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Effects of adjustments in face-to-face data collection due to the COVID-19 pandemic on survey results

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Abstract

Like many countries, the COVID-19 pandemic has forced Statistics Netherlands to make changes in its fieldwork strategy. Since mid-March 2020, there have been limited opportunities to conduct face-to-face interviews. Therefore, from September 2020, CAPI sampled people are offered the opportunity to respond by telephone. For this purpose, face-to-face interviewers are instructed to persuade the potential respondent at the doorway. When people refuse a face-to-face interview, interviewers ask for a telephone number and try to make an appointment to conduct the interview by telephone.

The aim of our study was to investigate the effects of conducting the interview by telephone instead of face-to-face on important survey outcome variables. We were particularly interested in whether differences are due to selection effects or caused by mode-specific measurement errors. Because we did not have the time or capacity to set up a controlled experiment, we performed regression analyses to decompensate the differences between selection effects and mode-specific measurement errors. We used data of the Labour Force Survey (LFS) and the Housing Survey (WoON).

Our analysis showed that there were differences in important target variables, for both LFS and WoON. These differences were, however, mainly caused by selection effects – which can be taken into account for during weighting – and were less likely to be caused by mode specific measurement errors. Although there are important limitations and caveats, these findings are supportive to further implement this field strategy.

About the speaker:

Dr. Danielle Groffen currently is a statistical researcher at the Data Collection department of Statistics Netherlands. She is involved in monitoring and analysing the response rates of household surveys, such as the Labour Force Survey. She has a specific interest in selectivity and representativeness of response rates among different sub-populations. Furthermore, she is involved in the analysis of experiments related to the improvement of survey response rates.

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Effects of adjustments in face-to-face data collection due to the COVID-19 pandemic on survey results

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summary   Like many countries, the COVID-19 pandemic has forced Statistics Netherlands to make changes in its fieldwork strategy. Since mid-March 2020, there have been limited opportunities to conduct face-to-face interviews. Therefore, from September 2020, CAPI sampled people are offered the opportunity to respond by telephone. For this purpose, face-to-face interviewers are instructed to persuade the potential respondent at the doorway. When people refuse a face-to-face interview, interviewers ask for a telephone number and try to make an appointment to conduct the interview by telephone.

The aim of our study was to investigate the effects of conducting the interview by telephone instead of face-to-face on important target variables. We were particularly interested in whether differences are due to selection effects or caused by mode-specific measurement errors. Because we did not have the time or capacity to set up a controlled experiment, we performed regression analyses to decompensate the differences between selection effects and mode-specific measurement errors. We used data of the Labour Force Survey (LFS) and the Housing Survey (WoON).

Our analysis showed that there were differences in important target variables, for both LFS and WoON. These differences were, however, mainly caused by selection effects – which can be taken into account for during weighting – and were less likely to be caused by mode specific measurement errors. Although there are important limitations and caveats, these findings are supportive to further implement this field strategy.

1. Background

Like many countries, the coronavirus measures has faced Statistics Netherlands, the face-to-face fieldwork in particular, with many challenges. Firstly, we completely stopped conducting Computer Assisted Personal Interviewing (CAPI). Next, we started calling the CAPI sampled people of whom we had a telephone number available. This number was, however, mostly of lower quality. Alternatively, for a few of our surveys we were able to re-open the web questionnaire. From June 2020, we experimented with starting the CAPI fieldwork again, applying the basic rules to prevent the spread of the coronavirus, including keeping 1,5 meter distance, wearing a face mask and cleaning all materials. From September 2021, CAPI sampled people are offered the opportunity to respond by telephone. For this purpose, face-to-face interviewers are instructed to persuade the potential respondent at the doorway. When people refuse a face-to-face interview, interviewers ask for a telephone number and try to make an appointment to conduct the interview by telephone. Using this strategy, we prevent a selection effect due to the availability of a telephone number. More importantly, we are able to enhance the number of response and thereby increase the precision of outcomes. However, it is likely that there are still mode-effects on important target variables.

The aim of our study was to investigate the mode effects of conducting the interview by telephone instead of face-to-face on important target variables. We were particularly interested in whether differences are due to selection effects or caused by mode-specific measurement errors. Because we did not have the time or capacity to set up a controlled experiment, we performed regression analyses to decompensate the differences between selection effects and mode-specific measurement errors. We used data of the Labour Force Survey (LFS) and the Housing Survey (WoON).

2. Methods

2.1 Decompensating the role of selection effects and mode-specific measurement errors

Mode-effects are systematic differences in survey outcomes that exist when using different modes of data collection. For example, the mode effect is the difference in outcome when part of the sample is conducted by telephone instead of face to face. It is the result of mode-specific selection effects and mode-specific measurement errors. Selection effects exist when there are differences in response or differences in reached populations between the modes. Measurement errors exist when a respondent answers the question differently between the modes. To estimate and decompensate the role of selection effects and mode-specific measurement errors advanced experiments are needed (Schouten et al., 2013).

Because we did not have the time or capacity to set up a controlled experiment, we performed regression analyses to decompensate the differences between selection effects and mode-specific measurement errors. Our strategy was as follows: In the first regression important target variables were modelled with the mode of response (1; CAWI, 2; CATI, 3; CAPI sample responded by phone, 4; CAPI sample responded face to face). In this situation, the difference between category 3 and 4 represents the total mode effect, including both selection effects and mode-specific measurement errors. In the second regression, target variables were modelled with mode of response and background variables that will also be used during weighting of the results. In this regression, the selection effect will be explained by the variables in the weighting as much as possible, and the difference that is still left between categories 3 and 4 mainly represents a mode-specific measurement error.

When the total mode effect is mainly due to selection effect, it is justified to further implement this field strategy. Selection effects can be taken into account for during the weighting of the results. It

should, however, be mentioned that this is only an indication of the mode-effects. Controlled experiments are still necessary to further decompensate the role of selection effects and mode-specific measurement errors.

2.2 Data

We used data from the Dutch Labour Force Survey (LFS) collected from September to December 2020 and from the Dutch Housing Survey (WoON) collected between October and December 2020. We used datasets containing all responses, including the mode of response, important target variables and variables that will also be used during weighting of the results. Detailed information about these variables can be found in Appendix I (LFS) and II (WoON).

2.3 Analyses

Firstly, we performed descriptive statistics to get an idea about the number of response per month, and mode. Secondly, we runned some crosstabulations by mode of response with important target variables and background variables from the weighting. Pearsons Chi-square test showed which variables significantly correlate with mode of response. Finally, we performed multinomial, linear and logistic regression analyses. The CAPI face to face mode is always used as the reference category. For the purpose of the logistic regression analyses, target variables were dichotomized. Mode of response is modelled as a fixed factor (model 1 and 2). Background variables are included using the backward regression method, using likelihood ratio tests to remove non-significant variables from the models (model 2). For the ease of presentation, we only present results of logistic regression analyses. All analyses were performed using SPSS version 25.

3. Results

3.1 Results from the LFS

Table 1 shows the total number of CAPI responses from September to December 2020 for the LFS. Please note that the LFS was[1] a sample of households. The numbers in Table 1 represents households. Further analyses are performed on a person level. From September to December 2020, on average 29,1% of the total CAPI response was conducted by telephone, increasing from 10,9% in September to 40,7% in December. The responses from December are largely collected in the first half of the month. Because of a new lockdown, we were forced to quit the fieldwork again in the second half of December. For a few households, there was already an appointment made for the second half of December. These responses are also included in the analyses.

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[1] In the new design of the Dutch LFS, starting from 2021, a sample of persons is used.

Table 1. CAPI face to face and telephonic responses. LFS, September- December 2020.

2020	Face-to-face interviews	CAPI interviews conducted by telephone	Total CAPI response	% CAPI interviews conducted by telephone
LFS households				
September	761	93	854	10,9%
October	580	233	813	28,7%
November	446	325	771	42,2%
December	305	209	514	40,7%
Total	2092	860	2952	29,1%

Table 2 presents the total number of response on a person level. Every household member is represented, excluding persons younger than 15 years of age and older than 74 years. Within a row, percentages count up to 100%. On average, 5,6% of all responses collected from September to December 2020 were conducted by telephone after an appointment was made on the doorway.

Table 2. Respons per mode. LFS, September - December 2020.

		CAPI face to face		CAPI by telephone		CATI		CAWI		Total	
		r	Row %	r	Row %	r	Row %	r	Row %	n	Row %
LFS persons	September	1551	15,9%	185	1,9%	1195	12,2%	6828	70,0%	9759	100,0%
	October	1341	12,9%	589	5,7%	1220	11,8%	7228	69,6%	10378	100,0%
	November	938	9,4%	749	7,5%	1091	11,0%	7152	72,0%	9930	100,0%
	December	646	9,4%	536	7,8%	1193	17,4%	4467	65,3%	6842	100,0%
	Total	4476	12,1%	2059	5,6%	4699	12,7%	25675	69,6%	36909	100,0%

Because of the size of the table, the crosstabulation between mode of response and the variables under study are presented in Appendix I. Different subscripts between column pairs, represent significant differences at a significance level of 5%. Relevant differences are marked in the table.
Respondents of whom the interview was conducted by telephone, were more likely to belong to the employed labour market (76,2% versus 72,5%, p-value = 0,008), less likely to be in the 'non-labour market' category (20,4% versus 23,7%, p-value = 0,024), more likely to work between 28 and 35 hours a week (13,2% versus 10,9% , p-value = 0,045), more likely to be of age 50-54 years old (14,5% versus 11,6%, p-value = 0,005), more likely to belong to a household having children (76,2% versus 69,9%, p-value < 0,001), more likely to have a higher household income (>=30.000 euro) (32,7% versus 29,2%, p-value = 0,021), and to be more likely to have an income out of salary (73,4% versus 69,0% p-value = 0,002) as compared to respondents of whom the interview was conducted face-to-face.
With regard to sex, origin, level of education and application for benefits we did not find any significant differences between interviews that were conducted face-to-face our by telephone.

Differences with the regular CATI and CAPI mode are also displayed but are not described in detail. CAWI respondents are more likely to belong to the employed labour market, to be younger and to have a higher educational level as compared to CAPI face-to-face respondents. They are less likely to have a non-Western migration background as compared to CAPI face-to-face respondents. CATI respondents are more likely to be older, to have a permanent position in the labour market and to have a higher educational level, as compared to CAPI face-to-face respondents. It is likely that a selection effect with regard to the CATI mode is also related to the availability of a telephone number (Roberts et al, 2017).

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Table 3 shows the results of the logistic regression analyses with regard to 4 important survey target variables. Only the dichotomisations in which model 1 showed significant differences are presented. In multinomial regression analyses, we studied all categories independently. Similar results were found.

Presented Odds Ratio's (OR) and confidence intervals (CI) in model 1 are unadjusted and represent the total mode-effect on the target variables, being the sum of selection effects and mode-specific measurement errors. In model 2, background variables are added. The resulting OR and CI thereby representing mode-specific measurement errors. The CAPI face-to-face mode is always used as the reference category. An OR above 1 indicates an increased odds of the specific target variable as compared to the reference category. When 1 (= no difference) does not fall within the CI, the chance that the results are found by coincidence is less than 5%.

Model 1 shows that respondents of whom the interview was conducted by telephone, were more likely to belong to the employed labour market (OR = 1,22), to have a permanent position (OR = 1,14), to work more than 28 hours per week (OR = 1,12) and to have a higher level of education (OR = 1,14), as compared to respondents of whom the interview was conducted face-to-face. When we add relevant background variables, all OR's lose their significance. This means that the differences that we have found, are largely due to selection effects and not by mode-specific measurement errors.

Table 3. Logistic regression analyses. LFS, September-December 2020

		Model 1 [a]	Model 2 [b]
		OR (95% CI)	OR (95% CI)
Employed labour market [c]	CAWI	*1,11 (1,03-1,19)*	1,01 (0,92-1,12)
	CATI	1,04 (0,95-1,14)	1,01 (0,89-1,15)
	CAPI by telephone	*1,22 (1,08-1,37)*	1,09 (0,93-1,27)
	CAPI face-to-face	ref	
Permanent labour market [d]	CAWI	*1,46 (1,37-1,56)*	*1,11 (1,01-1,22)*
	CATI	*1,43 (1,31-1,55)*	1,08 (0,96-1,22)
	CAPI by telephone	*1,14 (1,02-1,27)*	1,00 (0,87-1,17)
	CAPI face-to-face	ref	
>28 h/week employed [e]	CAWI	*1,16 (1,08-1,23)*	*0,82 (0,75-0,90)*
	CATI	*1,17 (1,08-1,27)*	0,97 (0,87-1,10)
	CAPI by telephone	*1,12 (1,01-1,24)*	1,06 (0,91-1,23)
	CAPI face-to-face	ref	
Higher level of education [f]	CAWI	*1,97 (1,84-2,12)*	*1,66 (1,53-1,80)*
	CATI	1,29 (1,17-1,41)	1,07 (0,97-1,19)
	CAPI by telephone	*1,14 (1,02-1,28)*	1,10 (0,97-1,26)
	CAPI face-to-face	ref	

a. Unadjusted.

b. Adjusted for all variables from the weighting. Through likelihood ratio tests, non-significant variables were removed from the model

c. Whereby 1 = 'Employed member of the labour market' and 0 = 'unemployed member of the labour market and non-labour market'

d. Whereby 1 = 'permanent employment' and 0 = 'flexible employment, self-employed, unemployed and non-labour market.

e. Whereby 1 = '> 28 h/week' and 0 = ' ≤28 h/week'.

f. Whereby 1 = 'higher level of education' and 0 = 'lower, middle or unknown level of education'

3.2 Results from WoON

Table 4 shows that for the Dutch Housing Survey (WoON), on average 29,9% of all CAPI responses collected from October to December 2020, was conducted by phone. This is similar as compared to the LFS.

Table 4. CAPI face to face and telephonic responses. WoON, October-December 2020

		Face-to-face interviews	Interviews conducted by telephone	Total CAPI response	%CAPI conducted by telephone
Fieldwork months	October	425	153	578	26,5%
	November	390	180	570	31,6%
	December	274	132	406	32,5%
	Total	1089	465	1554	29,9%

In Table 5 the response per mode over the sampling months[2] is presented, in which the CAWI sample (CAWI nonresponse[3]) of August was sent to the CATI mode in September and to the CAPI mode in October 2020. Only the regular samples are presented. Oversampling regions are excluded from the analyses. On average, 2,9% of the total response from the August-October samples was conducted by telephone.

Table 5. Response per mode. WoON 2020. Sampling months August-Oktober 2020.

		CAPI face to face		CAPI by telephone		CATI		CAWI		Total	
		r	Row %	r	Row %	r	Row %	r	Row %	n	Row %
Sampling months	August	425	7,9%	153	2,9%	966	18,0%	3816	71,2%	5360	100,0%
	September	390	7,0%	180	3,2%	941	16,9%	4057	72,9%	5568	100,0%
	October	274	5,2%	132	2,5%	911	17,2%	3965	75,1%	5282	100,0%
	Total	1089	6,7%	465	2,9%	2818	17,4%	11838	73,0%	16210	100,0%

Because of the size of the table, the crosstabulation between mode of response and the variables under study are presented in Appendix II. Significance of the column differences are presented in a separate table.

Respondents of whom the interview was conducted by telephone, were more likely to have a owner-occupied accommodation (50,6% versus 40,4%, p-value = 0.002), less likely to be tenant of a housing corporation (29,4% versus 38,4%, p-value = 0.005), and more likely to have a higher household income (21,8% versus 15,5%, p-value = 0.018), as compared to respondents of whom the interview was conducted face-to-face. In addition, in the Southern parts of the Netherlands respondents were more likely to participate by telephone as compared to face-to-face. In Rotterdam, respondents were more likely to participate face-to-face.

With regard to sex, age, migration background, size of the household, position in the household, and value of the property, we did not find any differences between CAPI face to face and CAPI interviews conducted by telephone.

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[2] The results for WoON are presented differently as compared to LFS, depending on the sampling method and method of analyses of survey results.

[3] The CAWI nonresponse of which we have a telephone number available of good quality are sent to the CATI mode. The CAWI nonresponse of which we do not have a (good quality) number available are sent to the CAPI mode.

Table 6 shows the logistic regression analyses with regard to the five target variables. Model 1 shows that respondents of whom the interview was conducted by telephone were significantly less likely to live independently (OR = 0,74, CI: 0,56-0,98) as compared to respondents of whom the interview was conducted face-to-face. When adjusting for background variables (model 2) the CI becomes wider and the OR loses its significance (OR = 0,73, CI: 0,43-1,25). Other target variables did not show significant differences between CAPI interviews conducted by telephone and face-to-face.

Table 6 also shows that CAWI respondents are less satisfied with their housing and living environment, report less social cohesion and are more likely to change housing as compared to CAPI face-to-face respondents. CATI respondents are, however, more likely to be satisfied with their housing, feel more social cohesion and are less likely to change housing, as compared to CAPI face-to-face respondents. These differences still exist after adjustment for important background variables, indicating a mode-specific measurement error. These findings fall outside the scope of the current analyses, but are similar to previous studies (Burger, 2010).

Because it is known from previous WoON editions that there are differences between residents of owner-occupied accommodations and tenants of rental properties, we have splitted our analyses for these categories. It should, however, be mentioned that the numbers per cell are sometimes very small. With regard to the target variable 'independently living', the results that are presented in Table 6, could only be replicated for tenants. Tenants who responded by telephone were less likely to live independently (OR = 0,46, CI: 0,25-0,74) as compared to tenants who responded face-to-face. With regard to the target variable 'social cohesion', residents of owner-occupied accommodations who responded by telephone were more likely to report a higher social cohesion with the neighborhood (OR = 1,82, CI : 1,06–3,11) as compared to residents of owner-occupied accommodations who responded face-to-face. Both OR lose their significance after adjusting for background variables (results not displayed).

Table 6. Logistic regression analyses. WoON 2020

		model 1 [a]	model 2 [b]
		OR (95% CI)	OR (95% BC)
Independently living [c]	CAWI	*1,28 (1,08-1,51)*	0,87 (0,83-1,22)
	CATI	1,02 (0,85-1,23)	1,49 (0,99-2,25)
	CAPI telefonisch	*0,74 (0,56-0,98)*	0,73 (0,43-1,25)
	CAPI face-to-face	ref	
Inclined to move [d]	CAWI	0,94 (0,83-1,07)	*1,57 (1,36-1,82)*
	CATI	*0,44 (0,38-0,52)*	*0,76 (0,64-0,90)*
	CAPI telefonisch	0,94 (0,74-1,18)	0,92 (0,72-1,17)
	CAPI face-to-face	ref	
(Very) satisfied with dwelling[e]	CAWI	*1,30 (1,08-1,58)*	*0,66 (0,53-0,80)*
	CATI	*2,63 (2,07-3,35)*	*1,40 (1,07-1,81)*
	CAPI telefonisch	1,06 (0,75-1,49)	0,89 (0,62-1,27)
	CAPI face-to-face	ref	
(Very) satisfied with living environment [f]	CAWI	1,05 (0,88-1,24)	*0,68 (0,56-0,82)*
	CATI	*1,50 (1,23-1,84)*	0,95 (0,77-1,18)
	CAPI telefonisch	1,01 (0,74-1,37)	0,86 (0,63-1,18)
	CAPI face-to-face	ref	
Strong social cohesion with neigbhourhood [g]	CAWI	0,93 (0,79-1,08)	*0,56 (0,47-0,66)*
	CATI	*2,24 (1,88-2,68)*	*1,35 (1,11-1,64)*
	CAPI telefonisch	1,22 (0,93-1,61)	1,11 (0,83-1,49)
	CAPI face-to-face	ref	

[a.] Unadjusted.

[b] Adjusted for age, sex, age x sex, sex x origin, origin x age, region19, partner, region19 x partner, part of the country, part of the country x origin, region19 x standardized household income, property value x partner, urbanity, position in the household, number of persons in the household, property x partner, type of housing x partner.

[c.] Whereby 1 = independently living and 0 = 'other categories of housing situation'. Age, sex, region19, region19 x partner, part of the country x origin are removed from the final model.

[d.] Whereby 1 = Looking to change housing and 0 = Not looking to change housing. Part of the country x origin, sex x origin, sex, type of housing x partner, age x origin, property value x partner, and partner are removed from the final mode.

[e.] Whereby 1 = (Very) satisfied with housing . Sex, sex x origin, type of housing x partner, region19 x partner, number of persons in the household, age x origin are removed from the final model.

[f.] Whereby 1 = (Very) satisfied with living environment. Age x origin, sex, region19 x partner, sex x origin and type of housing x partner are removed from the final model.

[g.] Whereby 1 = (Very) strong social cohesion (1 to 7) and 0 = no social cohesion (>7 to 10). Region19 x partner, sex, age x origin and sex x origin are removed from the final model.

4. Discussion

4.1 Limitations and recommendations

Using data from the LFS and the Housing Survey that were collected between September and December 2020, our analyses showed which groups were more or less likely to participate by telephone instead of face-fo-face when persuaded at the doorway. Moreover, we showed mode-effects in important target variables between interviews that were conducted by telephone or face-to-face. Using regression methods, we decompensated the role of selection effects and mode-specific measurement errors. Our results indicate that mode-effects were mainly caused by selection effects – which can be taken into account for during weighting – and were less likely to be due to mode specific measurement errors. These findings are supportive to further implement this field strategy as an emergency measure for the purpose of increasing the number of responses and thereby enhancing the precision of study outcomes. There are, however, some limitations that should be addressed.

Firstly, our results are only applicable to the four target variables from LFS and five target variables from WoON. The results cannot be generalizable to other target variables, other surveys, or situations in which the percentage of interviews conducted by telephone exceeds the 30%. Also, the number of responses that we could include in our analyses were still small. This is especially the case for WoON, in which we wanted to perform subgroup analyses. Our analyses should be replicated using higher number of responses, other surveys and other target variables.

Secondly, we used a simplified method to decompensate the role of selection effects and mode-specific measurement errors. In an ideal situation, advanced experiments are necessary, in which the same respondent is re-interviewed using a different mode.

Thirdly, we may have underestimated the number of interviews that were conducted by telephone, as this was a self-report by our interviewers. In our newest questionnaires, we have now included a specific question about the mode or response.

4.2 Conclusion

From September to December 2020, on average, 30% of our CAPI sampled respondents were interviewed by telephone. For both the LFS and WoON, these changes had an effect on important target variables. Our analyses showed that these mode-effects were, however, mainly caused by selection effects – which can be taken into account for during weighting – and were less likely to be caused by mode specific measurement errors. Although there are important limitations and caveats, these findings are supportive to further implement this field strategy as an emergency measure in times of COVID-19. Conducting the CAPI interview by telephone can be a good way to increase the number of response and enhance precision of study outcomes.

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Target variables, variables from the weighting and mode of response. Labour Force Survey, September – December 2020

		Mode of response							
		CAPI Face to Face		CAPI conducted by telephone		CATI		CAWI	
		r	column %	r	column %	r	column %	r	column %
Employment status	Employed labour force	3243a	72,50%	1569b	76,20%	3439a,b	73,20%	19107b	74,40%
	Unemployed labour force	174a	3,90%	69a,b	3,40%	117b	2,50%	788b,c	3,10%
	Non-labour force	1059a,c	23,70%	421b	20,40%	1143a	24,30%	5780b,c	22,50%
Total number of working hours per week	<12 hours/week	430a	9,60%	200a	9,70%	261b	5,60%	2052c	8,00%
	12 - <20 hours/week	266a	5,90%	126a	6,10%	235a,b	5,00%	1232b	4,80%
	20 - <28 hours/week	428a	9,60%	211a,b	10,20%	533b	11,30%	2741a,b	10,70%
	28t-<35 hours/week	487a	10,90%	271b	13,20%	661b	14,10%	3784b	14,70%
	≥35 hours/wk	1632a	36,50%	761a	37,00%	1749a	37,20%	9298a	36,20%
	Unemployed or non-labour force	1233a	27,50%	490b	23,80%	1260a,b	26,80%	6568b	25,60%
Position in the labour force	Permanent postion	1786a	39,90%	886a	43,00%	2285b	48,60%	12630b	49,20%
	Flexible postion	988a	22,10%	462a	22,40%	532b	11,30%	3767c	14,70%
	Self-employed without personnel	452a	10,10%	217a,b	10,50%	600b	12,80%	2331a	9,10%
	Self-employed with personnel	17a	0,40%	4a	0,20%	22a	0,50%	379b	1,50%
	Unemployed or non-labour force	1233a	27,50%	490b	23,80%	1260a,b	26,80%	6568b	25,60%
Highest obtained educational level	Lower	1315a	29,40%	609a	29,60%	1289a	27,40%	5552b	21,60%
	Middle	1874a	41,90%	851a	41,30%	1887a	40,20%	8723b	34,00%
	Higher	1122a	25,10%	569a,b	27,60%	1413b	30,10%	10208c	39,80%
	Unknown	165a	3,70%	30b	1,50%	110b	2,30%	1192c	4,60%
Seks	Male	2266a	50,60%	1060a	51,50%	2326a	49,50%	12970a	50,50%
	Female	2210a	49,40%	999a	48,50%	2373a	50,50%	12705a	49,50%
Age	15-19	628a	14,00%	323a	15,70%	326b	6,90%	2157c	8,40%
	20-24	757a	16,90%	305a	14,80%	210b	4,50%	1845c	7,20%
	25-29	565a	12,60%	239a	11,60%	166b	3,50%	1904c	7,40%
	30-34	368a	8,20%	174a	8,50%	247b	5,30%	1767c	6,90%
	35-39	266a	5,90%	134a,c	6,50%	427b	9,10%	1827c	7,10%
	40-44	267a	6,00%	126a	6,10%	525b	11,20%	2008c	7,80%
	45-49	416a	9,30%	176a	8,50%	544b	11,60%	2435a	9,50%
	50-54	519a	11,60%	299b	14,50%	550a	11,70%	2918a	11,40%
	55-59	371a	8,30%	171a	8,30%	636b	13,50%	3177b	12,40%
	60-64	191a	4,30%	80a	3,90%	610b	13,00%	3266b	12,70%
	65-74	128a	2,90%	32b	1,60%	458c	9,70%	2371c	9,20%
Migration background	Autochthonous (native-born)	3223a	72,00%	1475a	71,60%	3893b	82,80%	21505b	83,80%
	Western allochthonous (foreing-b)	396a	8,80%	151a	7,30%	368a	7,80%	2165a	8,40%
	Non-Western allochthonous	857a	19,10%	433a	21,00%	438b	9,30%	2005c	7,80%
Type of household	1 person household	680a	15,20%	219b	10,60%	509b	10,80%	3663a	14,30%
	Household with children	3129a	69,90%	1568b	76,20%	2949c	62,80%	14277d	55,60%
	Other household	667a	14,90%	272a	13,20%	1241b	26,40%	7735c	30,10%
Applied for unemployment benefit and/or looking for job * age	Not registered at UWV	3936a	87,90%	1840a,b	89,40%	4260b	90,70%	23311b,c	90,80%
	Registered at UWV, with an unen	122a	2,70%	51a,b	2,50%	93a,b	2,00%	529b	2,10%
	Registered at UWV, with an unen	34a	0,80%	15a,b	0,70%	70b	1,50%	321b,c	1,30%
	Registered at UWV, with an unen	34a	0,80%	12a	0,60%	81b	1,70%	592b	2,30%
	Registered at UWV, without an u	202a	4,50%	91a	4,40%	81b	1,70%	462b	1,80%
	Registered at UWV, without an u	87a	1,90%	27a,b	1,30%	42b,c	0,90%	166c	0,60%
	Registered at UWV, without an u	61a	1,40%	23a	1,10%	72a	1,50%	294a	1,10%
Bruto monthly personal income (salary or benefit)	< 3.000 Euro	1022a	22,80%	430a	20,90%	818b	17,40%	4449b	17,30%
	>=3.000 Euro en < 10.000 Euro	580a	13,00%	266a	12,90%	327b	7,00%	2033b	7,90%
	>=10.000 Euro en < 15.000 Euro	379a	8,50%	174a	8,50%	346a	7,40%	1551b	6,00%
	>=15.000 Euro en < 20.000 Euro	506a	11,30%	218a	10,60%	461a	9,80%	2054b	8,00%
	>=20.000 Euro en < 30.000 Euro	684a	15,30%	297a,b	14,40%	684a,b	14,60%	3528b	13,70%
	>=30.000 Euro	1305a	29,20%	674b	32,70%	2063c	43,90%	12060d	47,00%
Most important source of income	Salary	3088a	69,00%	1512b	73,40%	3110c	66,20%	17929a	69,80%
	Benefit	692a	15,50%	274a,b	13,30%	942b	20,00%	4531c	17,60%
	Unknown	696a	15,50%	274a,b	13,30%	647a,b	13,80%	3215b	12,50%
Region + 4 big cities	Northern	547a	12,20%	154b	7,50%	540a	11,50%	2445c	9,50%
	Eastern	1000a	22,30%	329b	16,00%	1040a	22,10%	5509a	21,50%
	Western	1337a	29,90%	671a,b	32,60%	1535b	32,70%	8840b,c	34,40%
	Southern	1006a	22,50%	578b	28,10%	1106a	23,50%	5788a	22,50%
	Amsterdam	117a	2,60%	223b	10,80%	170c	3,60%	1052c	4,10%
	Rotterdam	213a	4,80%	37b	1,80%	124b	2,60%	686b	2,70%
	Den Hague	129a,b	2,90%	46a,b	2,20%	97a	2,10%	713b	2,80%
	Utrecht	127a	2,80%	21b	1,00%	87b	1,90%	642a	2,50%

Note: Values in the same row and subtable not sharing the same subscript are significantly different at p< ,05 in the two-sided test of equality for column proportions. Cells with no subscript are not included in the test. Tests assume equal variances.[2]

1. This category is not used in comparisons because its column proportion is equal to zero or one.

2. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.

Appendix II

Target variables, variables from the weighting and mode of response. Housing Survey, October – December 2020

| | | Mode of response | | | | | | | | | |
| | | CAWI | | CATI | | CAPI conducted by telephone | | CAPI face to face | | Total | |
		r	Column %	r	Column %	r	Column %	r	Column %	r	Column %
Housing situation	Living on one's own	9433_a	84,8%	2304_b	81,9%	343_c	76,4%	$879_{b,c}$	80,7%	12959	83,7%
	independent residential unit	199_a	1,8%	19_b	0,7%	13_a	2,9%	22_a	2,0%	253	1,6%
	Shared accomodation	79_a	0,7%	3_b	0,1%	14_c	3,1%	11_a	1,0%	107	0,7%
	inhabited other space	152_a	1,4%	46_a	1,6%	4_a	0,9%	14_a	1,3%	216	1,4%
	cohabiting household	26_a	0,2%	0^1	0,0%	$1_{a,b}$	0,2%	9_b	0,8%	36	0,2%
	member of the household	1239_a	11,1%	441_b	15,7%	74_b	16,5%	154_b	14,1%	1908	12,3%
Inclined to move	inclined to move	4343_a	39,0%	656_b	23,3%	182_a	40,5%	437_a	40,1%	5618	36,3%
	recently found a new dwelling	340_a	3,1%	48_b	1,7%	$10_{a,b}$	2,2%	$33_{a,b}$	3,0%	431	2,8%
	forced resettlement	25_a	0,2%	$8_{a,b}$	0,3%	$1_{a,b}$	0,2%	9_b	0,8%	43	0,3%
	not inclined to move	6420_a	57,7%	2101_b	74,7%	256_a	57,0%	610_a	56,0%	9387	60,6%
(Very) satisfied with dwelling	No	1256_a	12,7%	160_b	6,7%	$57_{a,c}$	15,1%	151_c	16,2%	1624	12,0%
	Yes	8595_a	87,3%	2218_b	93,3%	$320_{a,c}$	84,9%	779_c	83,8%	11912	88,0%
(Very) satisfied with living environment	No	1745_a	15,7%	319_b	11,3%	75_a	16,7%	177_a	16,3%	2316	15,0%
	Yes	9377_a	84,3%	2493_b	88,7%	374_a	83,3%	912_a	83,7%	13156	85,0%
Social cohesion	No	3399_a	42,8%	500_b	23,6%	118_a	37,2%	328_a	41,1%	4345	38,9%
	Yes	4550_a	57,2%	1620_b	76,4%	199_a	62,8%	470_a	58,9%	6839	61,1%
Seks	Male	5293_a	47,8%	1292_a	46,1%	220_a	49,1%	540_a	49,9%	7345	47,7%
	Female	5788_b	52,2%	1509_a	53,9%	228_a	50,9%	543_a	50,1%	8068	52,3%
Age (Januari 1st, 2021)	18 - 24	1247_a	11,3%	356_a	12,7%	96_a	21,4%	196_a	18,1%	1895	12,3%
	25-34	1399_a	12,6%	197_b	7,0%	122_c	27,2%	304_c	28,1%	2022	13,1%
	35 - 44	1384_a	12,5%	267_b	9,5%	82_c	18,3%	176_c	16,3%	1909	12,4%
	45 - 54	1745_a	15,7%	396_a	14,1%	64_a	14,3%	146_a	13,5%	2351	15,3%
	55 - 64	2160_a	19,5%	423_b	15,1%	43_c	9,6%	117_c	10,8%	2743	17,8%
	65 - 74	1991_a	18,0%	467_a	16,7%	27_b	6,0%	80_b	7,4%	2565	16,6%
	75 +	1155_a	10,4%	695_b	24,8%	14_c	3,1%	64_c	5,9%	1928	12,5%
Migration background	Autochthonous (native-born)	9414_a	85,0%	2378_a	84,9%	312_b	69,6%	707_b	65,3%	12811	83,1%
	Western allochthonous (foreing-born)	687_a	6,2%	210_a	7,5%	88_b	19,6%	260_b	24,0%	1245	8,1%
	Non-Western allochthonous	978_a	8,8%	$213_{a,b}$	7,6%	$48_{a,b}$	10,7%	116_b	10,7%	1355	8,8%
	Unknown	2_a	0,0%	0^1	0,0%	0^1	0,0%	0^1	0,0%	2	0,0%
Position in the household	Alone	2860_a	25,7%	965_b	34,3%	141_a	31,4%	351_b	32,2%	4317	27,9%
	Head of the household/ partner without childeren	3694_a	33,2%	654_b	23,2%	72_c	16,0%	206_c	18,9%	4626	29,9%
	Head of the household / partner with children	2513_a	22,6%	565_b	20,1%	118_a	26,3%	$235_{a,b}$	21,6%	3431	22,2%
	Head of an one parent household	507_a	4,6%	132_a	4,7%	$26_{a,b}$	5,8%	102_b	9,4%	767	5,0%
	Child of a two parent household	974_a	8,8%	379_b	13,5%	37_a	8,2%	89_a	8,2%	1479	9,6%
	Child of a one parent household	249_a	2,2%	52_a	1,8%	29_b	6,5%	52_b	4,8%	382	2,5%
	Other household member	16_a	0,1%	10_a	0,4%	8_b	1,8%	12_b	1,2%	47	0,3%
	Not a member of the household	$315_{a,b}$	2,8%	56_a	2,0%	18_b	4,0%	$41_{b,c}$	3,8%	430	2,8%
Number of persons in the household	1	2927_a	26,4%	951_b	34,0%	148_a	33,0%	391_b	36,1%	4417	28,7%
	2	4181_a	37,7%	768_b	27,4%	107_b	23,9%	288_b	26,6%	5344	34,7%
	3	1532_a	13,8%	381_a	13,6%	81_a	18,1%	157_a	14,5%	2151	14,0%
	4	1711_a	15,4%	463_a	16,5%	77_a	17,2%	142_a	13,1%	2393	15,5%
	≥5	730_a	6,6%	238_b	8,5%	$35_{a,b}$	7,8%	105_b	9,7%	1108	7,2%
Partner	No	5376_a	45,4%	1620_b	57,5%	256_b	57,0%	675_b	62,0%	7927	49,0%
	Yes	6462_a	54,6%	1198_b	42,5%	193_b	43,0%	414_b	38,0%	8267	51,0%
Region excluding the big cities + big cities	Northern	1098_a	9,9%	333_b	11,8%	$45_{a,b}$	10,0%	$110_{a,b}$	10,1%	1586	10,2%
	Western	3506_a	31,5%	818_b	29,1%	126_a	28,1%	315_a	28,9%	4765	30,8%
	Eastern	2428_a	21,8%	607_a	21,6%	68_a	15,1%	$213_{a,b}$	19,6%	3316	21,4%
	Southern	$2784_{a,b}$	25,0%	743_a	26,4%	128_a	28,5%	239_c	21,9%	3894	25,2%
	Amsterdam	443_a	4,0%	110_a	3,9%	40_b	8,9%	81_b	7,4%	674	4,4%
	Rotterdam	327_a	2,9%	86_a	3,1%	12_a	2,7%	67_b	6,2%	492	3,2%
	The Hague	285_a	2,6%	63_a	2,2%	15_a	3,3%	33_a	3,0%	396	2,6%
	Utrecht (Municipality)	210_a	1,9%	41_a	1,5%	14_a	3,1%	25_a	2,3%	290	1,9%
Urbanitiy of the municipality	Very strong (>=2500 adresses/km2)	2469_a	22,3%	552_b	19,7%	131_c	29,2%	372_c	34,3%	3524	22,9%
	Strong (1500 - 2500 adresses/km2)	3423_a	30,9%	785_b	28,0%	144_a	32,1%	$333_{a,b}$	30,7%	4685	30,4%
	Moderate (1000 - 1500 adresses/km2)	1792_a	16,2%	467_a	16,7%	$59_{a,b}$	13,2%	136_b	12,6%	2454	15,9%
	Weak (500 - 1000 adresses/km2)	2496_a	22,5%	715_b	25,5%	$91_{a,b,c}$	20,3%	173_c	16,0%	3475	22,5%
	Not urban (<500 adresses/km2)	901_a	8,1%	282_b	10,1%	23_a	5,1%	69_a	6,4%	1275	8,3%
Type of dewlling	Unkwon	78_a	0,7%	19_a	0,7%	3_a	0,7%	12_a	1,1%	112	0,7%
	One household dwelling	8159_a	73,3%	2128_a	75,6%	280_b	62,4%	613_b	56,3%	11180	72,2%
	Multiple household dwelling	2891_a	26,0%	666_a	23,7%	166_b	37,0%	464_b	42,6%	4187	27,0%
Owner/tenant	Unknown	78_a	0,7%	1_b	0,0%	$6_{a,c}$	1,3%	18_c	1,7%	103	0,7%
	Owner	7856_a	70,6%	1881_b	66,9%	227_c	50,6%	440_d	40,4%	10404	67,2%
	Tenant of a housing corporation	2040_a	18,3%	724_b	25,7%	132_b	29,4%	418_b	38,4%	3314	21,4%
	Tenant of a commercial corporation	1154_a	10,4%	207_b	7,4%	84_c	18,7%	213_c	19,6%	1658	10,7%
Value of the property	Unknown	$300_{a,b}$	2,7%	57_a	2,0%	$15_{a,b}$	3,3%	42_b	3,9%	414	2,7%
	< 50.000 Euro	$26_{a,b}$	0,2%	1_a	0,0%	2_a	0,4%	$5_{b,c}$	0,5%	34	0,2%
	50.000-74.999 Euro	46_a	0,4%	$13_{a,b}$	0,5%	$6_{b,c}$	1,3%	16_c	1,5%	81	0,5%
	75.000-99.999 Euro	165_a	1,5%	44_a	1,6%	$13_{a,b}$	2,9%	49_b	4,5%	271	1,8%
	100.000-124.999 Euro	333_a	3,0%	101_a	3,6%	$20_{a,b}$	4,5%	75_b	6,9%	529	3,4%
	125.000-149.999 Euro	643_a	5,8%	202_b	7,2%	$37_{a,b,c}$	8,2%	115_c	10,6%	997	6,4%
	150.000-174.999 Euro	814_a	7,3%	271_b	9,6%	$43_{a,b}$	9,6%	136_b	12,5%	1264	8,2%
	175.000-199.999 Euro	1007_a	9,0%	$271_{a,b}$	9,6%	$41_{a,b}$	9,1%	133_b	12,2%	1452	9,4%
	200.000-224.999 Euro	1062_a	9,5%	283_a	10,1%	51_a	11,4%	100_a	9,2%	1496	9,7%
	225.000-249.999 Euro	980_a	8,8%	266_a	9,5%	42_a	9,4%	82_a	7,5%	1370	8,9%
	250.000-274.999 Euro	949_a	8,5%	246_a	8,7%	38_a	8,5%	74_a	6,8%	1307	8,4%
	275.000-299.999 Euro	798_a	7,2%	$183_{a,b}$	6,5%	$27_{a,b}$	6,0%	47_b	4,3%	1055	6,8%
	300.000-324.999 Euro	610_a	5,5%	151_a	5,4%	$18_{a,b}$	4,0%	33_b	3,0%	812	5,2%
	325.000-349.999 Euro	562_a	5,1%	$110_{a,b}$	3,9%	$17_{a,b}$	3,8%	33_b	3,0%	722	4,7%
	350.000-374.999 Euro	457_a	4,1%	105_a	3,7%	16_a	3,6%	29_a	2,7%	607	3,9%
	375.000-399.999 Euro	379_a	3,4%	79_a	2,8%	9_a	2,0%	22_a	2,0%	489	3,2%
	400.000-424.999 Euro	308_a	2,8%	80_a	2,8%	$8_{a,b}$	1,8%	13_b	1,2%	409	2,6%
	425.000-449.999 Euro	255_a	2,3%	53_a	1,9%	4_a	0,9%	13_a	1,2%	325	2,1%
	450.000-474.999 Euro	218_a	2,0%	60_a	2,1%	$4_{a,b}$	0,9%	8_b	0,7%	290	1,9%
	475.000-499.999 Euro	177_a	1,6%	34_a	1,2%	3_a	0,7%	10_a	0,9%	224	1,4%
	500.000-524.999 Euro	144_a	1,3%	$27_{a,b}$	1,0%	$3_{a,b}$	0,7%	3_b	0,3%	177	1,1%
	525.000 Euro of meer	895_a	8,0%	176_b	6,3%	32_b	7,1%	51_b	4,7%	1154	7,5%
Quintile standardized household income	Lowest	1090_a	9,8%	362_b	12,9%	93_c	20,7%	285_c	26,2%	1830	11,8%
	Second	1750_a	15,7%	642_b	22,8%	$85_{a,b}$	18,9%	233_b	21,4%	2710	17,5%
	Third	$2226_{a,b}$	20,0%	621_a	22,1%	$93_{a,b}$	20,7%	190_c	17,4%	3130	20,2%
	Fourth	2882_a	25,9%	611_b	21,7%	72_c	16,0%	187_c	17,2%	3752	24,2%
	Highest	3083_a	27,7%	575_b	20,4%	98_b	21,8%	169_c	15,5%	3925	25,4%
	Unknown	97_a	0,9%	2_b	0,1%	$8_{a,c}$	1,8%	25_c	2,3%	132	0,9%

Note: Values in the same row and subtable not sharing the same subscript are significantly different at p< ,05 in the two-sided test of equality for column proportions. Cells with no subscript are not included in the test. Tests assume equal variances.[2]

1. This category is not used in comparisons because its column proportion is equal to zero or one.

2. Tests are adjusted for all pairwise comparisons within a row of each innermost subtable using the Bonferroni correction.