

Mobile Phone in Sample Surveys

Gildas Roy

Scientific Director - Médiamétrie, France

groy@mediametrie.fr

Aurélié Vanheuverzwyn

Chief of Measurement Science - Internet and New Media - Médiamétrie, France

avanheuverzwyn@mediametrie.fr

1. Introduction

1.1. The Development of Telephone Surveys

Since opinion polls were first employed, the telephone has always been used to conduct surveys in rather diverse fields. Today, the telephone is often preferred to the face-to-face method for many reasons (simplicity of the control, homogeneity in completing the questionnaire, elimination of difficulties contacting the people or households being surveyed, low cost and larger population sample size). Although it may be easier to refuse to respond over the telephone than it is in a face-to-face survey context, the “impersonal,” neutral aspect of the telephone makes it possible to approach sensitive topics more easily and to reach populations that are generally more hesitant, such as the elderly, for example.

The existence of a directory that can be used as a sampling base has also promoted the use of the telephone for surveys. In France and in other countries, fixed telephony operators publish member directories (*Les pages blanches* (White Pages) for France Telecom) listing all numbers that have been attributed and the city in which the telephone line is located. The latter piece of information is quite useful, particularly for stratification according to geographic criteria such as a region or city size.

Furthermore, in 1990 Médiamétrie developed a method of randomly generating numbers, which made it possible to reach households whose numbers were unlisted (numbers that do not appear in the telephone directory). When calls to reach a particular number fail after four consecutive attempts, the method increases this number by one. Among the numbers generated by this process, some have been attributed and others have not. A portion of the numbers attributed appear in the directory, and the others are unlisted[2].

However, the use of fixed telephony as a method for conducting surveys implies that the households equipped with fixed telephones are representative of the whole population of polled entities (households or individuals). That is, it assumes that on one hand, the fixed telephone equipment rate is high, and on the other hand that the households that are not equipped with a fixed telephone do not demonstrate atypical behavior with respect to the variables being studied.

If these assumptions were verified today, it would be legitimate to wonder whether the arrival of the mobile telephone has not had an effect on this situation.

1.2. Change in the Rate of Fixed Telephone Equipment Owners

While in 1997, 95.8% of households in metropolitan France were equipped with a fixed telephone¹, that number has dropped to 85.5% in the first half of 2002 according to the Médiamétrie Multimedia Barometers. We are therefore getting away from the configuration that enabled telephone surveys to be developed: 14.5% of households are currently excluded from fixed telephone surveys. Over 60% of these households are equipped with at least one mobile telephone.

Table 1: Rate of French Households Equipped with a Fixed Telephone

1963*	1970*	1975*	1980*	1986*	1990*	1997**	1998**	1999**	2000**	2001**	2002***
9.3	14.9	30.2	51.0	90.0	93.7	95.8	94.3	92.6	90.5	87.5	85.5

* Source: INSEE.

** Source: Médiamétrie.

*** Source: Médiamétrie (1st half-year 2002).

According to the Médiamétrie Multimedia Barometers, 11.5% of individuals ages 15 and older were not equipped with a fixed telephone in the first half of 2002, and 9.3% of that group had a mobile telephone, thus exclusively. Although the penetration rate for fixed telephony is decreasing and the penetration rate of mobile telephony is increasing, more and more people can be reached by telephone – mobile or fixed: in the first half of 2002, 97.8% of individuals ages 15 and older could be reached by telephone; fixed telephony substitution seems to be occurring.

We also know that the socio-demographic situation of those individuals who own a mobile telephone exclusively is very different from the situation of those who are equipped with a fixed telephone, particularly in that which concerns criteria such as age and socio-professional category. They are younger, more often SPC- (socio-professional category, minus) and are increasingly a part of households that contain only one person. In the context of telephone surveys, the percentage of individuals who cannot be reached by fixed telephone is increasing, which casts doubt on the pertinence of population samples.

Médiamétrie's 75000 Survey, a reference study on the national radio programming market, is conducted by fixed telephone. The breakthrough in mobile telephones has led Médiamétrie to try to adapt its monitoring efforts by regularly conducting mobile telephone surveys intended to evaluate the feasibility of these mobile telephone surveys, to assess the acceptance rate of the people reached and to measure any differences in behavior that may manifest themselves, specifically for radio ratings, between the population sample reached in the 75000 Survey and the one representing those who own a mobile telephone exclusively, which we may consider to be atypical.

¹ Source: Médiamétrie.

2. Reflections on the Methodology of a Mobile Telephone Survey

2.1. A Mobile Telephone Survey?

If we are justified in discussing a functional substitution of mobile telephony for fixed telephony, would the two methods of communication still be comparable in all aspects?

Mobile telephony is, naturally, associated with an individual rather than a household; this could be an advantage for individual surveys even if, often, this type of survey does not exclude a description of the household (pertaining to the head of the household, its members, what equipment is used, etc.).

When a fixed telephone number is dialed, we know the geographic location of the person being called. He or she is at home, in the town in which he or she resides. A fixed telephone number is intrinsically rich in information, up to and including (possibly) the corresponding address and, as a result, the kind of neighborhood, the type of building, etc.². In the absence of a directory, a mobile telephone number contains no information of this kind and therefore cannot accommodate a sampling plan based on geographic criteria, except to maintain geographic quotas. We would still be unable to specify the nature (home, survey location, etc.).

A person who answers the telephone at a fixed number is in his private environment, available to answer the telephone, possibly even available to respond to a survey and spend the time that is reasonably necessary to answer the questions. A person who answers the telephone at a mobile number is not always in such a favorable environment; that person may be busy with professional matters, privately unavailable, or be in the middle of a non-conducive activity (for example, driving his car; be careful of the liability of the person calling in case of an accident). Making an appointment is possible (by calling back at an agreed time), however this is not always a successful method.

It is not uncommon for a mobile telephone to principally be used only for calling out, and the rest of the time it set on voicemail and the caller can leave a message requesting that call recipient return his phone call; however, this method is generally less successful than making an appointment.

Finally, there are still unknown variables concerning possible technical problems. Mobile telephone networks do not always cover the entire country and some calls may not connect or the connection could be of bad quality, or even cut off.

2.2. The Sampling Base Problem

For fixed telephone surveys, the France Telecom directory (White Pages) is a sampling base that offers many practical advantages: it covers all of France and is updated regularly.

For mobile telephone surveys, no such sampling base exists. The only information that we receive comes from the four-digit prefix, allocated by the Telecommunications Regulation Authority³ to the various mobile telephone operators. Mobile telephone number samples are therefore created by a generator of random numbers, with a prefix such as 06.XX, that have actually been attributed to operators.

² This should, however, be qualified, because a directory cannot record all moves and relocations.

³ Autorité de Régulation des Télécommunications (French Telecommunications Regulation Authority, ART)

Furthermore, unlike France Telecom, the prefixes attributed by mobile telephone operators have no relation to a geographic location. Finally, we have no information that is accurate enough to be considered background data on the population equipped with mobile telephones.

Overall, then, there is no sampling base, no geographical information or structure, and the only foreseeable method is therefore a simple random survey from a set of numbers, not all of which have necessarily been attributed to people by operators.

2.3. Médiamétrie's Experiment

The monitoring that was mentioned previously is broken down into a series of annual surveys. A pilot operation was conducted in the summer of 1998, in order to gather initial data on the feasibility of telephone surveys. Because this operation was rather conclusive, particularly concerning the acceptance rate, a first "life size" survey was conducted in the spring of 2000.

This second survey was conducted over a period of four weeks, with approximately 60 interviews per day from Monday to Friday between 5:30 p.m. and 9:30 p.m. In all, 1215 interviews were conducted. Fifty percent of the 1215 interviewees also had a fixed telephone (the "both" group) and 50% had only a mobile phone. The questionnaire included questions concerning socio-demographic data, mobile telephone use and finally questions on radio listening on the day of the interview, from 5:00 a.m. to 5:30 p.m. The questionnaire lasted an average of 11 minutes.

This second survey had two objectives:

- ✓ first, to determine whether or not the two methods of administering the questionnaire (fixed telephone and mobile telephone) are complementary,
- ✓ then, if the first hypothesis is confirmed, to determine if those who are equipped only with a mobile telephone differ from those equipped with a fixed telephone, with respect to their radio listening habits.

Indeed, because the objective is to complement our fixed telephone surveys with an over-sampling of people who use mobile telephones exclusively, we must, first and foremost, be assured that the two methods of gathering data are comparable. In order to compare the two survey methods, we analyzed responses to the same questions; specifically, questions pertaining to radio listening, for the sub-population of people who have both a mobile and a fixed telephone, the population that is reached in both surveys.

In order to do this, we compared the cumulative listening results⁴ between 5:00 a.m. and 5:30 p.m., broken down according to main socio-demographic criteria. Although the cumulative listening results from the mobile telephone survey seem to be more reliable than those from the 75000 Survey, the deviations are not very high. In order to highlight any possible deviations, Student tests were performed: concerning Total Radio, no deviation is significant at the 95% threshold. As for stations, hardly more than 13% of deviations are significant, but deviations are not significant for age, which is the most discriminating criterion in explaining radio listening behavior.

Overall, we can conclude that there is consistency in results between the survey conducted by fixed telephone and the one conducted by mobile telephone, for the sub-population of owners of both mobile and fixed telephones.

⁴ The cumulative audience of a station S in a timeslot T is estimated by the proportion of individuals who listened to station S during timeslot T.

Reinforced by this assessment, we took the liberty of comparing radio listening results for people who use mobile telephones exclusively, and we were able to note that, all other factors being equal, those who use mobile phones exclusively listen to the radio less than other people during the 5 a.m. to 5:30 p.m. timeslot.

3. The Survey Conducted in the Spring of 2001

Because previous experiments comforted us in the reliability of integrating an over-sampling of people who use mobile telephones exclusively into our system of telephone surveys, in 2001 we sought to test the integration of a complete module of questions pertaining to radio listening. That is, we decided to go further and gather data on radio listening over the last 24 hours, as well as a module of questions on how often people go to the movies. The final questionnaire lasted an average of 15 minutes.

3.1. Information Gathering

In order to conduct 579 interviews of individuals ages 15 and older, 9840 telephone numbers were required, for a completion rate of 5.9%.

Table 2: Results of the last call in the mobile telephone survey (May 2001)

Interviews conducted	579 (5.9%)			
Refusal to continue	1227 (12.5%)			
No answer	3967 (40.3%)	including	Voicemail	3701 (37.6%)
			Busy	44 (0.4%)
			Ring with no answer	222 (2.3%)
Outside the quota	144 (1.5%)			
Outside the study	3923 (39.9%)	including	Non-attributed number (operator message)	2184 (22.2%)
			Outside of the field	1739 (17.7%)
Total	9840 (100%)			

We note 1227 refusals to continue and 579 interviews completed. Based on useful numbers, which is to say, by excluding the ‘outside the quota’ and ‘outside the study’ numbers, the refusal rate was 21.3% and the success rate was 10%. These results are on the same order as those for fixed telephone surveys. For the telephone numbers that led to a complete interview, between 1 and 17 calls and reattempts were necessary to complete the interview successfully. Contact was established within the first four calls⁵, however, making appointments or connection failure during the interview sometimes necessitated returned phone calls, and therefore the high number of calls.

⁵ We set ourselves the rule of giving up on a number after four fruitless attempts to call.

Table 3: Number of calls necessary per complete interview

Number of calls	Distribution
1 call	47.8%
2 calls	23.5%
3 calls	10.5%
4 calls	5.5%
From 5 to 9 calls	10.5%
10 or more calls	2.1%

3.2. Impact on Ratings

Because we demonstrated that it is feasible to gather data on radio listening “75000 style” by mobile telephone, it is fitting, before planning on inserting a costly over-sampling of people who use mobile telephones exclusively, to determine if taking them into consideration would have an impact on listening results. Only a significant impact from their inclusion would justify such an investment.

In order to evaluate this impact, we merged the data from the 75000 Survey and that from the mobile telephone survey, thus creating a simulation sample. Each individual has a survey weight. In order to evaluate the impact of the people who use mobile telephones exclusively on the rating results, it is necessary to establish a setting that would make it possible to return the group of people who use mobile phones exclusively and those equipped with fixed telephones to their respective weights.

Graph 1: Cumulative listening by the quarter hour



In the end, it appears that mobile telephones do not yet have a determining impact on how well the 75000 Survey represents the general population. Indeed, for all of the Student tests performed (2758 tests) only 11% are significant at over 95%. Furthermore, 70.5% of the significant tests came from small sized relevant groups (threshold: 5% of the sample size) such that only 3.3% of the Student tests performed were significant and came from sufficient sub-groups of survey participants.

4. Conclusion and Outlook

This monitoring system has made it possible to highlight the fact that today, those who use mobile telephones exclusively, a number that is still a small proportion of the general population, does not cast doubt on the radio rating results of the 75000 Survey, although their listening habits do differ from those who are equipped with a fixed telephone. This assessment is valid for radio listening, but cannot be generalized. It depends on the variables being studied.

In June 2002, Médiamétrie conducted a new test for administering the 75000 Survey to people who use mobile telephones exclusively. In this new test, questions were added that pertained to television watching. In order to do this, the questionnaire was divided into two modules: the first module included questions on radio listening, television equipment, how often participants browse the Internet and socio-demographic variables; the second module involved gathering data on television watching on the evening preceding the interview, and questions on how often participants go to the cinema.

The questionnaire was organized in the following manner: at the end of the first module, the interviewer offered either to continue the interview or to set an appointment with the person being surveyed to finish the questionnaire.

The results, out of 200 "first module" questionnaires completed, are as follows:

- ✓ questionnaires completed in one single phone call: 63%
- ✓ module 2 completed upon appointment: 8%
- ✓ refusal of module 2 at the end of module 1: 29%

We note therefore that the "full" 75000 Survey is completed by 71% of respondents, which is encouraging for our plan to insert the sub-population of people who use mobile telephones exclusively into our telephone surveys.

5. Author Biographies

Gildas ROY is a part of the Médiamétrie executive board, for which he has been the Scientific Director since 1998, after several years spent in government statistics (INSEE).

With a degree from the National School for Statistics and Economic Administration (Ecole Nationale de la Statistique et de l'Administration Economique, ENSAE), he specializes in survey and poll methodology. He is also a member of the team that designed, coordinated and monitors rating measurements for television theme channels (cable and satellite), developed in 2000-2001 by Médiamétrie with the name Médiacabsat.

It is under his direction that Médiamétrie organized mobile telephone monitoring and related work. Since 1999, he has also been in charge of analyzing and presenting the results of the half-yearly opinion poll on the economy for the Paris Chamber of Commerce and Industry.

G. Roy has been a member of the International Statistical Institute (ISI) since 1985 as well as the International Association of Survey Statisticians (IASS).

Aurélie VANHEUVERZWYN has been the Chief of Measurement Science of the Internet and New Media Department since 2001.

With a diploma from the ENSAI (National School for Statistics and Information Analysis), she joined the Médiamétrie Scientific Department in 1999, as the head of research and methods.

In this capacity, she supervised the first surveys conducted by mobile telephone, for which she presented the results at the Statistics Methodology Days conference. She has also worked on the launch of Médiacabsat, the first panel of households subscribing to a broader television offering with ratings measurement data gathering for cable and satellite channels.

Finally, she participated in the development of a new function used to correct samples by margin settings (macro SAS CALMAR) and developed a drawing algorithm balanced with marginal quota limits presented at the Second Francophone Survey Colloquium.

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