LORE methodological note 2014:12

Device used to answer web surveys – data quality

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ABSTRACT

There seem to be no cause for concern regarding data quality differences between desktop/laptop computers on one hand and tablet and smartphones on the other, at least for the time being. However, small but significant differences in terms of item nonresponse and time use, combined with a slow increase in use of handheld devices as shown in Note 2014:11, indicate that survey methodologists might need to keep an eye on future developments.

Background

Web surveys can be answered using different devices; mobile phones, tablets or laptop/desktop computers. Choice of device is an aspect which is difficult to control and such efforts would probably be counterproductive in terms of respondent cooperation and potentially also for data quality since some respondents would be forced to use a device they might not be used to. There are two good reasons to examine whether device choice could affect response quality. Screen size and interaction method are two aspects that differ across device type and both these differences might affect data quality. This note examines three different indicators of data quality: percent item nonresponse, time use, and correlations. See LORE methodological note 2014:11 for more information on the descriptive features of device use.

Results

Six separate waves of the Citizen Panel (Sw. Medborgarpanelen - MP), collected between June 2013 and November 2014, are analyzed in this report, MP7-MP12. Participation rates (corresponding to AAPOR RR5) ranges from 55 percent in MP9 to 61 percent in MP7 and MP10.

Percent item nonresponse is calculated as the ratio of responded questions to all applicable questions. Table 1 below shows that smartphone users have a somewhat higher item nonresponse than both desktop/laptop computer and tablet users. The only statistically significant difference is when comparing smartphone and computer users

(t(37,934) = -4.52, p < .001), but the difference of 0.4 percentage points is substantially negligible. However, we must remember that the devices used in this study represent the respondents' choices. Thus, differences are not to be interpreted as causal differences since selection bias might be present. This study relies on observational data rather than randomized experimental data. Differences in data quality are therefore to be regarded as descriptive information that might be caused by differences in respondent characteristics as well as by the device used.

Table 1. Percent item nonresponse and device

	% Mean item nonresponse	Std. dev.	N
Computer	1.9	5.8	32,346
Tablet	2.0	6.0	3,771
Smartphone	2.3	7.3	5,590
Total	2.0	6.0	41,707

Table 2 shows the second measure of data quality, namely time used to finish the survey. Note that it is uncertain whether longer or shorter response time is better in terms of response quality. What matters more is whether there is a significant difference at all between devices. And there is indeed, similar to the item nonresponse case, a substantially small but statistically significant difference (30 seconds, 3.5 percent more time) between computer users and smartphone users (t(39,753) = -3.30, p = .001).

Table 2. Time use and device

	Mean time (minutes)	Std. dev.	N
Computer	14.2	9.1	34,292
Tablet	14.4	8.8	3,998
Smartphone	14.7	9.0	5,463
Total	14.3	9.1	43,753

***Comment*: Outliers are excluded from the reported data. Outliers are defined as those who spend more time than the third quartile plus the interquartile range multiplied by 3 (3Q+IQR*3).**

Finally, table 3 and 4 shows two commonly reported relationships. The general fear is that lower data quality on mobile devices could result in lower correlations between constructs than otherwise. Table 3 displays the correlation between educational level and social trust (see e.g. Putnam 1995). Again, only small differences are found. On a speculative note, this might be partly due to device selection. If those who now chose to use a computer to respond would be forced to use a smartphone, their time use could potentially be substantially higher since they might feel less comfortable doing so.

Table 3. Partial correlations by device: education and social trust (controlling for gender and age)

	Partial corr.	Sig.	N
Computer	0.18	0.00	16,196
Tablet	0.18	0.00	2,024
Smartphone	0.19	0.00	3,132

Comments: Education is measured using six ordinal categories (from low to high education). Social trust is measured on an eleven-point scale (0, low trust to 10, high trust). The social trust item was only given to a subsample in each wave and was not asked in MP11. Correlations vary between 0.12 and 0.26 in specific waves.

Table 4. Partial correlations by device: environmental policy proposals and an index of concern about societal problems (controlling for gender, age and education)

	Variable	Partial corr.	Sig.	N
Computer	Proposal 1	0.33	0.00	4,140
	Proposal 2	0.22	0.00	4,140
Tablet	Proposal 1	0.31	0.00	560
	Proposal 2	0.19	0.00	560
Smartphone	Proposal 1	0.31	0.00	831
	Proposal 2	0.22	0.00	831

Comments: Proposal 1 is "Strive towards an environmentally friendly society, even without economic growth", proposal 2 is "Raise the CO^2 tax on petrol", the scale ranges from 1 "Very bad proposal" to 5 "Very good proposal". The index is composed of concern about 3 different aspects of society; "Environmental degradation," "Global epidemics" and "Climate change." The scale ranges from 1 "Not at all concerned" to 5 "Very concerned." The proposal and concern items were only given to a subsample in each wave and were only asked in MP10 and MP12.

The same pattern is observable in table 4 where two different environmental proposals are correlated with an index of concern (see e.g. Stern, Dietz & Black 1985). All differences in correlation strength between devices turn out to be very small. Variations in correlation strength are found between specific waves, but only varies between 0.29-0.34 (proposal 1) or between 0.18-0.26 (proposal 2).

To summarize the findings, there seem to be no serious cause for concern, at least not for the time being. The slow increase in use of handheld devices shown in Note 2014:11 is thus not necessarily problematic for survey data quality. But since there are still small but significant differences in terms of item nonresponse and time use there are still reasons to keep an eye on future developments.

References

Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, *6*, 68.

Stern, P. C., Dietz, T., & Black, J. S. (1985). Support for environmental protection: The role of moral norms. *Population and Environment*, *8*(3-4), 204-222.

The Laboratory of Opinion Research (LORE) is an academic web survey center located at the Department of Political Science at the University of Gothenburg. LORE was established in 2010 as part of an initiative to strengthen multidisciplinary research on opinion and democracy. The objective of the Laboratory of Opinion Research is to facilitate for social scientists to conduct web survey experiments, collect panel data, and to contribute to methodological development. For more information, please contact us at:

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