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Mobile Market Research and the Hard-to-Reach Consumers

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Abstract:

Market research organizations put a lot of work into trying to reach consumers and make them cooperate with market surveys. Some subgroups are particular hard to reach, notably the young, the employed and the highly educated. Mobile market research is a promising way of catching these consumers since via mobile phones everyone can be accessed anywhere and at any time.

This study investigates whether mobile phone surveys make it easier to interview the hard-to-reach consumers. Results reveal a significant effect of age on the likelihood of being difficult to reach, but different use patterns of the mobile phone or attitudes towards mobile phones do not affect the likelihood of being a hard-to-reach respondent.

Key words: market surveys, mobile phones, Computer Assisted Telephone Interviewing

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1. Introduction

Market researchers strive to find the best way to reach consumers in order to collect data that allows their choices and attitudes to be analyzed. There are a number of ways that market research companies use to collect information about consumers, such as surveys, concept and product testing, website usability studies, and qualitative studies, however certain groups of consumers can be harder to reach than others for a number of reasons. Until the end of 20th century, (fixed) CATI surveys (Computer Assisted Telephone Interviewing surveys) were the dominant mode for collecting survey data about consumers but the growing mobility and time pressures of consumers make it increasingly difficult to find them at home. Not surprisingly, mCATI surveys (Mobile Computer Assisted Telephone Interviewing surveys) are gradually supplementing and even replacing CATI surveys because mobile phones allow market researchers “to go mobile” together with the consumers they want to catch. It is well known that population subgroups that spend a lot of time away from home – males, people with a higher educational level, younger people and residents in large cities – are difficult to reach in CATI surveys (Traugott 1987; Shaiko et al. 1991; Merkle et al. 1993; Groves & Couper 1998; European Commission 2004; Johnson & Cho 2004). Other specific populations who are often away or on travel and cannot be easily reached at a fixed location, (e.g. business people), are also difficult to catch in market surveys that rely on “fixed” modes of data collection. Mobile market research is a promising way of reaching these groups as mCATI surveys can be done anywhere and at any time. Moreover, mobile devices are increasingly the consumers' preferred mode for participating in surveys (Fine & Menictas 2012; Yazbeck & Scarlet 2013).

As mobile phones are expected to be used increasingly as consumers' research mode (Nathan 2001; Couper 2011), it is crucial to gain a better understanding of the methodological implications for market surveys. This study contributes to this by analyzing whether the level of effort required to obtain the interviews in a mCATI survey is associated with the socio-demographic profile of consumers and with their behaviors and attitudes towards mobile phones. The outcomes provide useful information that helps shape methodological approaches for future mCATI surveys.

2. Literature review

The spread and increased use of mobile communications technology have captured the attention of market researchers who now see the mobile phone as a survey instrument. Using mobile phones to conduct mCATI surveys has some benefits, namely the speed of fieldwork completion and the easiness of contact. The tendency for mobile phone users to constantly carry their mobile devices makes them potentially accessible to interviewers in a wide variety of settings and during most of their waking hours (Kuusela et al. 2008; AAPOR 2010; Poynter et al. 2014) which, at least theoretically, favors contactability and participation, and ultimately, reduce fieldwork completion.

While the mobility of mobile phones may play favorably to catch the hard-to-reach consumers, other specificities of mobile communications can reduce the likelihood of cooperation with a mobile market survey. Logically, when a potential respondent is in a restaurant, somewhere noisy or crowded, or driving a car, the request for an interview on the mobile phone is likely to be met with a hasty “no” before the interviewer can even mention the possibility of rescheduling the call (AAPOR 2010). Additionally, noisy environments make it difficult to hear the mobile phone ringing and the call may be ignored or rejected. Another factor that affects negatively the likelihood of cooperation is the fact that some people only use their mobile phone for outgoing calls, and turn it off or on voicemail at other times. People often do this when they are abroad to avoid roaming costs (European Commission 2014) and it is also common in countries with Receiving Party Pays tariffs so as to control the costs of incoming calls (Littlechild 2006)². Moreover, many people regard their mobile phone as a personal device and tend to reject incoming calls from unfamiliar numbers, which makes obtaining an interview via mobile phone more difficult.

The likelihood of obtaining response can also be affected by other specificities of mobile phones: the caller's number may be visible on the mobile phone screen so it is easy to take or reject the call based on what appears on the screen; the voice mail can be activated and calls diverted without answering them; the mobile phone can be

² Receiving Party Pays (RPP) tariffs means that the receiving network charges its own subscriber for the cost of receiving and terminating calls from other networks. RPP is applied in several countries, notably the US and Canada, Hong Kong, Singapore and China. Calling Party Pays (CPP) is an alternative costing system, in which the caller pays for the entire cost of each telephone call. CPP is used in Europe, Australia and New Zealand (OECD 2000).

set on silent mode or even turned off, blocking the contact at the moment of the call. All these factors reduce the likelihood of obtaining response and require market research companies to make an additional effort in order to achieve high response rates.

In the context of CATI surveys, past research has revealed that “being at home” is strongly related to individuals' socio-demographic attributes, and therefore the likelihood of interview varies across subgroups of the population. Specifically, it is more difficult to interview males because they spend less time at home than females; more call attempts must be made to more educated people before obtaining an interview, and older adults (65 years and over) are easier than younger adults to contact and interview (Traugott 1987; Shaiko et al. 1991; Merkle et al. 1993).

In the case of mCATI surveys, the key issue is not being at home but “being on the mobile phone”. Recent research reveals that men, young people, more educated people, employees and self-employed are heavy users of mobile phones (European Commission 2008) which probably increases the likelihood of finding them “on the mobile phone”. This fact allows to hypothesize that difficulty of obtaining response in mCATI surveys may be associated with mobile phone users' sociodemographic attributes.

In fixed CATI surveys, the difficulty in obtaining response is also affected by socio-environmental attributes surrounding the household such as the urbanicity and the income level of the area/region where the household is located. Residents in large cities may spend more time between home-work-home than residents in smaller areas. They may be away from home longer to do grocery purchases, shopping and other errands. People living in urbanized areas have more entertainment options that take them out of the house more time than the non urban residents. All these factors reduce the likelihood of finding people at home, and ultimately, obtaining response (Groves & Couper 1998; Johnson & Cho 2004). The households' characteristics are of little importance for the likelihood of interview in mCATI surveys because the sample unit and the elementary unit is the individual not the household; however, other ecological factors surrounding the individual such as the urbanicity of the area of residence and the location of the individual when he/she receive the call should not be ignored. As people living in urban areas use their mobile phones more frequently than those in rural or less urbanized areas (European Commission 2008), the urbanicity of the region of residence can influence

the likelihood of obtaining response from mobile phone users. In addition, contact and cooperation may be affected by the individual's location or what he/she is doing at the time of the call. Noisy environments like the street or shopping centers make it difficult to hear the mobile phone ringing, and agreement to an interview is less likely in these situational contexts even when the individual does notice the call. It is also more difficult to obtain a response when calling individuals who are abroad because the mobile phone is usually turned off to avoid roaming costs (European Commission 2014), and individuals tend to reject calls or deny cooperation if they expect the conversation to be long.

3. Data and Methods

The data used in this study come from a mobile CATI survey conducted on the Portuguese mobile phone users (aged 15 or older) in 2012. Mobile phone numbers were selected using a random digit dialing procedure as there is no official lists of mobile phone subscribers in Portugal. If a selected mobile phone number could not be contacted at the first call attempt, it could be selected again to be called at a different time and/or day. A maximum of 15 call attempts were made to mobile phone numbers.

Difficulty of obtaining response can be measured by a dichotomous variable indicating easy versus difficult responses, in which easy-to-reach respondents are those interviewed within a given number of call attempts and hard-to-reach respondents are those requiring more than a given minimum number of call attempts – usually more than 3 call attempts. (e.g. Lin & Schaeffer 1995; Biemer & Link 2008; Montaquila et al. 2008; Weidman 2010; Schneiderat & Schlinzig 2012). In this study mobile phone users who could only be reached after at least four calls were classified as hard-to-reach.

The questionnaire had three sections. The first included questions about mobile phone use patterns. The second section included a set of 17 items designed to evaluate respondents' attitudes towards mobile phones. These items were measured by means of a four-point Likert-type scale (1=totally agree, 2=agree, 3= disagree, 4=totally disagree). These items were constructed on the results of the study Portugal Mobile conducted in 2007 by OberCom-Portuguese Communications Observatorium (Cardoso et al. 2007). The third section was on socio-demographics of the respondent.

The analysis start with a set of descriptive results and bivariate associations. Then Binary Logistic Regression is used to assess whether there is an effect of socio-demographics, behaviors and attitudes towards mobile phones on the difficulty of obtaining response in mCATI surveys. The difficulty of obtaining response is measured by a dichotomous variable coded as 1-hard-to-reach and 0-non hard-to-reach.

4. Results

4.1 Descriptive results

Table 1 presents the outcomes of the mobile phone numbers dialed. A total of 11472 mobile phone numbers were dialed, 4110 of which were not attributed, not working, or disconnected, and 314 were found to be out-of-the-scope, i.e., the person answering the phone was aged under 15 years. Of the overall mobile phones called, 34.1% could not be contacted either because they were found to be busy, the call was rejected, the phone rang with no answer, the call was sent to voice-mail or the number was temporarily unavailable.

Table 1. Outcomes for dialed numbers

Outcome	n	%
Completed interview	1501	13.1
Interview break-off	169	1.5
Non-contact [†]	3908	34.1
Refusals	1470	12.8
Out of the scope (aged under 15)	314	2.7
Not working, not attributed or disconnected	4110	35.8
Total	11472	100.0

[†] Includes reject the call without answering, busy, ring with no answer, voice-mail and temporarily unavailable (message from the operator).

A total of 1501 interviews were completed, representing a 13.1% response rate (RR1) (AAPOR 2006). The percentage of break-offs was only 1.5% (Table 1) and in these cases the average time of interview was around 7 minutes, compared with 16 minutes for those coded as a completed interview.

Table 2 presents the number and percentage of interviews completed in each call attempt. The majority of respondents are non hard-to-reach (93%).

Table 2. Completed interviews per call attempt

Call attempt	n	%
3 or less calls	1397	93%
4 or more calls	104	7%
Total	1501	100.0

Table 3 presents the socio-demographic profile of the hard and non hard-to-reach respondents. The characteristic more strongly associated with being a hard-to-reach respondent is age (Cramer's $V=0.133$) and the weakest association is with sex (Cramer's $V=0.012$).

Table 3. Socio-demographic characteristics of hard and non hard-to-reach respondents

Socio-demographic	Non hard-to-reach (%)	Hard-to-reach (%)	Cramer's V
Sex			0.012
Female	49.5	47.1	
Male	50.5	52.9	
Age			0.133
15-24	12.7	25.0	
25-34	19.8	28.8	
35-44	23.0	19.2	
45-54	19.2	18.3	
55-64	14.1	4.8	
≥ 65	11.2	3.8	
Education level			0.043
Basic education (9 years)	44.4	36.5	
Secondary education (12 years)	33.4	40.4	
University level	22.3	23.1	
Professional status			0.062
Self employed	16.6	16.3	
Employed by a third party	59.1	69.2	
Other	24.3	14.4	
Social class			0.031
A-Upper	8.4	8.7	
B-Upper middle	14.8	16.3	
C1-Middle	33.6	36.5	
C2-Lower middle	27.6	26.9	
D-Low	15.6	11.5	
Region of residence			0.057
Large Urban city	31.7	35.6	
Other	68.3	64.4	

Hard and non hard-to-reach respondents are now compared in terms of substantive estimates of the survey. Comparisons are made on 27 items regarding mobile phone use: four items concern the mean number of calls and SMS received/sent; ten of the items concern the percentage of mobile phone users that use a specific service or function of the mobile phone and thirteen of the items

concern the frequency of turning the mobile phone off or on silent mode in specific circumstances (Table 4).

The behavioral items more strongly associated with being a hard-to-reach respondent are those concerning the number of calls made or received and the number of SMS send or received (Eta's value higher then 0.1) and the frequency of turning the mobile phone off while travelling on public transports (Cramer's V=0.108). All other behaviors are weakly associated with being a hard-to-reach respondent.

Table 4. Behavioral items estimates of hard and non hard-to-reach respondents

Usage item[†]	Non hard-to-reach	Hard-to-reach	Association indicator
	Mean	Mean	Eta
Number of calls made per day ^a	5.70	5.88	0.143
Number of calls received per day ^a	6.98	6.77	0.114
Number of SMS sent per day ^a	12.2	21.8	0.220
Number of SMS received per day ^a	13.2	23.3	0.239
Uses the mobile phone ^b ...	%	%	Cramer's V
To access the internet	18.7	23.1	0.028
As alarm clock	56.1	64.4	0.043
To listen to music	22.5	32.7	0.061
To listen to the radio	16.9	15.4	0.010
To take photos	49.5	52.9	0.017
As a calculator	45.2	50.0	0.024
To use the agenda	36.5	38.5	0.010
To play games	17.0	26.9	0.066
To read e-mails	12.6	18.3	0.043
To send MMS	22.0	20.2	0.011
Turns the mobile phone off or sets on silent mode ^c ...	Mean	Mean	Cramer's V
Public transports	3.49	3.10	0.108
Private personal conversations	3.25	2.96	0.075
Medical treatments	1.82	1.55	0.059
Funerals	1.50	1.35	0.049
Celebrations and parties	3.28	3.00	0.067
Working meetings	1.87	1.62	0.061
Conferences	1.64	1.44	0.063
Cinema	1.59	1.49	0.041
Weekends	3.58	3.31	0.082
Religious celebrations	1.45	1.44	0.044
Restaurants	3.40	3.13	0.077
On holidays	3.44	3.13	0.077
Abroad	3.34	3.20	0.077

^a Open-ended numeric response; ^b Dichotomous response yes/no; ^c Ordinal scale response from 1-always to 4-never.

[†] Sample size is not equal for all items due to missing values.

Table 5 shows the differences between hard and non hard-to-reach respondents in attitudes towards mobile phones. Cramer’s V computed for each of the attitudinal items reveals a weak association between attitudes towards mobile phones and being a hard-to-reach respondent (all Cramer’s V less than 0.1).

Table 5. Attitudes towards mobile phones (mean) of hard and non hard-to-reach respondents

Attitudinal item*†	Non hard-to-reach	Hard-to-reach	Cramer’s V
The mobile phone is just a technical device to make and receive calls	2.21	2.35	0.053
Without the phone, I feel disconnected from the world	2.57	2.41	0.063
The design of my mobile phone means a lot to me	2.78	2.52	0.098
The opinion of others about my mobile phone is important to me	3.13	3.06	0.044
I often need to turn off the mobile phone for calls that I receive so as not to be disturbed	2.83	2.66	0.081
I feel calmer when I have the mobile phone	2.08	2.07	0.031
Without a mobile phone, my life would be happier and peaceful	2.75	2.57	0.069
My mobile phone is an essential tool for solving professionals problems at any time	1.88	1.89	0.051
Most professional calls I get out of working hours are unwelcome and invade my privacy	2.63	2.51	0.050
The mobile phone allows me to manage the family and private life more efficiently	2.14	2.07	0.033
The mobile phone allows social status to be identified	2.88	2.76	0.061
I feel anxious when I can’t have the mobile phone	2.70	2.54	0.054
My mobile phone is only useful to me if it is permanently on	2.09	2.06	0.070
The mobile phone helps me at work	2.13	2.11	0.024
The mobile phone helps me remain informed	2.17	2.11	0.027
The mobile phone allows me to be in contact with family and friends	1.59	1.62	0.031
The mobile phone allows me to share ideas and content with others	2.07	1.95	0.040

* Ordinal scale response from 1-totally agree to 4-totally disagree.

† Sample size is not equal for all items due to missing values.

4.2 Estimation of the likelihood of being hard-to-reach

The next stage of the analysis evaluates socio-demographics and whether it affects the level of effort required to reach the respondent. A Binary Logistic Regression is performed to estimate the likelihood of being a hard-to-reach

respondent. The effect of the following factors are tested: sex, age, professional status, educational level, type of residence and social class. A Stepwise approach is used to estimate the model. Table 6 presents the estimates for the factors with a significant effect at 5%.

Table 6. Binary logistic regression estimates for the likelihood of hard-to-reach

Socio-demographics	$\hat{\beta}$	Std error	p-value	Odds ratio
Age (ref: ≥ 65 years)			<i>0.000</i>	
15-24 years	+1.752	0.548	<i>0.001</i>	5.776
25-34 year	+1.447	0.542	<i>0.008</i>	4.251
35-44 years	+0.894	0.556	<i>0.108</i>	2.445
45-54 years	+1.023	0.559	<i>0.067</i>	2.783
55-64 years	-0.004	0.679	<i>0.996</i>	0.996
Constant	-3.670	0.506	<i>0.000</i>	0.025

Note: Nagelkerke R²: 0.05.

Age has a significant effect ($p \leq 0.05$) on the likelihood of being a hard-to-reach respondent. The difficulty of reaching the respondents increases among the younger age categories. People aged 15-24 years is more than five times more likely to be difficult to reach (odds ratio=5.776) than those aged 65 or older (the reference category) and those aged 25-34 years are four times harder to reach than the eldest (odds ratio=4.251). The likelihood of being hard-to-reach is not significantly affected by sex, professional status, educational level, type of residence and social class since none of these factors entered the model.

The analysis proceeds with the evaluation of the influence of usage patterns and attitudes towards mobile phones in the difficulty of obtaining response. Table 7 presents the Binary Logistic Regression estimates for the models where the likelihood of being hard-to-reach is explained by the 27 items describing the usage pattern of the mobile phone (items presented on Table 4). Age is a covariate in the model because of the strong association found between age and being hard-to-reach (see Table 3). A Stepwise approach is used to estimate the model. Table 7 presents the estimates for the factors with a significant effect at 5%.

Table 7. Binary logistic regression estimates for the likelihood of hard-to-reach explained by mobile phone use

Usage item	$\hat{\beta}$	Std error	p-value	Odds ratio
Uses the mobile phone ...				
To listen to the radio	-1.232	0.539	<i>0.022</i>	0.292
Constant	-0.702	0.482	<i>0.145</i>	0.495

Note: Nagelkerke R²: 0.069

The likelihood of being a hard-to-reach respondent is significantly affected by using the mobile phone to listen to the radio. Specifically those who use the mobile phone for such purpose are less likely to be hard-to-reach (odds ratio=0.292). None of the other behavioral items affects the likelihood of being a hard-to-reach respondent since none of the items entered the model.

Finally, Table 8 presents the Binary Logistic Regression estimates for the model where the likelihood of being hard-to-reach is explained by the 17 items describing attitudes towards mobile phones (items presented on Table 5).

Table 8. Binary logistic regression estimates for the likelihood of hard-to-reach explained by attitudes towards mobile phones

Attitudinal item	$\hat{\beta}$	Std error	<i>p-value</i>	<i>Odds ratio</i>
Without a mobile phone, my life would be happier and peaceful	-0.319	0.157	<i>0.042</i>	0.727
The design of my mobile phone means a lot to me	-0.428	0.145	<i>0.003</i>	0.652
Constant	+0.908	0.644	<i>0.159</i>	2.479

Note: Nagelkerke R²: 0.069

A significant effect ($p \leq 0.05$) is found on the item “Without a mobile phone, my life would be happier and peaceful” and “The design of my mobile phone means a lot to me. Specifically, a strong disagreement with these attitudes decreases the likelihood of being a hard-to-reach respondent (odds ratios less than 1). The other attitudinal items do not affect the likelihood of being a hard-to-reach respondent since none of the items entered the model.

5. Discussion and conclusion

This study intended to assess in the context of a mCATI survey whether socio-demographics and use and attitudes towards mobile phones explains the difficulty in reaching respondents. The outcomes reveal a significant effect of socio-demographics but different use patterns of the mobile phone or attitudes towards mobile phones do not affect the likelihood of being a hard to reach respondent.

In the survey undertaken, only 7% of the respondents were hard-to-reach, a figure much similar to the one obtained in the research by Vicente et al. (2009) (6.4%) and Schneiderat and Schlinzig (2010) (9%) which is evidence that in mCATI surveys the large majority of sample units can be interviewed with few call attempts.

This is good news when comparing mCATI survey with fixed CATI surveys or in-person surveys that tend to have much higher percentages of hard-to-reach respondents (e.g. Groves & Couper 1998; Biemer & Link 2008).

However the expectation that certain target groups would be more easily reached – namely people under the age of 25 – was not confirmed. The study found a significant association between respondents' age and the difficulty in obtaining response although the likelihood of being hard-to-reach increased among the 15-34 years group. This finding is not exclusive to mCATI surveys but is common to fixed CATI or in-person surveys (e.g. Kristal et al. 1993; Groves & Couper 1998; Johnson & Cho 2004; Biemer & Link 2008; Qayad et al. 2010; Weidman 2010). As such, the findings do not confirm the expectation that mobile phones can do better than other survey modes to catch the hard-to-reach consumers. Lifestyles and time occupation are likely to explain the difficulty in reaching the young, who tend to have a busy life style, with professional and leisure activities that leave them less free time and reduce their availability to take mobile phone calls immediately. Given that a mobile marketing approach does not *per se* resolve the problem of interviewing these people, quotas based on age should be considered by market survey organizations when conducting mCATI surveys in order to guarantee adequate balance of the sample in terms of age. Making callbacks is an alternative approach. Although the percentage of interviews obtained after 3 call attempts was small – 7% of the overall sample size – it allowed reaching people that in terms of age is distinct from early respondents. Without 4 or more callbacks the sample would under represent the younger age groups.

Only one behavioral item affected the likelihood of being a hard-to-reach respondent which is a sign that the level of effort required to obtain an interview is not strongly associated to mobile phone usage patterns. Recent research reveals that mobile phone usage patterns change across subgroups of the population. Specifically, it is well known that the young are “on the mobile phone” more often and use a wider set of functionalities and services (Ling 2002; European Commission 2008; van Biljon & Renaud 2008; Fernández-Ardèvol 2010; Chen et al. 2013; Neves et al. 2013). As such, interviewing this people in a mobile phone survey would be expected to entail less effort. The study does not support this expectation which means that intensive use of the mobile phone is not synonymous with availability to take all incoming calls or agreeing to cooperate. We recall that many mobile phone users

reject the calls without answering if they are occupied when they receive the call. Choosing the “best” time period to call may help increase the likelihood of interview but this warrants investigation so as to find out what are the time periods of the day when calls and cooperation are more likely to be rejected (or accepted) so that mobile market surveys can be designed to minimize the effort required to obtain interviews. The research by Vicente (2015) reveals that first calls are more efficient when made in the beginning or in the end of the week while Tuesdays and Wednesdays are the worst days to obtain peoples’ cooperation in a mCATI survey. This may be explained by the fact that for the working population, Tuesdays and Wednesdays tend on average to be the days people work most while Sundays and Saturdays are less occupied for professional reasons (European Commission 2004). The available time is therefore a strong conditioner of potential respondents’ availability for interviews, more than the use patterns of the mobile phone.

Most survey operations have household surveys as the large part of their work mix. Operating at full capacity is therefore restricted to times when people are most likely to be at home (i.e. evenings and weekends). Call centers usually only work 30 hours a week at full capacity (3 hours each week night and all weekend) (Kelly et al. 2008). When dealing with mCATI surveys, operations should also be concentrated on the days and times of the day when users are most likely to be “available” on the mobile phone. Additionally, the best times to call depends varies across subgroups of the population (Vicente 2015). Being the younger a hard to find group it is important do disclosure the best times to reach them in order to make the calling process more efficient in mCATI surveys.

Attitudes towards mobile phones proved to be irrelevant as predictors of the level of effort necessary to obtain interviews.

Since 2002 the number of calls made and received on the mobile phones has consistently grow while the number of calls made and received on the fixed phones has decreased (ANACOM 2014). This tendency is likely to continue in the future as more people regard the mobile phone as their main mode of communication. Replicating studies like the one presented here is crucial to widen the knowledge about the opportunities and challenges mobile phones bring to mobile market research. The difficulty of contact and cooperation is foreseen as one of the biggest future problems for market surveys (Couper 2013). Research into why consumers are difficult to interview can therefore yield practical guidelines on when hard-to-

reach consumers might be a serious concern in market surveys. Due to its novelty in the context of mCATI surveys, the topic of difficulty of obtaining response from specific population subgroups and the effect of their under representativeness on survey outcomes warrants further study in order to shed more light on the mechanisms that cause difficulty in obtaining response and on the decisions to be taken to prevent or correct their impact on market survey estimates.

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References

American Association for Public Opinion Research (AAPOR) 2006. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. KS: Lenexa.

American Association for Public Opinion Research (AAPOR) 2010. *AAPOR cell phone task force: new considerations for survey researchers when planning and conducting RDD and other telephone surveys in the US with respondents reached via cell phone numbers*. Available at: <http://www.aapor.org/AM/Template.cfm?Section=Cell Phone Task Force Report&Template=/CM/ContentDisplay.cfm&ContentID=3189>

Autoridade Nacional das Comunicações (ANACOM) 2014. *O Sector das Comunicações '14*. Available at: http://www.anacom.pt/streaming/Sector Comunicacoes 2014.pdf?contentId=1358849&field=ATTACHED_FILE

Biemer, P., Link, M. 2008. Evaluating and modeling early cooperator effects in RDD surveys. In *Advances in Telephone Survey Methodology*, edited by J. Lepkowski, C. Tucker, J. Brick, E. de Leeuw, L. Japac, P. Lavrakas, M. Link, R. Sangster. New Jersey: Wiley. 587-618.

Cardoso, G., Gomes, M. C., Espanha, R., Araújo, V. 2007. *Portugal móvel, utilização do telemóvel e transformação da vida social*. Lisboa, OberCom.

- Chen, K., Chan, A., Tsang, S. 2013. Usage of mobile phone amongst elderly people in Hong Kong. *Proceedings of the International MultiConference of Engineers and Computer Scientists*, Hong Kong.
- Couper, M. 2011. The future of modes of data collection. *Public Opinion Quarterly* 75:889-908.
- Couper, M. 2013. Is the sky falling? New technology, changing media, and the future of surveys. *Survey Research Methods*, 7:145-156.
- European Commission 2004. *How Europeans spend their time: everyday life of women and men*. Available at: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-58-04-998/EN/KS-58-04-998-EN.PDF
- European Commission. 2008. *E-communications household survey*. Available at: http://ec.europa.eu/public_opinion/archives/ebs/ebs_293_full_en.pdf. 05-06-14 11:21.
- European Commission. 2014. *Special Eurobarometer 414: E-Communications Household Survey and Telecom Single Market Survey Roaming Results*. Brussels: European Commission.
- Fernández-Ardèvol, M. 2010. Interactions with and through mobile phones: what about the elderly population. Paper presented at the *3rd European Communication Conference*, 12-15 October 2010. Hamburg.
- Fine, B., Menictas, C. 2012. The who, when, where and how of Smartphone research. *Australasian Journal of Market & Social Research*, 20:29-46.
- Groves, R., Couper, M. 1998. *Nonresponse in household interview surveys*. New York: Wiley.
- Johnson, T., Cho, Y. 2004. Understanding nonresponse mechanisms in telephone surveys. *Proceedings of the Section on Survey Research Methods*. American Statistical Association, 4952-4959.
- Kelly, J., Link, M., Petty, J., Hobson, K., Cagney, P. 2008. Establishing a new survey research call center. In *Advances in telephone survey methodology*, edited by J.M. Lepkowski, C. Tucker, J.M. Brick, E. Leeuw, L. Japac, P.J. Lavrakas, M.W. Link, and RL Sangster 317-339. New Jersey: Wiley.
- Kristal, A., White, E., Davis, J., Corycell, G., Raghunathan, T., Kinne, S., Lin, T. 1993. Effects of enhanced calling efforts on response rates, estimates of health

- behavior, and costs in a telephone health survey using random-digit dialing. *Public Health Reports* 108:372-379.
- Kuusela, V., Callegaro, M., Vehovar, V. 2008. The influence of mobile telephones on telephone surveys. In *Advances in Telephone Survey Methodology*, edited by J.M. Lepkowski, C. Tucker, J.M. Brick, E. Leeuw, L. Japac, P.J. Lavrakas, M.W. Link, and RL Sangster, 87-112. New Jersey: Wiley.
- Lin, I., Schaeffer, N. 1995. Using survey participants to estimate the impact on nonparticipation. *Public Opinion Quarterly* 59:236-258.
- Ling, R. 2002. Adolescent girls and young adult men: two sub-cultures of the mobile telephone. *Revista de Estudios de Juventud* 52: 33-46.
- Littlechild, S. 2006. Mobile Terminations Charges: Calling Party Pays versus Receiving Party Pays. *Telecommunications Policy* 30:242-277.
- Merkle, D., Bauman, S., Lavrakas, P. 1993. The impact o callbacks on survey estimates in an annual RDD survey. *Proceedings of the Section on Survey Research Methods*. American Statistical Association, 1070-1075.
- Montaquila, J., Brick, J., Hagedorn, M., Kennedy, C., Keeter, S. 2008. Aspects of nonresponse bias in RDD telephone surveys. In *Advances in Telephone Survey Methodology*, edited by J. Lepkowski, C. Tucker, J. Brick, E. de Leeuw, L. Japac, P. Lavrakas, M. Link, R. Sangster. New Jersey: Wiley. 561-586.
- Nathan, G. 2001. Telesurvey methodologies for household surveys-a review and some thoughts for the future. *Survey Methodology* 27:7-31.
- Neves, B., Amaro, F. & Fonseca, J. 2013. Coming of (old) age in the digital age: ICT usage and non-usage among older adults. *Sociological Research Online*, 18(2). Available at: <http://www.socresonline.org.uk/18/2/6.html>.
- Organisation for Economic Co-operation and Development (OECD). 2000. *Cellular Mobile Pricing Structures and Trends*. Available at: <http://www.oecd.org/dataoecd/54/42/2538118.pdf>
- Poynter, R., Williams, N., York, S. 2014. *The Handbook of Mobile Market Research*. Chichester, UK: Wiley.
- Qayad, M., Chowdhury, P., Hu, S., Balluz, L. 2010. Respondent differences and length of data collection in the Behavioral Risk Factor Surveillance System. *Survey Methodology*, 36:223-227.

- Schneiderat, G., Schlinzig, T. 2012. Mobile- and landline-onlys in dual-frame-approaches: effects on sample quality. In *Telephone Surveys in Europe*, edited by S. Häder, M. Häder, M. Kühne. Berlin: Springer 121-146.
- Shaiko, R., Dwyre, D., O’Gorman, M., Stonecash, J., Vike, J. 1991. Pre-election political polling and the non-response bias issue. *International Journal of Public Opinion Research*, 3:86-99.
- Traugott, M. 1987. The importance of persistence in respondent selection for preelection surveys, *Public Opinion Quarterly*, 51:48-57.
- van Biljon, J., Renaud, K. 2008. A qualitative study of the applicability of technology acceptance models to senior mobile phone users. Paper presented at the *ER2008, 27th International Conference on Conceptual Modeling*, LNCS 5232, 228-237.
- Vicente, P. 2015. The best times to call in a mobile phone survey, *International Journal of Market Research*, 56:1-16.
- Vicente, P., Reis, E., Santos, M. 2009. Using mobile phones for survey research: a comparison with fixed phones. *International Journal of Market Research*, 51:613-633.
- Weidman, P. 2010. Do characteristics of RDD survey respondents differ according to difficulty of obtaining response?, *Proceedings of the Survey Research Methods Section*, American Statistical Association, 3956-3965.
- Yazbeck, B., Scarlet, S. 2013. 10 reasons why you should go mobile right now. *Quirk’s Review*. Available at: <http://www.quirks.com/articles/2013/20130710.aspx?searchID=1056305522&sort=7&pg=1>.