civil status).

We find differences by experimental groups that used different modes for the work-related variables, with web respondents somewhat more likely to report changes and events compared with telephone respondents. Moreover, these differences do not disappear once the socio-demographic composition of the sample is taken into consideration, suggesting that it is not driven by observed differences in characteristics of the respondents ending up in each mode due to differences in coverage or the likelihood of a respondent to answer in one or the other mode (nonresponse error). Although other characteristics not included in the study could play a role, these findings suggest that there may be differences in response behavior. Yet, these differences are relatively modest, and are also not simply a clear mode effect: the difference in the protocol matters in the sense that not all protocols including web on the individual level differed from the telephone protocol. We find no clear pattern here: for a change in employment status the web group differed from the telephone group and for a change in jobs the mixed-mode groups differed from the telephone group. The difference between web and telephone is, however, larger than the differences among the different web protocols. The differences between the web protocols can be an artifact due to varying sample sizes, or possibly the mode on the household level matters for responses given on the individual level. This deserves further exploration in future research.

Finally, whereas the employment changes and events were more common in the web group, the termination of a relationship was more common in the telephone group than in the web group. This shows that one mode does not necessarily measure more change or events than another, this may be depending on the variable in question.

We looked in this study only at a limited number of events and changes. As not all changes and events were reported more frequently by web respondents, we cannot generalize to other domains. Future research should incorporate other events and changes. Another limitation is the possibility that although we controlled for several socio-demographic variables and only analyzed respondents who answered in their assigned mode, there may still be uncontrolled selection in the two modes. Also, slightly different initial non-response or attrition across modes may have resulted in somewhat different samples.

In conclusion, although some differences by experimental group emerged, they were small with no clear pattern across work and family variables. For employment status variables, we find evidence that longitudinal data collected by web would produce a higher number of changes and events that respondents report. This finding further underlines the differences between web and telephone as a mode of data collection. Therefore, as web and telephone differ in important ways, longitudinal analyses of data collected in these two modes in a mixed-mode design should always incorporate the mode to obtain valid conclusions.

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## Appendix

Descriptive statistics (all variables are binary 0/1 variables). Item nonresponse excluded

	N Individual level	Mean Individual level	N Household level	Mean Household level
Change in employment situation	2068	13.2	-	-
Change in jobs	3497	13.1	-	-
Episode of unemployment	3784	3.3	-	-
Change in partnership status	2029	6.2	-	-
Change in civil status	2067	1.6	-	-
Termination of relationship	5257	7.8	-	-
Death of close other	5256	21.8	-	-
Change in household size	-	-	1196	4.1
Residential move	-	-	1296	5.8
Telephone group	5354	19.9	2786	21.6
Both mixed-mode groups (1st wave)	5354	29.5	2786	28.7
Mixed-mode group (2nd wave)	5354	14.4	2786	17.2
Mixed-mode-to-web group <sup>a)</sup> (2nd wave)	5354	8.1	2786	7.6
Web group	5354	28.1	2786	24.8
Wave	5354	1.45	2786	1.47
Registered landline	5354	68.9	2786	68.4
Male	5354	48.3	2786	43.7
Age 14-30 (for HRP min is 18)	5354	25.6	2786	7.0
Age 31-49	5354	30.7	2786	34.6
Age 50-60	5354	22.0	2786	26.5
Age 61-92	5354	21.7	2786	32.0
Swiss	5354	86.9	2786	87.0
Neighboring country	5354	6.9	2786	7.4
Other country	5354	6.1	2786	5.6
Tertiary education	5354	27.9	2786	31.4
Reference person	5354	47.4	-	-

<sup>a)</sup> The mixed-mode-to-web group is 1 for the observations from the second wave of the households that were moved to the web protocol, and 0 otherwise.