

Using Smartphones for Survey and Passive Mobile Data Collection

Florian Keusch, University of Mannheim
Statistics Day 2017
Statistics Austria, 2.10.2017

Why Smartphones?



- Smartphone penetration on the rise
 - U.S.: 77% (12% Smartphone-only Internet) (Pew Research Center, 2017)
 - GER: 82% (5% Smartphone-only Internet) (Keusch & Kreuter, 2017)
 - AUT: 68% (Integral, 2017)

Two Separate Phenomena

- Completion of Web surveys on mobile Web devices
 - PC-optimized Web surveys completed by some on mobile devices
 - “Unintentional mobile *Rs*” (Peterson 2012)
 - Depending on the target audience, between 10 and 50% of *Rs* fill out web surveys on smartphone (de Bruijne & Wijnant, 2014; Kinesis, 2013; Peterson, 2012; Pew Research Center, 2015; Revilla et al., 2015, Struminskaya et al., 2015)
 - Hope to increase coverage or reduce nonresponse, without affecting data quality

What Makes Mobile Web Different from Regular Web for Surveys?

Technology Features	User Characteristics	Context of Use
<ul style="list-style-type: none">• Display dimensions & orientation• Input mode (usually touchscreen)• Bandwidth & connectivity• Software	<ul style="list-style-type: none">• Comfort & familiarity• Fine motor skills• Willingness, motivation, & interest• Alternatives available & choice of device• Consumption vs. production• Cost & type of data plan• Shared use of device• Invitation mode	<ul style="list-style-type: none">• Location<ul style="list-style-type: none">– Safety– Distractions– Presence of others– Environmental cues• User behavior<ul style="list-style-type: none">– Multi-tasking– Interstitial activities– Time on task

Nonresponse in Mobile Web Surveys

- Evidence that *RR* lower and break-off rate higher for mobile Web than PC Web^{1,2,3}, even when optimizing for mobile devices^{4,5,6,7,8}
- Longer response times^{1,2,3,4,7,8,9}
 - Higher burden for participation
 - Much of difference due to within-page (i.e., answering) times, not between-page (i.e., connection speed)¹⁰
- Smartphone *Rs* younger^{1,7,8,9}, female^{8,9}, have higher formal education³, heavier mobile Web users¹, and primarily rely on smartphones to access Internet⁸

Source: ¹Mavletova (2013); ²Mavletova & Couper (2013); ³Keusch & Yan (2016); ⁴Antoun (2015); ⁵Buskirk & Andrus (2014); ⁶Stapleton (2013); ⁷Toepoel & Lugtig (2014); ⁸Wells, et al. (2013); ⁹de Bruijne & Wijnant (2013); ¹⁰Couper & Peterson (2015)

Measurement Error in Mobile Web Surveys

- General cognitive processing seems to be same as in other modes¹
- Survey completion on mobile device (especially smartphone) different than survey completion on desktop/laptop
 - Effects on item omission^{2,3,4,5} and primacy effects^{1,2,6}
 - Tablet seems to be more similar to desktop/laptop than smartphone
- As long as care taken in design, very few (reliable) differences in responses to mobile Web and regular Web after controlling for self-selection and nonresponse^{3,5,7,8}

Implications of Smartphone Use in Web Surveys

- *Rs* will use smartphones to fill out web surveys, if you like it or not
- Data quality of mobile Web surveys not necessarily inferior to PC Web surveys
- We need to think “Mobile First” when designing web surveys
 - Adapt questionnaire to smaller displays: no grid questions, no long horizontal scales, fewer open-ended questions
 - Modularized surveys (?)

How “Mobile Ready”?

	2014	2015	2016
Mobile Incompatible	30%	33%	29%
Mobile Possible	27%	23%	23%
Mobile Friendly	30%	30%	33%
Mobile Optimized	13%	15%	15%

Source: Research Now (Global figures)

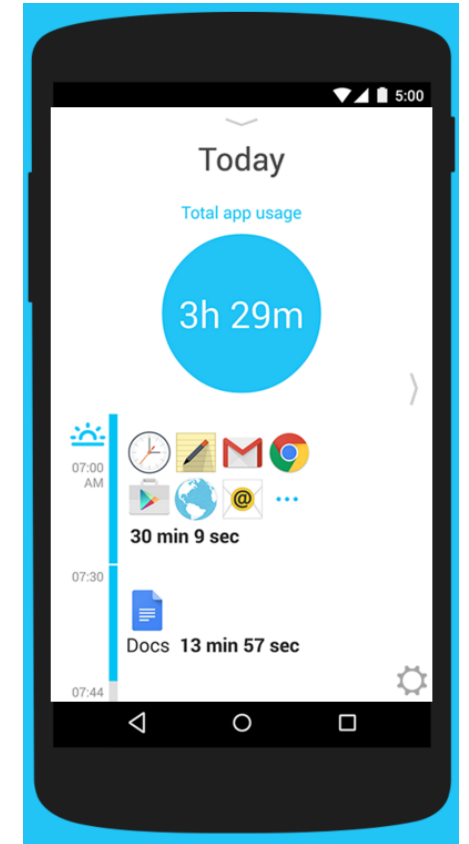
<https://newmr.org/blog/major-update-on-mobile-market-research/>

Two Separate Phenomena

- Completion of Web surveys on mobile Web devices
- New opportunities through passive mobile data collection via apps beyond asking survey questions
 - Examples: geolocation & movements, online behavior & browser history, app usage, call & text logs

Compared to Surveys, Passive Mobile Data Collection Has Potential to...

- ...provide richer data
 - Because it can be collected in much higher frequencies
- ...decrease respondent burden
 - Because fewer survey questions need to be asked
- ...reduce measurement error
 - Because of reduced recall errors and social desirability

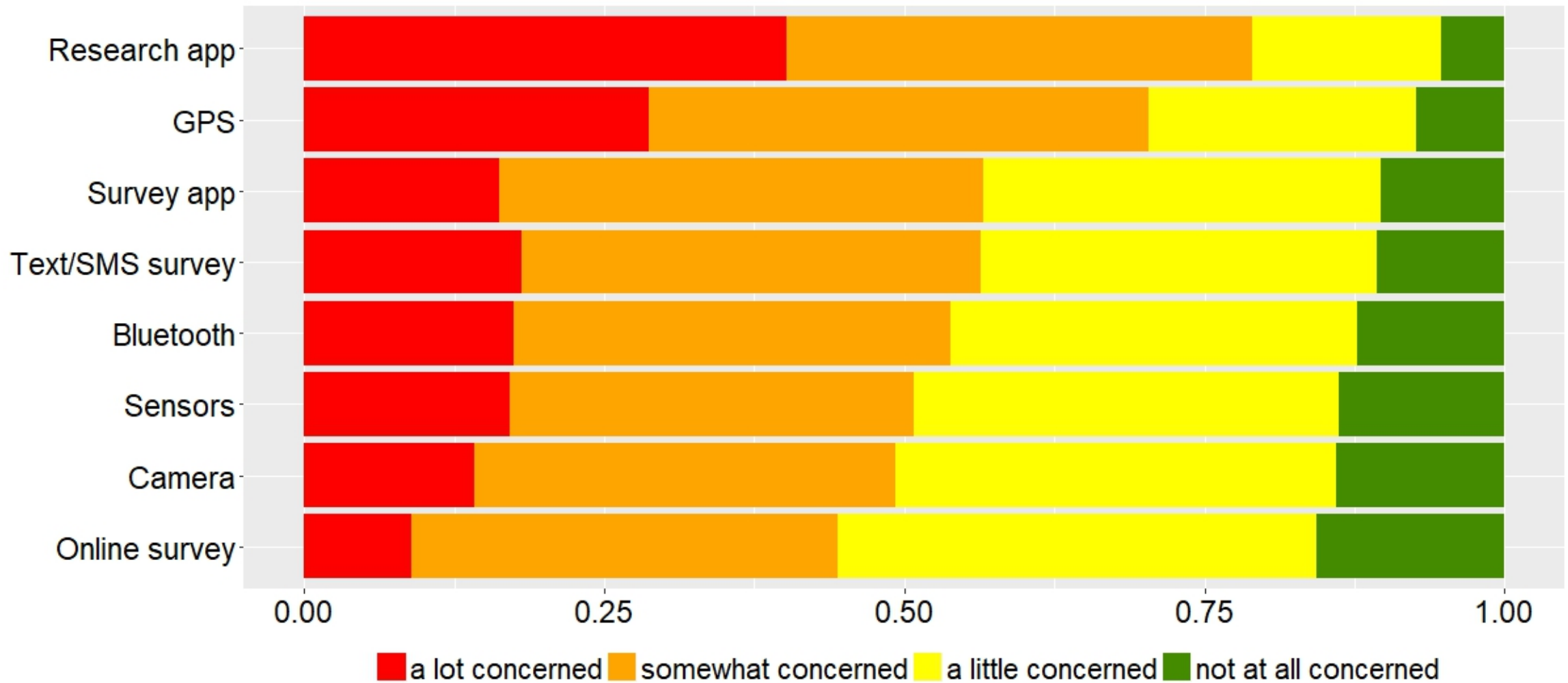


<http://www.qualitytimeapp.com/>

Using Apps for Passive Mobile Data Collection

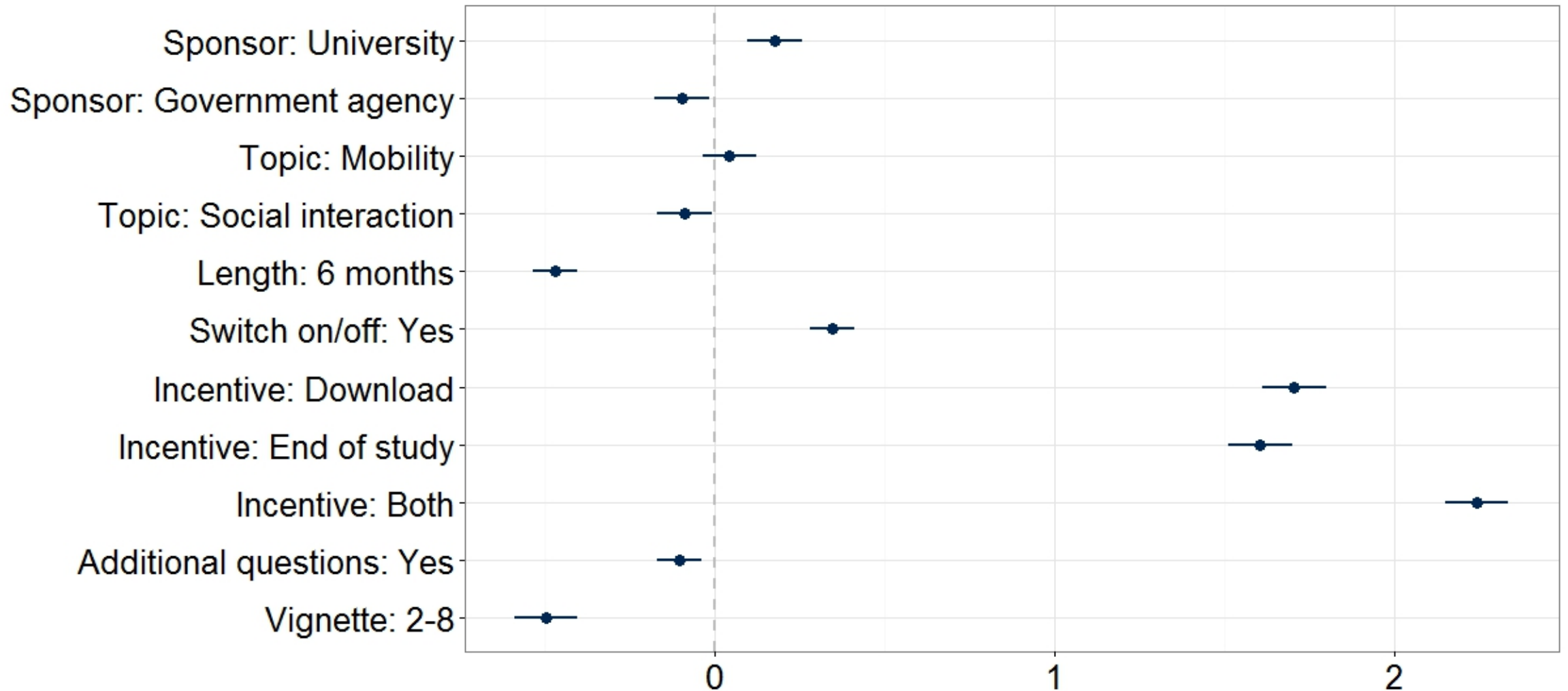
- Small but growing literature (Fritz et al., 2017; Revilla et al., 2016; Sonck & Fernee, 2013; Sugie, 2016)
 - First studies demonstrate that passive mobile data collection has potential to provide rich data for social science research in specific target populations
- Several large scale research projects on the way
 - SOEP started to use mobile app to keep in touch with their refugee cohort
 - CBS and Utrecht University just formed a large-scale Innovation Network (WIN) for data collection innovation with smartphones
 - IAB will use mobile device measures for labor market research (MoDeM)
 - Modernizing Migration Measures – Combining survey and passive data collection among refugees (MZES)
- Effects of using passive smartphone data collection on data quality, especially on nonresponse error, unclear

Concern About Security of Providing Information on Smartphones for Research via...



"Smartphones can collect a variety of data that provide researchers with information of the everyday life of the users. Below you will see a number of activities that you could do with your smartphone. How concerned would you be about the security of providing information in the following ways for research?" n=2,647 German smartphone users

Willingness to Participate in Passive Mobile Data Collection



Unstandardized coefficients (points) with 95%-CI (lines) from multilevel linear regression (REML). DV: Willingness to participate in passive mobile data collection. n=1,947 German smartphone users

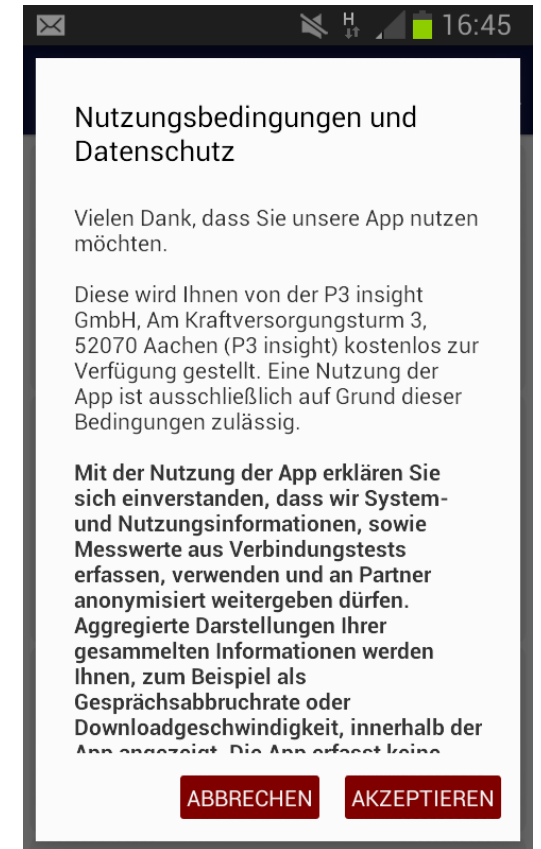
Reasons (Not) to Participate

Reasons not to participate		Reasons to participate	
Privacy, data security concerns	31%	Interest, curiosity	35%
Not enough information provided	23%	Incentive	25%
No incentive, incentive too low	17%	Help research, researcher	14%
Not interested	5%	Good thing, will be helpful	7%
Not enough time	3%	No additional effort	5%
Don't use smartphone enough	2%	Seems legitimate, safe	5%
Other reasons	8%	Fun	2%
		Good experience with research so far	2%
		Other reasons	9%

n=1,947 German smartphone users

Challenges so far...

- Legal and ethical concerns
 - Consent, data linkage, and privacy
- Rapid advancement of technology
 - Constant updates of hard- and software
- Limitation to Android smartphones
 - Coverage error?
 - Android users are older than users of other OS
(Keusch & Kreuter, 2017)
- New skills required that survey methodologists usually don't have
 - Technical know-how to set up app
 - Working with Big Data



Summary

- For increasing number of people, smartphones only way to access Internet
 - *Design your web survey to be smartphone-friendly!*
- Researchers can use smartphones for more than just Web surveys
 - Location- and behavior-based survey invitations
 - Combining mobile web surveys with passive data collection
- We need to better understand what drives people to participate/not participate in passive mobile data collection
 - Concerns that might influence nonresponse and measurement error

Thank You!



Florian Keusch

University of Mannheim

School of Social Sciences

Statistics and Methodology

f.keusch@uni-mannheim.de

<http://floriankeusch.weebly.com/>

Literature

- Antoun, C. (2015). Mobile web surveys: A first look at measurement, nonresponse, and coverage errors. Dissertation at the University of Michigan, Ann Arbor, MI.
- Buskirk, T. D., & Andrus, C. (2014). Making mobile browser surveys smarter: Results from a randomized experiment comparing online surveys completed via computer or smartphone. *Field Methods*, 26, 322–342.
- Couper, M. P., & Peterson, G. (2016). Why do web surveys take longer on smartphones? *Social Science Computer Review*. Published online before print February 11, 2016. doi:10.1177/0894439316629932.
- de Bruijne, M., & Wijnat, A. (2014). Mobile response in web panels. *Social Science Computer Review*, 32, 728–742.
- Fritz, H., Tarraf, W., Saleh, D.J., & Cutchin, M.P. (2017). Using a Smartphone-Based Ecological Momentary Assessment Protocol with Community Dwelling Older African Americans. *The Journal of Gerontology: Psychological Sciences and Social Sciences*. Advance Access publication January 5, 2017. doi:10.1093/geronb/gbw166.
- Integral (2017). Austrian Internet Monitor, Kommunikation und IT in Österreich, 1. Quartal 2017. http://www.integral.co.at/downloads/Internet/2017/06/AIM-C_-_Q1_2017.pdf.
- Keusch, F. & Kreuter, F. (2016). Smartphones und Soziale Medien. Unpublished report wave 28 of GIP.
- Keusch, F. & Yan, T. (2016). Web Versus Mobile Web: An Experimental Study of Device Effects and Self-Selection Effects. *Social Science Computer Review*. Published online before print November 2, 2016, doi: 10.1177/0894439316675566.
- Kinesis. (2013). Online survey statistics from the mobile future. <http://www.kinesissurvey.com/wp-content/uploads/2014/05/UPDATED-with-Q3-2013-Data-Mobile-whitepaper.pdf>.
- Lugtig, P., & Toepoel, V. (2016). The use of PCs, smartphones, and tablets in a probability-based panel survey: Effects on survey measurement error. *Social Science Computer Review*, 34, 78–95.
- Mavletova, A. (2013). Data quality in PC and mobile web surveys. *Social Science Computer Review*, 31, 725–743.
- Mavletova, A., & Couper, M. P. (2013). Sensitive topics in PC web and mobile web surveys: Is there a difference? *Survey Research Methods*, 7, 191–205.

Literature

- Peterson, G. (2012). What we can learn from unintentional mobile respondents. *CASRO Journal*, 2012-2013, 32-35.
- Pew Research Center. (2017). Mobile Fact Sheet. <http://www.pewinternet.org/factsheet/mobile/>.
- Peytchev, A., & Hill, C. A. (2010). Experiments in mobile web survey design. Similarities to other modes and unique considerations. *Social Science Computer Review*, 28, 319–335.
- Revilla, M., Toninelli, D., Ochoa, C., & Loewe, G. (2015). Who has access to mobile devices in an online opt-in panel? An analysis of potential respondents for mobile surveys. In D. Toninelli, R. Pinter, & P. de Pedraza (Eds.), *Mobile Research Methods: Opportunities and Challenges of Mobile Research Methodologies* (pp. 119–139). London, England: Ubiquity Press.
- Revilla, M., Ochoa, C., & Loewe, G. (2016). Using passive data from a meter to complement survey data in order to study online behavior. *Social Science Computer Review*. Published online before print March 17, 2016. doi:10.1177/0894439316638457
- Sonck, N., & Fernee, H. (2013). Using smartphones in survey research: A multifunctional tool. Implementation of a time use app: A feasibility study. The Hague, Netherlands: The Netherlands Institute for Social Research.
- Stapleton, C. E. (2013). The smartphone way to collect survey data. *Survey Practice*, 6. <http://www.surveypactice.org/index.php/SurveyPractice/article/view/75/html>.
- Struminskaya, B., Weyandt, K., & Bosnjak, M. (2015). The effects of questionnaire completion using mobile devices on data quality. Evidence from a probability-based general population panel. *Methods, Data, Analyses*, 9, 261–292.
- Sugie, N. (2016). Utilizing Smartphones to Study Disadvantaged and Hard-to-Reach Groups. *Sociological Methods & Research*. Published online before print January 18, 2016, doi: 10.1177/0049124115626176.
- Toepoel, V., & Lugtig, P. (2014). What happens if you offer a mobile option to your web panel? Evidence from a probability-based panel of Internet users. *Social Science Computer Review*, 32, 544–560.
- Wells, T., Bailey, J. T., & Link, M. W. (2013). Filling the void: Gaining a better understanding of tablet-based surveys. *Survey Practice*, 6. <http://www.surveypactice.org/index.php/SurveyPractice/article/view/25/html>.