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Survey Participation in the Time of Corona: An Empirical Analysis of the Effect of the COVID-19 Pandemic on Survey Participation in a Swiss Panel Study

Rolf Becker
Department of Sociology of Education
University of Bern, Switzerland

Sara Möser
Department of Sociology of Education
University of Bern, Switzerland

Nora Moser
Department of Sociology of Education
University of Bern, Switzerland

David Glauser
Department of Sociology of Education
University of Bern, Switzerland

The singular effect of a public shutdown in spring 2020—as a result of non-pharmaceutical official orders and arrangements in the course of the COVID-19 pandemic—on survey participation is investigated. The analysis is focused on panellists born around 1997 and living in German-speaking cantons of Switzerland. Utilising the techniques and procedures of event history analysis, the paradata of the fieldwork period are analysed in a dynamic micro–macro design. Several competing time-varying effects on the panellists' survey participation and changes in the pandemic progress are controlled for, in addition to time-constant covariates, such as their education and social origin. Indeed, it becomes obvious that the public shutdown during the first wave of the pandemic improved the target persons' propensity for survey participation.

Keywords: SARS-CoV-2, COVID-19, coronavirus pandemic, panel data, event history analysis, episode splitting, online survey, micro-macro design

1 Introduction

This empirical study investigates the impact of the pandemic caused by the new coronavirus disease 2019-nCov (COVID-19)—an infectious disease caused by SARS-CoV-2 and recognised since February 2020 in Switzerland—on the rate and timing of participation in an online survey. As in other countries, the spread of the SARS-CoV-2 virus resulted in a dramatic increase in cases of infection, and fatalities as a consequence of this. It is interesting for survey methodological research to reveal *whether* and *how* the COVID-19 crisis has caused problems in the fieldwork of social-scientific surveys conducted during this pandemic period (Sastry, McGonagle, & Fomby, 2020; Schaurer & Weiß, 2020). On the one hand, the dramatic increase in infections and fatalities could have had an adverse impact on the survey climate (Groves, Cialdini, & Couper, 1992; Groves & Couper, 1998; Loosveldt & Joye, 2016). From this point of view, due to the increased uncertainty and anxiety in the population, there might a decreasing intention and inclination for survey participation among target persons. On the other hand, the public shutdown imposed by official non-pharmaceutical interventions and administrative arrangements to fight the spread of coronavirus could result in positive effects on the response rate.[1] Due to constrained alternatives in daily life (e. g., the

Contact information: Rolf Becker, University of Bern, Department of Sociology of Education, Fabrikstrasse 8, CH–3012 Bern, Switzerland, (e-mail: rolf.becker@edu.unibe.ch)

Editor's note: The results of this study have been replicted with new data after the acceptance of this paper. The results of this re-analysis can be found in a postscript to this paper, published in this issue of *Survey Research Methods* (R. Becker, Möser, Moser, & Glauser, 2022)

[1] In Switzerland, the first case of infection with the new coronavirus disease 2019-nCov (COVID-19) was officially confirmed on 25 February 2020 by the Swiss Federal Office of Public Health (2020b). Three days later, the Swiss government declared the first regulation—including non-pharmaceutical interventions—to fight the spread of coronavirus, followed by a revised regulation declared on 16 March 2020. These administrative orders have since been continually revised (by more than 32 orders prior to the end of May 2020), resulting in a public shutdown in terms of the closure of schools, restaurants, and shops (except grocery stores); the prohibition of public events; the relocation of work to home offices; limitations on social contact; the closure of borders with neighbouring countries; and the temporary suspension of personal air traffic. However, in contrast with other countries such as Italy (a southern

closure of cultural locations, limited personal contact, restricted geographical mobility, and reduced working hours), the opportunity costs of survey participations would be low compared to previous periods. Thus, taking part in a survey could be a welcome distraction during the public shutdown.

These impacts of the COVID-19 outbreak on survey participation are investigated in spring 2020. The target population were youths born around 1997 and living in German-speaking cantons of Switzerland. They are panellists in an established longitudinal study on educational and occupational trajectories (R. Becker, Glauser, & Möser, 2020). In the context of this panel study, there is a unique opportunity to investigate the consequences of a public shutdown during the pandemic period on the response rate. The panellists were interviewed in May and June 2018, two years before the COVID-19 outbreak. They were then interviewed again in the same months of 2020, during the coronavirus crisis. The same sequential mixed-mode design has been used (R. Becker, 2022) and the eligible target persons received identical monetary incentives (R. Becker et al., 2020). The same push-to-web strategy (D. A. Dillman, 2017), the same burden for survey participation, and the same topic of interest for the panellists (Stocké & Becker, 2004; Stocké & Langfeldt, 2003) were applied. In sum, for these two waves, the question arises whether the coronavirus pandemic and the end of the public shutdown during the fieldwork had a positive or a negative impact on the timing and the amount of survey participation after the invitation to participate in the respective survey wave. In order to avoid sample selection bias, it is also analysed whether the pattern of the pandemic at the macro level, as well as the official reaction to this pandemic at the meso level, have had systematic impacts on social selectivity in survey participation at the micro level.

In the second section of this contribution, the theoretical background and hypotheses are outlined. The third section describes the data, variables, design, and statistical procedures. The empirical findings are presented in the fourth section. Finally, the fifth section summarises the results and provides a conclusion.

2 Theoretical background

For an explanation of individual participation in longitudinal studies, such as a multi-wave panel survey, it seems plausible that the decision of target persons to respond or to refuse is based on a subjective benefit-cost calculation regarding these alternatives—i. e., an individual cognitive assessment comparing advantages and disadvantages (Keusch, 2015; Singer, 2011, p. 388; D. Dillman, Smyth, & Christian, 2014; Groves & Couper, 1998; Groves, Singer, & Corning, 2000). In the case of experienced panellists, the deliberate, analytical, and thorough consideration of all the pertinent information as a result of the cost-benefit calculation and a decision on survey participation might not be prevalent (Groves et al., 1992; Groves & Couper, 1998; Singer, 2006). In most cases, the panellists have internalised the definition of the social situation, as well as the assessment of the cost and benefit of survey participation, so that the decision becomes a habitual routine. In accordance with the concept of bounded rationality (Simon, 1959), the decision regarding response or refusal is dominated by the activation of cognitive heuristic routines of situation and action (Groves & Couper, 1998, p. 32). Therefore, it is observed that most experienced panellists habitually start participating immediately after receiving the invitation letter, which—in the case of our panel study—encloses a prepaid monetary incentive (R. Becker, Möser, & Glauser, 2019; Castiglioni, Pforr, & Krieger, 2008; Pforr et al., 2015; Singer & Ye, 2013). Each of the target persons in this panel study received the invitation letter at the same time.

However, what happens if the well-known setting and features of daily routines in general, and of social-scientific surveys in particular, change dramatically due to drastic events and processes? What effect did the temporary public shutdown following the COVID-19 outbreak and sustained pandemic, with far-reaching consequences for the population and societal order, have on the target persons' propensity to take part in a survey? In view of the fact that the COVID-19 crisis in the spring of 2020 impacted on the social environment and the everyday life of panellists, it is likely that they had to reframe the invitation to take part in a web survey. Furthermore, they had to recalculate the subjective expected benefits of survey participation as well as the related burdens in terms of opportunity costs (Auspurg, 2020; Couper & Groves, 1996, e. g.). This might also be true for loyal and experienced panellists.

It would be obvious to assume that the COVID-19 crisis resulted in a decline in response rates, strengthening the long-term trend of increasing nonresponse (D. Dillman et al., 2009; Groves, 2006; Singer, 2006). The adverse impact of the pandemic on the survey climate, the level of affectedness of an individual by the coronavirus or the social disintegration caused by official arrangements of public shutdown, would lead us to expect a decreasing propensity towards survey participation among target persons. On the basis of cost-benefits explanations of survey participation, however, alternative hypotheses could be derived. It seems likely that the

neighbouring country of Switzerland) or France (a western neighbouring country), there were no strict lockdowns: the Swiss population was not required to stay at home. Furthermore, the public health system has been reorganised in response to the increasing amount of contagion and the serious progression of the disease. As a result of these measures, economic production slowed dramatically and part-time work increased rapidly. Due to the decreasing factor of infectious reproduction, the orders relating to the pandemic were relaxed and largely abolished after 10 May 2020 in Switzerland.

benefits of survey participation increased during the partial public shutdown in each of the Swiss cantons between 17 March and 10 May 2020. The target persons in our panel study received the invitation letter 10 days before the end of this shutdown on 1 May 2020. Thus, during the initial stage of fieldwork at least, participation might have provided welcome cognitive and emotional entertainment in a constrained and unfamiliar daily life. With regular schooling, training, and work unavailable, survey participation might be a pleasant indoor activity for participants, compared to other less enjoyable everyday routines. The entertainment value of the questionnaire during the difficulty of partial isolation, and the need to talk induced by the circumstances of the COVID-19 crisis might significantly increase the inclination of invitees to take part in a survey launched during a period of public shutdown.

The public shutdown and its consequences for the everyday life of panellists could result in decreasing opportunity costs of survey participation. This cost factor is supposed to be one of the meaningful mechanisms explaining the decision of target persons to take part in a survey. In the case of a strict lockdown (as observed in Italy, Spain, or France), one could argue that—due to the lack of interesting alternatives, such as outdoor leisure activities—target persons should have more, and therefore enough, time to take part in the online survey in their subjective view. In the Swiss case, however, it was permitted for the target persons to leave their home for individual outdoor activities. These few opportunities could be compelling enough to postpone survey participation to another time. In this respect, it could be assumed that the pandemic had no significant effect on survey participation. However, it is difficult to indicate the opportunities available to target persons for different activities exactly across the field period. Therefore, the weather situation might be an adequate proxy for incentives to start or to postpone the completion of the questionnaire (R. Becker, 2021). For example, it is evident that "pleasant" weather conditions that are attractive for outdoor activities increase the opportunity costs for indoor activities such as completing an online questionnaire (Göritz, 2014). Therefore, it is probable that panellists will postpone their survey participation to a later, more convenient point in time, e. g., to a day with "unpleasant" weather conditions—even during a period of public shutdown. It has to be clarified empirically whether meteorological impacts exceed the impact of the pandemic on the participation of the panellists in the web survey. However, the COVID-19 crisis and the partial shutdown of public life was, in contrast to the weather situation, a unique event in the life of the panellists. The imprinting of the pandemic on the panellists' survey participation might be strong. Thus, the response rate is expected to be significantly higher during the period of the pandemic-related shutdown than in other periods (Hypothesis 1).

As an unintended consequence of the pandemic situation in the initial field period, the timing of survey participation might be different in the most recent wave, compared to the previous wave in 2018. It should therefore be shown that the latency—i. e., the average time that elapses between survey launch and panellists' participation—is much lower at this time interval of public shutdown. In this way, a positive effect of the public shutdown on participation is likely to exist regardless of the total response rate at the end of the survey. Additionally, even when the response rates are equal for both panel waves, the differences in the timing of survey participation in the initial stage of the field period across the consecutive waves might indicate an effect of the pandemic. It is also indicated indirectly that opportunity costs are indeed meaningful for the target persons' response behaviour. Overall, the latency of survey participation will be systematically lower during the period of public shutdown than in other periods (Hypothesis 2).

However, it is reasonable to believe that the public shutdown will have the opposite effect on survey participation. For example, one can assume that public discussions about the disease, the outbreak, and official arrangements resulted in individual uncertainty, confusion in families, and decreased interest among panellists in survey participation. This could be true for those who experienced a coronavirus infection in their family or were infected themselves. It might be valid for those who lost their training opportunity or workplace due to their employers suffering from economic troubles as a consequence of the shutdown, or for those who were exhausted mentally due to the stress caused by the pandemic. It might be true for young people, the target population of the DAB panel, who could not start or continue their vocational education and training. Some of them might have lost their apprenticeship position or their job. Juveniles in baccalaureate schools or in university training had to switch to home schooling or virtual learning platforms. In the debate regarding the social and economic consequences of COVID-19 on the wellbeing of individuals, the social selectivity of personal resilience in times of crisis is emphasised (Leopoldina (Nationale Akademie der Wissenschaften), 2020). For Switzerland, it has been found for the first wave of coronavirus pandemic that the level of stress in the workplace decreased for highly educated people. People with a lower educational level reported a constant stress level (Klaas et al., 2021). It is supposed, therefore, that panellists with a high educational level are more likely to take part in a survey launched during the period of public shutdown than their counterparts (Hypothesis 3).

Finally, it could be argued that it is difficult to isolate a pandemic effect on both the likelihood and the timing of survey response. They could result from other impacts on response competitive with the pandemic effect. Since participation in a social-scientific survey is generally voluntary,

the individuals asked to take part are free to accept or reject that request (Groves & Couper, 1998, p. 1). Their decision regarding survey participation is thus based on their free will. They can therefore also choose their own time to fill out the questionnaire (Groves & Couper, 1998, p. 32). They can start completing the questionnaire immediately after the invitation, at a later more convenient point in time, or never. On the one hand, it is observed that experienced panellists are more likely start completing a questionnaire immediately after the survey launch (R. Becker et al., 2019). On the other, several studies provide evidence that the likelihood of survey participation declines across the fieldwork period (Keusch, 2015; Sigman, Lewis, Yount, & Lee, 2014). In this case, even for experienced panellists, it is necessary to renew their potential interest in taking part in the online survey by sending them digital reminders (D. Dillman et al., 2014). A maximum of three follow-ups, the typical number of email reminders in web surveys, are considered to be enough to increase an invitee's propensity to participate in an online survey (R. Becker, 2022; Muñoz-Leiva, Sánchez-Fernández, Montoro-Ríos, & Ibáñez-Zapata, 2010; Rao & Pennington, 2013; Sauermann & Roach, 2013). However, it is possible that such follow-ups—sent out at frequent intervals—could compensate for the negative impacts of the COVID-19 crisis on response behaviour. Therefore, it is supposed that the potentially negative effect of public shutdown on survey participation is eliminated by the digital reminders (Hypothesis 4).

3 Data, design, variables, and statistical procedures

3.1 Data base

The empirical analysis is based on longitudinal data from the DAB panel study (R. Becker et al., 2020; DAB, 2020). In particular, *paradata* from the online surveys (i. e., time stamps and status of participation) includes exact time references for the survey participation (Kreuter, 2015; West, 2011). These paradata are combined with information about the panellists. The target population of the DAB study comprised of eighth graders of the 2011/12 school year (born around 1997) who were enrolled in regular classes in public schools placed in German-speaking cantons of Switzerland. The panel data were based on a random and 10-percent stratified gross sample of 296 classes (8th grade), out of a total universe of 3,045 classes. A disproportional sampling of school classes from different school types and a proportional sampling of school classes regarding the share of migrants within schools were applied. At school level, a simple random sample of school classes was chosen.

The DAB panel study was initiated to investigate the youths' educational and occupational trajectories after the end of compulsory schooling (R. Becker et al., 2020; Glauser, 2015). Between January 2012 and June 2018, seven waves were realised. The most recent (Wave 8) was conducted in May and June 2020, while Wave 7 was realised two years ago in the same months of the year. Since Wave 5, different incentives have been used for each of the individuals in the gross sample to minimise panel attrition (R. Becker & Glauser, 2018). In the two latest waves (Waves 7 and 8), the eligible panellists received cash (10 Swiss Francs) as an unconditional prepaid incentive. The use of this incentive has been proven to be highly effective in increasing the response rate in this panel study (R. Becker et al., 2019). Across panel waves, the realised response rates were constant at a high level of about 80 per cent. In the recent waves, the highest response rates were realised in the online mode.

In this study, the empirical analysis focused on the online mode only and the observation window was limited to 28 days (R. Becker, 2021). From the previous waves, we have learned that the response rate stagnates after four weeks of the field period, while the majority of eligible panellists (90%) used the online mode instead of the telephone mode (R. Becker, 2022). The detection of the pandemic effect in which we are interested in should not be dependent on the survey mode. Furthermore, we are interested in the effect of the pandemic and in the role of the public shutdown on the response rate. The dynamics of the pandemic and the related public shutdown occurred in the first two weeks of the field period in Wave 8 before the second survey mode had been offered to the invitees.

3.2 Survey design

In order to reveal the impacts of the coronavirus pandemic on the response rate in Wave 8 compared to the previous rate of participation in Wave 7, several conditions were controlled for. The samples of Waves 7 and 8 consisted of panellists whose educational and occupational trajectories had been followed by the study for at least six years. Therefore, it can be assumed that they are loyal and enjoy participation (Lynn et al., 2017). They are familiar with the core topic of the survey—their life course (Groves, Presser, & Dipko, 2004; Zillmann, Schmitz, Skopek, & Blossfeld, 2014). They know the researchers and the sponsor of the study, its procedure, and the benefits, costs, and burdens of survey participation. The two waves we have focused on in this contribution were conducted in the same months of the year: in May and June of 2018 and of 2020. In both waves, the respondents were invited to participate in the web survey by an invitation letter—sent by regular mail and by email—using the same wording. This included the same unconditional cash incentive—a 10 Swiss Francs bank note—as well as a personalised link and an access code for the online questionnaire. In Wave 7, the respondents received the invitation on 4 May 2018; in Wave 8, they received it on 1 May 2020. Furthermore, the duration was standardised by considering the same time interval of 28 days after the invitation to participate in the online survey.

Therefore, the analysis was limited to May 2018 and to May 2020.

Additional conditions which could have an impact on the response rate, such as the weather situation or the dynamic of the pandemic, were controlled for in the multivariate analysis of the participation pattern. However, not all of the possible influences could be controlled for—for example, the situation of the contacted individuals during this pandemic or their subjective perception, expectations, and evaluation of the invitation to interview. Finally, it has to be noticed again that we do not know what might have happened to the panellists between the two waves, except for the occurrence of the pandemic. Therefore, as already mentioned above, we have to assume that the panellists had not experienced events that would have a significant impact on their propensity for survey response.

3.3 Dependent and independent variables

The dependent variable is the panellists' survey response. In particular, the duration (measured on a daily basis) between the invitation to participate and beginning to fill out the online questionnaire is of interest. For Wave 7, the response rate was defined as the ratio of contactable units and their response in terms of starting and completing the questionnaire (RR2 according American Association for Public Opinion Research, 2016). In Wave 8, the cases of non-contact and non-ability were additionally taken into account (RR1 according American Association for Public Opinion Research, 2016, p. 16).

One of the most crucial independent time-varying variables at the macro level deals with the recent coronavirus pandemic. Macro information on the COVID-19 crisis—including the number of infections per day, the number of hospitalisations per day, and the number of fatalities per day (Figure 1)—was taken into account. This information was taken from the website of the Swiss Federal Office of Public Health (2020b). At the start of the field period, 29,922 infections had been indicated since 24 February 2020 and 1,549 people had died due to SARS-CoV-2. In sum, the pandemic slowed during the field period but was on everybody's mind due to information from the mass media (e. g. "SRF (Schweizer Radio und Fernsehen; Swiss Radio and Television)," 2020). At the end of the observation window (midnight on 27 May), 30,812 cases of infection and 1,656 fatalities had been counted by the official statistics.

The policies concerning this pandemic at the meso level are indicated by the period of partial public shutdown. The Swiss Government remitted regulations for provisions in order to defeat the SARS-CoV-2 virus from 13 March 2020 onwards. As a result of these regulations, public life came to a standstill until 10 May 2020. After 11 May 2020, compulsory schools reopened, provided they put in place safety precautions for the pupils and teachers. This was also true for public spaces such as shops, restaurants, markets and supermarkets, museums, theatres, cinemas, and libraries. Some sports activities for fewer than five persons became possible, provided there was no bodily contact. In our analysis, this public shutdown is indicated by a dummy variable. Its value is 1 for the period between 1 May and 10 May 2020 (within the observation window between 1 May and 28 May 2020, as depicted by the dashed and dotted line in Figure 1). For other periods, the value is 0.

Another explaining exogenous variable is information on the weather situation in May 2018 and May 2020 (R. Becker, 2021). The following indicators are considered, for German-speaking cantons only, as average measures on a daily basis: air temperature by day (in degrees centigrade); relative humidity (in per cent); rainfall (in millimetres); duration of sunshine (in hours); and barometric pressure (in hectopascal). These time-varying meteorological indicators were taken from the SwissMeteo website of the Federal Office of Meteorology and Climatology (MeteoSwiss) (2020). In order to reduce complexity and multicollinearity in the time series, confirmatory factor analysis was applied to these four time series separately for each of the waves (Harrington, 2009). The weather situation in May 2018 explains almost 93 per cent of the variance in these different time series. About 94 per cent of the variance is explained in May 2020. The development of the weather situation is depicted in Figure 2. The higher the factor scores, the higher the temperatures and the humidity, and the longer the duration of sunshine. Lower factor scores indicate uncomfortable, i. e., cold and rainy, weather.

Regarding the social characteristics of the target persons, different time-constant sociodemographic characteristics of the panellists are considered in order to control for their impact on response. Based on previous studies that have frequently found women to be more likely to respond to web surveys than men (Keusch, 2015, p. 186; Green, 1996, p. 176), the panellists' gender (reference category: male) is used. Since there is constant evidence that the socioeconomic conditions in which target persons have grown up (including welfare, integration, and environment) affect their survey participation, their social origin is included in the multivariate analysis (Groves & Couper, 1998, p. 30). Social origin is indicated by the class scheme suggested by Erikson and Goldthorpe (1992). This class scheme is a well-established concept to indicate the class position of a private household. The social classes are categorised by the market situation, employment relationship, and working conditions of the employees in the household.

According to Green (1996), education and achievement correlate positively with survey response rates. The panellists' education is measured by the school type—such as lower secondary schools with basic or intermediate requirements and pre-gymnasiums implying advanced requirements

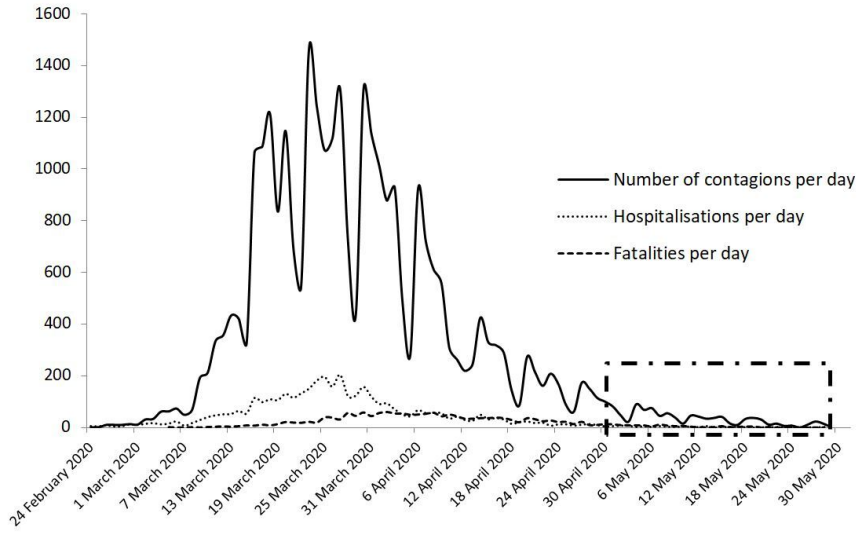

Figure 1. The coronavirus pandemic in Switzerland (24 February-31 May 2020): absolute prevalence (Swiss Federal Office of Public Health, 2020a, author presentation)

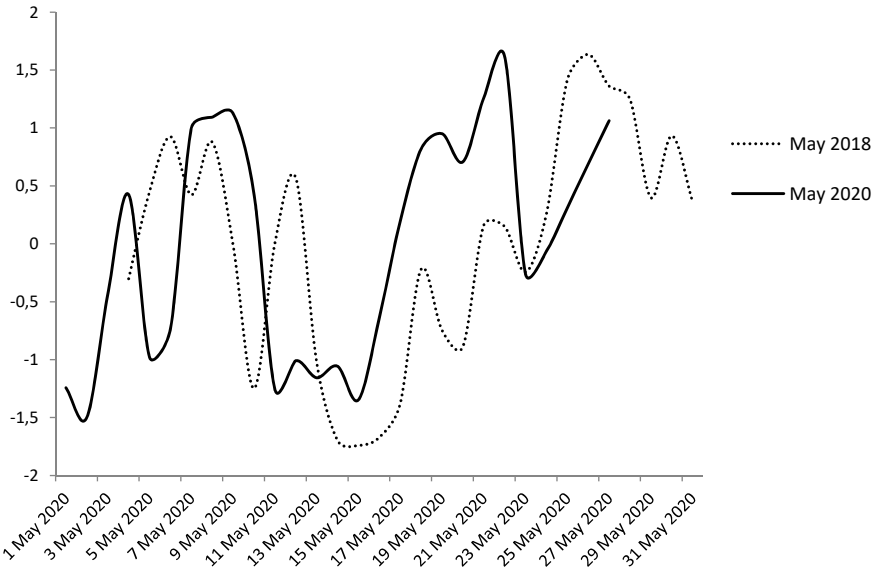

Figure 2. The weather situation in May 2018 and May 2020 (factor scores) (Federal Office of Meteorology and Climatology (MeteoSwiss), 2020, author presentation)

(reference category: miscellaneous school types such as integrative schools without selection)—in which they were enrolled at the end of their compulsory schooling. Their education is positively correlated with the appreciation of the utility of social-scientific research and information-gathering activities (Groves & Couper, 1998, p.128). The panellists' language proficiency is indicated by their standardised grade point average in German language class. The institutionally attested achievement indicates the transaction costs and cognitive burden of survey participation faced by panellists.

3.4 Statistical procedures

To estimate the target persons' likelihood and timing of survey participation simultaneously (Chebat & Cohen, 1993, p. 21), techniques and procedures of event history analysis are used (Blossfeld, Rohwer, & Schneider, 2019). The panellists' survey participation will be analysed as a stochastic process in the social setting of the exchange between

panellists and researchers (Singer, 2006, p. 640). This kind of modelling aims to specify the likelihood of survey participation—that is, the hazard rate—as a time-dependent function of individual resources (micro level), of global settings (macro level), and of the politics relating to the pandemic (meso level). This hazard rate is defined as the marginal value of the conditional probability of such an event (such as starting to fill out the questionnaire) occurring in the time interval $(t, t + \Delta t)$, provided that this event has not occurred before.

In order to combine time-variant covariates such as the period-specific weather situation or the dynamics of the coronavirus pandemic the procedure of episode splitting is used. The episodes of an individual's participation (defined by the time of invitation and by the time of starting to complete the questionnaire, i. e., the interval until response on a daily basis) are divided into daily sub-episodes. These are then linked to the corresponding daily macro and meso information on the weather, the public shutdown, and the coronavirus pandemic. For each of the short sub-episodes on a daily basis, there is a constant hazard rate. Therefore, the hazard rate will be estimated on the basis of an exponential distribution: $r(t|x(t)) = \exp(\beta' \mathbf{x}(\mathbf{t}))$, whereby $\mathbf{x}(\mathbf{t})$ is the time-dependent vector of exogenous variables, whose coefficients β have to be estimated. Using this procedure, it is possible to model step functions that display the empirically observed hazard function for the entire process until response embedded in different periods of external developments, such as the situation of interviewees, the weather situation, and the policies and outcomes of the coronavirus pandemic.

Finally, by means of a non-parametrical procedure, the Kaplan-Meier method of failure estimates, the pattern of survey participation since the invitation to the current wave are described on the basis of relative prevalence across time. By calculating indices, such as the median, it is possible to show how long it takes panellists to start filling out the questionnaire, and how many of the panellists had not responded at different points in time.

4 Empirical results

The empirical analysis of the target persons' participation in the online survey consists of three steps. In the first, the time-dependent process of participation is described. In the second, the dynamics of participation patterns are compared between two waves. In the third, the time-varying impacts on the survey participation in May 2020 are estimated.

4.1 Description of the process of survey response to the online survey

The dynamic trajectory of survey participation for both waves of the DAB panel is described by the Kaplan-Meier method. The estimated failure rates show for each of the points in time how many of the panellists started to complete the questionnaire since survey launch. The curves depicted in Figure 3 reveal higher and earlier responses in Wave 8 than in the previous wave. They confirm Hypothesis 1 and Hypothesis 2.

In three days, for example, 25 per cent of the Wave 7 sample had taken part in the survey, while 75 per cent of the sample had not started completing the questionnaire by then. In Wave 8, however, it took less than 2 days before a quarter of the sample had completed the online questionnaire. The median of the waiting time until response in Wave 7 was 10 days, whereas this parameter was seven days in Wave 8 (see the dotted vertical lines in Figure 3). This means that, in the most recent panel wave, it only took a week for at least 50 per cent of the sample to respond. In sum, after 28 days, about 26 per cent of the panellists had not completed the online questionnaire in the last wave, while more than a third had not taken part in the previous wave.

The differences of the trajectories between the waves—i. e., in terms of relative prevalence and absolute speed until survey participation—are significant for each of the points in time during the field period. Each of the tests—such as the Wilcoxon-Breslan-Gehan test, sensitive at the beginning of the process time, or the Generalised Savage Log-rank test, stressing increasing differences at the end of the process time—show significant differences between the waves (Blossfeld et al., 2019, p. 83). At first glance, it seems that the pandemic did not have an adverse effect on the response rate.

4.2 The effect of coronavirus on survey participation

In order to test whether differences between both panel waves depended on the consequences of the current pandemic, the impact of time-varying and time-constant factors on the survey participation was estimated in an exponential model (Table 1). It is obvious that target persons in the current panel wave were more likely to participate than those in the previous wave two years ago (Model 1). On every day after survey launch, the likelihood of survey participation was about $(\exp(0.272) - 1) \times 100\% = 31$ per cent higher in Wave 8 than in the previous wave. In the next step, the indicator of the different panel waves was replaced by informative time-varying covariates measured at different analytical levels (Model 2). These variables are statistically significant. First, a "pleasant" weather situation delayed the timing of survey participation and had an adverse effect on the response rate across the observed field period. Second, during the public shutdown, a sub-period of the fieldwork in Wave 8, the panellists started filling out the online questionnaire much sooner than at other stages of the field periods. On each day during the shutdown period, the likelihood of response was about $(\exp(0.745) - 1) \times 100\% = 111$ per cent (Model 3) and $(\exp(0.813) - 1) \times 100\% = 125$ per cent (Model 2) higher than during the other periods.

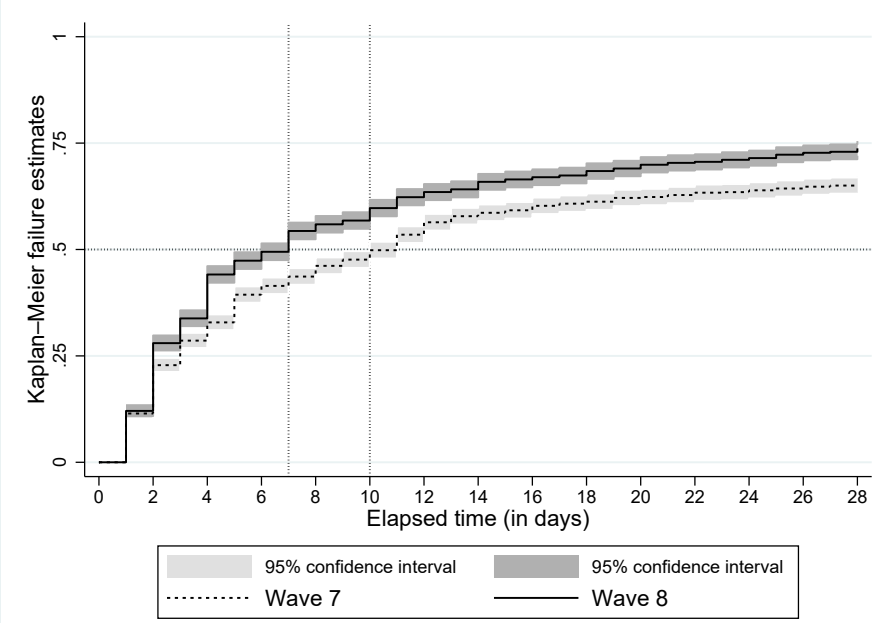

Figure 3. Comparison of survey participation in the Waves 7 and 8 using the Kaplan-Meier method

In sum, the positive effect of public shutdown on the rate and speed of survey participation is remarkable, even net of panellists' characteristics such as social origin, education, language proficiency, and gender, as well as net of circumstances on the macro level (Model 3). Indeed, in line with Hypothesis 1, the response rate is significantly higher during the period of the pandemic-related shutdown than during other periods. The response speed, indicated by the elapsed time between survey launch and response, is systematically lower during the period of public shutdown in other periods of the fieldwork.

4.3 Fine-grained analysis of the effect of coronavirus

In order to re-test our previous findings, the impact of the coronavirus pandemic and its consequences for the survey response in May 2020 (only the first part of the field period in Wave 8) are analysed in detail (Table 2). In this third step, other macro indicators concerning the pandemic—such as cases of illness, the number of hospitalisations and fatalities, and the changing weather situation—are considered on a daily basis. In line with Hypothesis 1 and Hypothesis 2, the positive impact of the shutdown period on the panellists' timing and the likelihood of survey participation is revealed again (Model 1).

This effect remains constant if the panellists' characteristics are considered (Model 2). In sum, it seems *de facto* to be the case that the official orders and administrative arrangements that resulted in the public shutdown fuelled the response rate during this initial period of the most recent DAB panel wave.

To test Hypothesis 3, the interaction terms of the shutdown period and the panellists' education are taken into account (Model 3). In contrast to this hypothesis, there are no statistically significant interactions while the main effects remain significant. Well-educated panellists, enrolled previously in the pre-gymnasium, are more likely to take part in the most recent wave than their counterparts regardless of the public shutdown.

Finally, Hypothesis 4 is tested by claiming that digital reminders sent out in the initial stage of the fieldwork period reveal that the effect of public shutdown on participation is negative or even an artefact (Model 4). However, this hypothesis is also not confirmed. By taking follow-ups sent out in the period of public shutdown, i. e., 4, 7, and 11 days after the invitation, there is still a significant effect of public shutdown on the panellists' participation. The digital reminders do not overlay the institutional shutdown effect. But, as often observed, the reminders are expected to boost significantly the response rate. All in all, the significant effect of the COVID-19-related shutdown on the development of the response rate is robust. These results are in line with the Hypothesis 1 and Hypothesis 2.

5 Summary and conclusions

As in other countries, the COVID-19 pandemic poses a challenge for Switzerland's citizens, government, administrations, and societal orders. The outbreak of the most infectious and deadly disease since the Spanish flu, which

Table 1
Time-varying impacts on survey participation in Waves 7 and 8

	Model 1		Model 2		Model 3	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Time-varying covariates						
Survey: Wave 8 (Ref.: Wave 7)	0.272***	0.034	-	-	-	
Macro: Weather situation	-	-	−0.165***	0.018	−0.147***	0.018
Meso: Public shutdown	-	-	0.813***	0.035	0.745***	0.035
Social origin (Ref.: missing value)						
Upper service class	-	-	-	-	0.256***	0.067
Lower service class	-	-	-	-	0.253	0.063
Routine non-manual employee	-	-	-	-	0.212***	0.061
Farmer; small proprietor	-	-	-	-	0.257**	0.084
Foreman; skilled manual worker	-	-	-	-	0.096	0.067
Semi-skilled and unskilled manual worker	-	-	-	-	0.113	0.091
School type (Ref.: miscellaneous type)						
Basic requirements	-	-	-	-	−0.304***	0.066
Intermediate requirements	-	-	-	-	0.242***	0.059
Pre-gymnasium	-	-	-	-	0.761***	0.063
Individual characteristics						
Language proficiency	-	-	-	-	0.155***	0.020
Female (Ref.: male)	-	-	-	-	0.296***	0.035
Constant	−3.043***	0.025	−3.212***	0.023	−3.665***	0.062
Number of observations	62,831		62,831		62,831	
Number of cases	4,986		4,986		4,986	
Number of events	3,429		3,429		3,429	
LR χ^2 (d.f.)	63.39 (1)		666.87 (2)		1,354.23 (13)	

Coefficients estimated by exponential model (with robust standard errors)
* $p < .05$, ** $p < .01$, *** $p < .001$

occurred 100 years ago (Spinney, 2018), has also had an impact on sociological research elsewhere.[2] In the spirit of analytical-empirical survey methodology, the aim of this contribution has therefore been to reveal the effects of the current pandemic of COVID-19 on the participation of panellists during the eighth wave of the DAB panel study. The fieldwork started during the period of the pandemic-related public shutdown, which has enabled us to investigate whether such a crisis had a significant impact on panellists' participation in an online survey. Therefore, we have asked whether pandemic-related peculiarities in everyday life reduced the absolute latency until survey participation, as well as the likelihood of survey participation. Finally, it is of interest whether the COVID-19 crisis has influenced the social selectivity of survey participation during the period of public shutdown compared to reference periods of fieldwork.

Based on dynamic multi-level event history analysis, it has indeed been found that the public shutdown had an obviously positive effect on the rate and speed of survey participa-

[2]This pandemic is significant for both the analytical-empirical social sciences and for survey methodology (Kohler, 2020). "Feverish" activities have been observed in undertaking sociological surveys on the consequences of the coronavirus outbreak (Auspurg, 2020); these aim to investigate the social, psychological, economic, and medical impacts of the COVID-19 crisis (Consortium for the Social, Behavioural, Educational and Economic Sciences, 2022). Rushed publications have "saturated" the scientific community, published without any peer review procedure, but within several days of submission (e. g. Homolak, Kodvanj, & Virag, 2020). However, even for well-established sociological projects such as the GESIS Panel, which started fieldwork immediately before the outbreak, the pandemic has been a challenge because they have rapidly had to adapt their survey design and the management of fieldwork to the new situation (Schaurer & Weiß, 2020). Other panel studies, such as the ReGES (Refugees in the German Educational System) study at the Leibniz Institute for Educational Trajectories, have had to switch modes to continue a running survey (Will, Becker, & Weigand, 2020). This switch from face-to-face interviews to CATI has been necessary due to the limitations on direct social contact

Table 2
Impact of the coronavirus pandemic on the survey participation in Wave 8 (May 2020)

	Model 1		Model 2		Model 3		Model 4	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Time-varying covariates								
Meso: Public shutdown	0.429***	0.112	0.394***	0.112	0.402*	0.179	0.766***	0.148
Macro: Cases of illness per day	0.009***	0.002	0.009***	0.002	0.009***	0.002	−0.012***	0.003
Macro: Number of hospitalisations per day	0.116***	0.027	0.116***	0.027	0.116***	0.027	−0.026	0.033
Macro: Number of deaths per day	0.045**	0.016	0.036*	0.016	0.037*	0.016	0.105***	0.019
Macro: Weather situation	−0.085*	0.039	−0.061	0.039	−0.061	0.039	−0.509***	0.065
Social origin (Ref.: missing value)								
Upper service class	-	-	0.232*	0.091	0.232*	0.091	0.234**	0.091
Lower service class	-	-	0.224**	0.086	0.226**	0.087	0.224**	0.086
Routine non-manual employee	-	-	0.213**	0.083	0.217**	0.083	0.212*	0.083
Farmer; small proprietor	-	-	0.241*	0.114	0.243*	0.114	0.237*	0.114
Foreman; skilled manual worker	-	-	0.104	0.091	0.105	0.091	0.105	0.091
Semi-skilled and unskilled manual worker	-	-	0.130	0.124	0.133	0.124	0.126	0.124
School type (Ref.: miscellaneous type)								
Basic requirements	-	-	−0.318***	0.089	−0.346	0.179	−0.317***	0.089
Intermediate requirements	-	-	0.125	0.080	0.100	0.164	0.117	0.080
Pre-gymnasium	-	-	0.583***	0.086	0.781***	0.202	0.576***	0.086
Individual characteristics								
Language proficiency	-	-	0.110***	0.027	0.111***	0.027	0.111***	0.027
Female (Ref.: male)	-	-	0.226***	0.048	0.227***	0.048	0.222***	0.048
Interaction terms: Public lockdown times								
Basic requirements	-	-	-	-	0.036	0.197	-	-
Intermediate requirements	-	-	-	-	0.030	0.178	-	-
Pre-gymnasium	-	-	-	-	−0.224	0.218	-	-
Digital reminders								
Reminder 1: Day 4	-	-	-	-	-	-	1.587***	0.119
Reminder 2: Day 7	-	-	-	-	-	-	0.675***	0.153
Reminder 3: Day 11	-	-	-	-	-	-	0.679***	0.148
Constant	−4.284***	0.098	−4.527***	0.125	−4.536***	0.168	−4.035***	0.129
Number of observations	29,063		29,063		29,063		29,063	
Number of cases	2,493		2,493		2,493		2,493	
Number of events	1,819		1,819		1,819		1,819	
LR chi2 (d.f.)	898.15 (5)		1,139.11 (16)		1,141.78 (19)		1,339.44 (19)	

Coefficients estimated by exponential model (with robust standard errors)
* $p < .05$, ** $p < .01$, *** $p < .001$

tion. First, controlling for the possibly diverting effects of the weather situation, unfamiliar circumstances caused by the coronavirus pandemic or affected individual resources, the response rate was higher during the most recent panel wave than for the wave realised two years ago at the same time of year. Second, the reservoir of potential respondents was exhausted much faster than during the previous wave. This was also true for the analysis within the current panel wave. During the public shutdown period, the panellists started completing the online questionnaire more likely than after the shutdown. These findings remained stable when considering the effect of the digital reminders sent out during the field period. Finally, it was found for the shutdown period that the social selectivity of participation in regard to the panellists' education has not changed. The social selectivity of personal resilience in times of crisis did not contribute to the explanation of educational bias in survey participation. However, it could be assumed that the impact of the public shutdown was not the same for different social groups. For example, while some of the panellists were able to work in their home office, others had to continue with their schooling, training, or employment outside their home. Due to missing information, it has not been possible to test this assumption.

Furthermore, these findings might be in favour of the sophisticated version of structural-individualistic theories regarding the decision made by target persons to respond or to refuse. This rational action theory has been used to deduce empirically testable hypotheses. The decrease in opportunity costs relating to time scarcity, as well as the transaction costs relating to invasions of privacy, might be mediated through the uncertainty in the course of an unfamiliar process such as the pandemic, as well as the public shutdown. The former situation might contribute to an increase in the benefits of survey participation for panellists. Distractions from an everyday life characterised by strictly limited social contact, or the postponement of unpalatable work in the home office, seem to have resulted in the increased benefits of survey participation exceeding its costs.

However, it must be stressed that these interpretations, although plausible, are not confirmed empirically in a *direct* way. This problem is one of the main limitations of this study. It is purely an indirect application of a rational action theory—i. e., drawing statistical inferences from the empirically unobserved preferences of the target persons—based on their observed response as a rational action, since the social mechanisms behind the actual survey participation (such as expectation, the evaluation and selection of options, and mental frames and cognitive habits) are not directly observed. Overall, the empirical findings are in line with the theoretical considerations, but do not provide its direct empirical confirmation.

As already mentioned about this second limitation, we were not able to control for all of the possible influences on the survey response in the last wave. For example, the situation of the contacted individuals during the first wave of the COVID-19 pandemic—in particular, their subjective perception, expectations, and evaluation of the invitation to interview in this time—might had an impact on their response behaviour. It also seems plausible that the coronavirus outbreak has contributed—via unexpected unemployment or other diffuse threats—to the isolation of some of the panellists and their nonresponse. However, such interpretations are not yet empirically confirmed. It is therefore obvious that the survey methodology is in need of an empirically confirmed mechanism-based explanation of survey participation, as well as direct observations of its main mechanisms and processes (Singer, 2011).

There is a final limitation on our contribution. A special target population, juveniles born around 1997 and living in German-speaking cantons of Switzerland, has been the focus. Therefore, it is not possible to generalise our findings to other birth cohorts and language regions in Switzerland. These "panelised" youths might belong to the so-called "digital natives" (those who have grown up with internet technology). Therefore, it could be assumed that the pandemic effect is over-estimated. In sum, there is a need to replicate the analysis for other populations and different types of survey modes not considered in this contribution.

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References

American Association for Public Opinion Research. (2016). *Standard definitions: Final dispositions of case codes and outcome rates for surveys* (9th ed.).

as a result of the public shutdown. Similar problems have been reported from PSID in the United States (Sastry et al., 2020).

Auspurg, K. (2020). Fieberhafte Forschung – Warum Forschung derzeit wenig verlässlich ist und was wir dagegen tun können. Retrieved 13 May 2020. Retrieved from https://coronasoziologie.blog.wzb.eu/podcast/katrin-auspurg-fieberhafte-forschung-warum-forschung-derzeit-wenig-verlaesslich-ist-und-was-wir-dagegen-tun-koennen/

Becker, R. (2021). Have you ever seen the rain? The causal impact of the weather situation and the season on survey participation in a multi-wave panel study. *Survey Research Methods*, *15*, 27–41.

Becker, R. (2022). The effects of a special sequential mixed-mode design, and reminders, on panellists participation in a probability-based panel study. *Quality and Quantity*, *55*.

Becker, R., & Glauser, D. (2018). Are prepaid monetary incentives sufficient for reducing panel attrition and optimizing the response rate? An experiment in the context of a multi-wave panel with a sequential mixed-mode design. *Bulletin of Sociological Methodology*, *137*, 74–95.

Becker, R., Glauser, D., & Möser, S. (2020). Determinants of educational choice and vocational training opportunities in Switzerland—empirical analyses with longitudinal data from the DAB panel study. In N. McElvany, H. Holtappels, F. Lauermann, A. Edele, & A. Ohle-Peters (Eds.), *Against the odds—(in)equity in education and educational systems* (pp. 125–143). Münster: Waxmann.

Becker, R., Möser, S., & Glauser, D. (2019). Cash vs. vouchers vs. gifts in web surveys of a mature panel study—main effects in a long-term incentives experiment across three panel waves. *Social Science Research*, *81*, 221–234.

Becker, R., Möser, S., Moser, N., & Glauser, D. (2022). Postscript to "survey participation in the time of corona". *Survey Research Methods*, *16*(1), xx. doi:0.18148/srm/2022.v16i1.8065

Blossfeld, H.-P., Rohwer, G., & Schneider, T. (2019). *Event history analysis*. London & New York: Taylor & Francis.

Castiglioni, L., Pforr, K., & Krieger, U. (2008). The effect of incentives on response rates and panel attrition: Results of a controlled experiment. *Survey Research Methods*, *2*, 151–158.

Chebat, J.-C., & Cohen, A. (1993). Response speed in mail surveys: Beware of shortcuts. *Marketing Research*, *5*, 20–25.

Consortium for the Social, Behavioural, Educational and Economic Sciences. (2022). Research on the coronavirus pandemic. overview of empirical research on the social impact of the coronavirus pandemic. Retrieved from https://www.konsortswd.de/en/ratswd/topics/corona/

Couper, M., & Groves, R. (1996). Social environmental impacts on survey cooperation. *Quality and Quantity*, *30*, 173–186.

DAB. (2020). *DAB-Panelstudie (DAB): W1–W7 [Dataset]*. Universität Bern, Institut für Erziehungswissenschaft, Abteilung Bildungssoziologie. Distributed by FORS, Lausanne. doi:10.23662/FORS-DS-946-4

Dillman, D., Phelps, G., Tortora, R., Swift, K., Kohrell, J., Berck, J., & Messer, B. (2009). Response rate and measurement differences in mixed-mode surveys using mail, telephone, interactive voice response (IVR) and the internet. *Social Science Research*, *38*, 1–18.

Dillman, D., Smyth, J., & Christian, L. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. New York: John Wiley & Sons.

Dillman, D. A. (2017). The promise and challenge of pushing respondents to the web in mixed-mode surveys. *Survey Methodology*, *43*, 3–30.

Erikson, R., & Goldthorpe, J. (1992). *The constant flux. a study of class mobility in industrial societies*. Oxford: Clarendon Press.

Federal Office of Meteorology and Climatology (MeteoSwiss). (2020). IDAWEB. Retrieved 11 June 2020. Retrieved from https://gate.meteoswiss.ch/idaweb/more.do;idaweb=k1Hh2WXS5nLymOnbE71OWI9jcfQs-IyoaXJQTbMpb46mDxt965hV!-325835654)

Glauser, D. (2015). *Berufsausbildung oder Allgemeinbildung*. Wiesbaden: Springer VS.

Göritz, A. (2014). Determinants of the starting rate and the completion rate in online panel studies. In M. Callegaro, R. Baker, J. Bethlehem, A. Göritz, J. Krosnick, & P. Lavrakas (Eds.), *Online panel research: A data quality perspective* (pp. 154–170). New York: John Wiley & Sons.

Green, K. (1996). Sociodemographic factors and mail survey response. *Psychology & Marketing*, *13*, 171–184.

Groves, R. (2006). Nonresponse rates and nonresponse bias in household surveys. *Public Opinion Quarterly*, *70*, 646–675.

Groves, R., Cialdini, R., & Couper, M. (1992). Understanding the decision to participate in a survey. *Public Opinion Quarterly*, *56*, 475–495.

Groves, R., & Couper, M. (1998). *Nonresponse in household interview surveys*. New York: John Wiley & Sons.

Groves, R., Presser, S., & Dipko, S. (2004). The role of topic interest in survey participation decisions. *Public Opinion Quarterly*, *68*, 2–31.

Groves, R., Singer, E., & Corning, A. (2000). Leverage-saliency theory of survey participation. Description

and an illustration. *Public Opinion Quarterly*, *64*, 299–308.

Harrington, D. (2009). *Confirmatory factor analysis*. Oxford: Oxford University Press.

Homolak, J., Kodvanj, I., & Virag, D. (2020). Preliminary analysis of COVID-19 academic information patterns: A call for open science in the times of closed borders. *Scientometrics*, *124*, 2687–2701.

Keusch, F. (2015). Why do people participate in web surveys? Applying survey participation theory to internet survey data collection. *Management Review Quarterly*, *65*, 183–216.

Klaas, H., Kuhn, U., Refle, J.-E., Voorpostel, M., Ryser, V.-A., Dasoki, N., & Tillmann, R. (2021). Die Entwicklung von Stress in der Schweiz—die erste Welle der Pandemie verschafft gestressten Menschen eine Pause. *Social Change in Switzerland*, *26*.

Kohler, U. (2020). Editorial: Survey research methods during the COVID-19 crisis. *Survey Research Methods*, *14*, 93–94.

Kreuter, F. (2015). The use of paradata. In U. Engel, B. Jann, P. Lynn, A. Scherpenzeel, & P. Sturgis (Eds.), *Improving surveys methods* (pp. 330–315). New York: Routledge.

Leopoldina (Nationale Akademie der Wissenschaften). (2020). Coronavirus-Pandemie: Für ein krisenresistentes Bildungssystem. 5. Ad-hoc-Stellungnahme vom 05. August 2020. Retrieved 3 October 2020. Retrieved from https://www.leopoldina.org/uploads/tx_leopublication/2020_08_05_Leopoldina_Stellungnahme_Coronavirus_Bildung.pdf

Loosveldt, G., & Joye, D. (2016). Defining and assessing survey climate. In C. Wolf, D. Joye, & T. Smith (Eds.), *The SAGE handbook of survey methodology* (pp. 67–76). London: SAGE Publications.

Lynn, P., Lugtig, P., Biemer, P., Leeuw, E., Eckman, S., Edwards, B., … Tucker, N. (2017). Total survey error for longitudinal surveys. In West (Ed.), *Total survey error in practice* (pp. 279–298). Hoboken, NJ: Wiley & Sons.

Muñoz-Leiva, F., Sánchez-Fernández, J., Montoro-Ríos, F., & Ibáñez-Zapata, J. (2010). Improving the response rate and quality in web-based surveys through the personalization and frequency of reminder mailings. *Quality & Quantity*, *44*, 1037–1052.

Pforr, K., Blohm, M., Blom, A., Erdel, B., Felderer, B., Fräßdorf, A., … Rammstedt, B. (2015). Are incentive effects on response rates and nonresponse bias in large-scale, face-toface surveys generalizable to germany? Evidence from ten experiments. *Public Opinion Quarterly*, *79*, 740–768.

Rao, K., & Pennington, J. (2013). Should the third reminder be sent? The role of survey response timing on web survey results. *International Journal of Market Research*, *55*, 651–674.

Sastry, N., McGonagle, K., & Fomby, P. (2020). Effects of the COVID-19 crisis on survey fieldwork: Experience and lessons from two major supplements to the US Panel Study of Income Dynamics. *Survey Research Methods*, *14*, 241–245.

Sauermann, H., & Roach, M. (2013). Increasing web survey response rates in innovation research: An experimental study of static and dynamic contact design feature. *Research Policy*, *42*(1), 273–286.

Schaurer, I., & Weiß, B. (2020). Investigating selection bias of online surveys on coronavirus-related behavioral outcomes. *Survey Research Methods*, *14*, 103–108.

Sigman, R., Lewis, T., Yount, N., & Lee, K. (2014). Does the length of fielding period matter? Examining response scores of early versus late responders. *Journal of Official Statistics*, *30*, 651–674.

Simon, H. (1959). Theories of decision making in economics and behavioural science. *American Economic Review*, *49*, 253–283.

Singer, E. (2006). Introduction: Nonresponse bias in household surveys. *Public Opinion Quarterly*, *70*, 637–645.

Singer, E. (2011). Toward a benefit–cost theory of survey participation: Evidence, further tests, and implication. *Journal of Official Statistics*, *27*, 379–392.

Singer, E., & Ye, C. (2013). The use and effects of incentives in surveys. *The Annals of the American Academy of Political and Social Science*, *645*, 112–141.

Spinney, L. (2018). *Pale rider: The Spanish flu of 1918 and how it changed the world*. New York: PublicAffairs.

SRF (Schweizer Radio und Fernsehen; Swiss Radio and Television). (2020). Retrieved 17 June 2020. Retrieved from https://www.srf.ch/news/schweiz/coronavirus-so-entwickeln-sich-die-fallzahlen-in-der-schweiz

Stocké, V., & Becker, B. (2004). Determinanten und Konsequenzen der Umfrageeinstellung: Bewertungsdimensionen unterschiedlicher Umfragesponsoren und die Antwortbereitschaft der Befragten. *ZUMA-Nachrichten*, *28*, 89–116.

Stocké, V., & Langfeldt, B. (2003). Umfrageeinstellung und Umfrageerfahrung. Die relative Bedeutung unterschiedlicher Aspekte der Interviewerfahrung für die generalisierte Umfrageeinstellung. *ZUMA-Nachrichten*, *27*, 55–88.

Swiss Federal Office of Public Health. (2020a). Coronavirus: Situation in Switzerland. Retrieved 11 June 2020. Retrieved from https://www.bag.admin.ch/bag/en/home/krankheiten/ausbrueche-epidemien-pandemien/aktuelle-ausbrueche-epidemien/novel-cov/situation-schweiz-und-international.html

Swiss Federal Office of Public Health. (2020b). New coronavirus 2019-nCoV: First confirmed case in Switzer-

land. Retrieved 8 June 2020. Retrieved from https://www.bag.admin.ch/bag/en/home/das-bag/aktuell/medienmitteilungen.msg-id-78233.html

West, B. (2011). Paradata in survey research. *Survey Practice*, *4*, 1–8.

Will, G., Becker, R., & Weigand, D. (2020). COVID-19 lockdown during field work—challenges and strategies in continuing the ReGES study. *Survey Research Methods*, *14*, 247–252.

Zillmann, D., Schmitz, A., Skopek, J., & Blossfeld, H.-P. (2014). Survey topic and unit nonresponse. evidence from an online survey on mating. *Quality and Quantity*, *48*, 2069–2088.