# It Matters Where and With Whom You Are: A Comparison of Mobile Phone and Landline Phone Survey Interviews[1]

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**Abstract**

The rise and fall of social research methods rely on how much a certain method is able to appropriately reflect the change of society. The present research proposes new mobile surveying methods, considering the current and future trends in Korea. In particular, this research focuses on environmental pressure (time constraints, the presence of others and the place) as one of the major factors influencing the effects of survey modes. For example, landline surveys are conducted in the respondent's home, which is a private and fixed space. On the other hand, surveys on mobile phones can be conducted in diverse places with other people around.

After sampling 500 landline respondents and 500 mobile phone respondents using a quota method, the same questionnaire was used for both the mobile and landline interviews. The findings are generally consistent with the literature supporting the data quality and comparability of the mixed mode survey.

These results are encouraging for researchers designing surveys that feature mobile phone data collection.

Keywords: landline phone survey, mobile phone survey, mode effects, political attitudes

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## Background

Public opinion polls meant to predict the results of the local elections held in South Korea on June 17, 2010 incorrectly predicted the winners. Most of these opinion polls were telephone interviews, which only used listed landline phone numbers. Over the past several years, an increasing number of Koreans have switched to using only mobile phones and no longer have landlines, and those that do have landlines may choose to have unlisted numbers (Brick, Dipko, Presser, Tucker, & Yuan, 2006; S. W. Kim, Lee, Hong, & Park, 2012; Tucker, Brick, & Meekins, 2007). In addition, many households have no one at home to answer the phone during the day (S. W. Kim, 2004). After this election, it became apparent that by ignoring mobile phone numbers in telephone surveys in Korea, we were ignoring an important part of our population and therefore getting inaccurate results (S. W. Kim, Traugott, Park, & Lee, 2011).

Since the popularization of mobile phones, researchers and survey practitioners have considered the nature of measurement error of interviews via mobile phones (AAPOR Cell Phone Task Force, 2010). For example, Lavrakas, Shuttles, Steeh, & Fienberg (2007) speculate that response accuracy could be lower with mobile-phone interviews, due to multitasking or a lack of privacy. However, little empirical evidence has been gathered till now.

The present study was designed to explore the use of mobile phones to supplement landlines in telephone interviews. Our aim was to explore the mode effects, that is, we wanted to see the differences in responses between those responding on landlines and those responding on mobile phones. Knowing that neither method is perfect, we sought to understand the differences and their causes in order to evaluate which method is better. Prior to conducting this study, we were not sure whether people would be willing to answer interviews on their mobile phones.

This study assumed that the perception of social environments caused by the respondents' location, available time for the interview and the presence of other people around them would affect their responses. If someone is answering questions in front of others, he may respond differently. In addition, these responses may be affected by whether he is in front of his colleagues at work or in front of strangers at a restaurant. If he is by himself, he may be free to give his honest opinion. Those answering on

landlines are mostly at home and therefore are more likely to be alone and free to answer honestly. Finally, this study also assumed that these responses may be affected by the amount of time the respondent has available for the interview. If respondents have more time to spend on the survey, they have more time to speculate and evaluate their responses.

Thus, this study aims to investigate different responses to the same questions caused by different telephone interview modes. The purpose of this study is to look forward, not just to find the existence of the difference between landline and mobile phone interviews, but rather to explore the factors which cause these differences.

## Literature Review and Hypothesis

### Telephone Interviews via Mobile and Landline Phones

It is known that the mixing of mobile and landline phone interviews can reduce data comparability, because different modes allow for access to different types of people and induce different type of responses (Dillman, Phelps, Tortora, Swift, Kohrell, Berck, & Messer, 2009; Kühne & Häder, 2012; Tourangeau & Yan, 2007). One of the advantages of the mixed mode survey is that it allows the researcher to compensate for the non-coverage of mobile only households. Furthermore, data collection via the mixing of mobile and landline phone interviews can reduce implementation costs and non-response rates (Dillman et al., 2009; Häder, Häder, & Kühne, 2012).

However, it is known that different modes of data collection can lead to differences in response, even when different modes cover the same statistical population and use the same questions (Dillman & Christian, 2005; Tucker & Lepkowski, 2008). These results may stem from the fact that many respondents are away from home when they are interviewed via mobile phone (Brick, Brick, Dipko, Presser, Tucker, & Yuan, 2007), that mobile-phone respondents are more likely to be in the presence of other people and to multitask during the mobile phone survey (Lavrakas et al., 2007), and that cost could cause mobile-phone respondents to hasten through interviews, paying less attention to the questions than they might on a landline.

Given that, this research focuses on environmental pressure as one of the major factors influencing the effects of the interview modes. In this study, environmental pressure includes three situational factors which a respondent encounters while participating in a telephone interview: time, presence of others, and place.

Landline interviews are conducted in the respondent's home, which is a private and fixed space. On the other hand, interviews on mobile phones can be conducted in diverse places. According to scholars, mobile phones have enabled individuals to interact without limitations in time and space, changing the way humans manage and adjust their space. The use of mobile phones expanded fixed space such as households and offices to diverse urban physical space which is used for mobile telecommunication (Hwang, Yoo, & Lee, 2006; P. Kim, 2002). According to Kim (2002), mobile phones allow people to avoid meetings and conversations in public spaces, and develop a private space for the individual's own communicative behaviors. To further assert, the formation of private space may lead to perceiving mobile phones as a tool for closed or exclusive communication. Mobile phones can be used to avoid surrounding environments, people, and situations (Wooldridge, 1999). In short, mobile phones allow urban physical space to be used privately. The implication of this research lies in the fact that mobile phone interviews are possible as public spaces became privatized.

However, Bae (2006) argues that individual behaviors are influenced by informal and formal norms. "Acceptance of social control" was suggested as a factor which affects perception of norms in public space. Hwang, Yoo, and Lee (2006) distinguished diverse public spaces into "mobile phone receiving behavior" and "space perception," and used empirical data to study mobile phone usage behavior for each type of public space. They suggested four types of public space: (1) open space for diverse behavior, (2) closed space for diverse behavior, (3) open space for limited behavior, and (4) closed space for limited behavior.

People are often under special time constraints and special pressures when speaking on their mobile phones such as the risk of phone battery failure, the cost of receiving calls and so on.

These factors can make those who respond to the mobile phone interview spend less time and pay less attention to the questions than they might on a landline. However,

it is worth noting that, as there is no need to pay for receiving mobile phone calls in Korea, the situation may be different compared to the U.S.

Based on previous research, this research tentatively presents a new concept of "environmental pressure," referring to the perception of a certain situation by a telephone interview respondent based on the type of public space that the individual is located in, the time pressure they felt and the presence of other people around during the interview.

From this we derived our research questions.

**Research Question 1**: Can the mode of telephone interview (mobile versus landline) make any difference in respondents' environmental pressure such as the amount of available time, the number of people around, and the place of interview?

**Research Question 2**: Can the mode of telephone interview (mobile versus landline) make any difference in respondents' reactions toward certain interview questions, such as those about political attitudes?

**Research question 3**: If the environmental pressures, such as the place of the interview, the presence of others and time pressure are controlled, will the impact of the mode of the telephone interview be lost?

## Methodology

### Design

This research focuses on environmental pressure as one of the major factors influencing the effects of the interview modes. Also, this research expects that environmental pressure interacts with the telephone interview modes. In order to clearly identify the differences in response bias between these two types of interviews, this study followed these characteristics.

First, the respondents for both mobile and landline phone interviews were quota sampled from the same population based on gender, age and region. Second, one group of respondents were interviewed via landline phone, and a different group of people

were interviewed by mobile telephone. This study collected data only from those who use both mobile and landline phones. Third, to reduce interviewer bias, the same groups of interviewers conducted the interviews via mobile and landline phone. Fourth, both modes followed the same supervision principles and used the same CATI system.

## Sampling

The same sampling methods and questionnaire were used for both the mobile and landline interviews. However, since there is no directory of mobile phone numbers in South Korea, we were forced to dial random numbers that begin with one of the area codes used for mobile numbers. Many of these numbers were not activated. There is a directory of landline numbers and so we were able to select only home landline numbers. Table 1 provides an overview of the exact disposition codes.

Table 1

*Disposition Codes for the Landline and the Mobile Phone Interview*

| | Landline | | Mobile Phone | |
|---|---|---|---|---|
| | Call | % | Call | % |
| *Connection Failure* | | | | |
| no answer | 7,803 | 30.4% | 6,796 | 33.1% |
| Line busy | 218 | 0.9% | 222 | 1.1% |
| Fax/non-existing number | 9,435 | 36.8% | 7,719 | 37.6% |
| Sub total | 17,456 | 68.1% | 14,737 | 71.7% |
| *Connection Success* | | | | |
| Receiver-refusal | 3,206 | 12.5% | 3,203 | 15.6% |
| Eligible-refusal | 102 | 0.4% | 116 | 0.6% |
| Not-eligible | 3,952 | 15.4% | 1,570 | 7.6% |
| Exceed-quota | 348 | 1.4% | 415 | 2.0% |
| Eligible-absence | 78 | 0.3% | - | 0% |
| Sub total | 7,688 | 30.0% | 5,310 | 25.8% |
| *Interviews* | | | | |
| Complete | 500 | 1.9% | 500 | 2.4% |
| Total phone number used | 32,156 | 100.0% | 25,948 | 100.0% |

The interview was conducted by the Hyundai Research Institute between April 14 and May 4, 2011 of 1000 adults, at least 19 years old, according to the Korean way of counting, which is 17 or 18 in the western way of counting. It was conducted using a quota method, with 500 landline respondents and 500 mobile phone respondents. Only people who use both landlines and mobile phones were included, so as not to confuse mode difference with the differences between those who only use one of the two types of phones. We also were able to control for the gender, age and region of the sample. All telephone numbers were contacted up to 5 times.

**Independent Variables**

Types of telephone interview (modes): This variable provides information on whether the interviews were conducted via landline or mobile phone.

Time available for the interview: Respondents were asked about the time they had available for this interview. Out of 992 total respondents, 154 respondents (15.5%) reported that they could spend more than 3 minutes on the present interview. Those respondents were categorized as a low time pressure group. 513 respondents (51.7%) reported that they could spend about 3 minutes on conducting the present interview. Those respondents were categorized as a medium time pressure group. Finally 325 (32.8%) respondents reported that they could spare less than 3 minutes for the present interview. They were categorized as a high time pressure group.

People presence: No matter where the interview is conducted, at a private place or public place, it is possible that other people are present during the interview. Thus, respondents in this study were directly asked whether others were around during the interview, regardless of the type of telephone interview. Out of 1000 total respondents, 639 respondents (63.9%) reported that they were alone during the interview. Three-hundred-sixty-one respondents (36.1%) reported that there was someone around them during the interview.

Place of interview: This study distinguished between interviews conducted in a private place of the respondents' from those conducted in a public place. Out of 982 total respondents, 686 respondents (69.9%) reported that they were in a private place. Two-hundred-ninety-six respondents (30.1%) reported that they were conducting the

interview in a non-private setting such as their work place (n=226) or a public place (n=70).

### Dependent Variables

Political Attitudes: To assess political attitudes as dependent variables, this study used four different questions. First, the evaluation of the president was assessed by asking, "How do you evaluate the administration of the Lee Myung-bak government?" using a 5-point scale ranging from 1 for "very good" to 5 for "very wrong" ($M$ = 3.34, $SD$ = .96, N=500). Second, the evaluation of the ruling party was assessed with the question, "How do you evaluate the performance of the Grand National Party as the ruling party?" and a 5-point scale ranging from 1 for "doing very well" to 5 for "doing very poorly" ($M$ = 3.54, $SD$ = 1.06, N=500). Third, the evaluation of the opposition party was assessed by asking, "How do you evaluate the performance of the Democratic Party as an opposition party?" and a 5-point scale ranging from 1 for "doing very well" to 5 for "doing very poorly" ($M$ = 3.51, $SD$ = .99, N=500). Fourth, the political propensity was assessed by asking, "What is your political orientation?" a 5-point scale ranging from 1 for "very progressive," 2 for "progressive," 3 for "moderate," 4 for "conservative" and 5 for "very conservative" ($M$ = 3.00, $SD$ = .81, N=500).

## Results

### The Relationship of Interview Modes on Environmental Pressure

A series of chi-square test were performed to find the relationship between the modes of telephone interview and the environmental pressure (see Table 2).

Research Question 1 asked whether interview mode would have any effect on environmental pressure. Chi-square results revealed a significant relationship between the modes of the telephone interview and respondents' time pressure, $X^2$ (2, $N$=992) = 33.62, $p$=.000. Those who responded to telephone interviews via landline phones felt more time pressure than those who were interviewed via mobile phone.

Unsurprisingly, landline respondents were more likely to be alone than mobile phone respondents. Of our 500 landline respondents, 346 (69.2%) were alone

compared to 293 or 58.6% of mobile phone respondents, $X^2$ (1, $N$=1000) = 12.18, $p$=.000.

There were significant differences in the place of interview conducted according to the different modes. Although 465 out of 495 respondents who used a landline phone for the interview were in private places, only 221 out of 487 respondents who used a mobile phone for the interview were in a private place, $X^2$ (1, $N$=982) = 274.90, $p$=.000.

Table 2

*The Cross-tabulation of Interview Modes on Time Pressure, People Presence and Place*

| | | Landline | | Mobile Phone | | Crosstabulation |
|---|---|---|---|---|---|---|
| | | N | % | N | % | |
| Time pressure | Low pressure (available more than 3min.) | 54 | 10.9% | 100 | 20.2% | $X^2$=33.62, $df$=2, $p$=.000 |
| | Medium pressure (available 3min.) | 242 | 48.7% | 271 | 54.7% | |
| | High pressure (available less than 3min.) | 201 | 40.4% | 124 | 25.1% | |
| | Total | 497 | 100% | 495 | 100% | |
| People Presence | Alone | 346 | 69.2% | 293 | 58.6% | $X^2$=12.18, $df$=1, $p$=.000 |
| | Not alone | 154 | 30.8% | 207 | 41.4% | |
| | Total | 500 | 100% | 500 | 100% | |
| place | Private place | 465 | 93.9% | 221 | 45.4% | $X^2$=274.90, $df$=1, $p$=.000 |
| | Non-private place | 30 | 6.1% | 266 | 54.6% | |
| | Total | 495 | 100% | 487 | 100% | |

## The Effect of Interview Modes on Political Attitudes

Research Question 2 asked whether interview mode would affect the measurement of political attitudes. A series of independent sample $t$-test analyses were performed to find the relationship between the modes of telephone interview and the political attitudes.

Statistical analysis revealed that the evaluation of the ruling party for those who participated in the landline phone survey and those who participated in the mobile

phone survey was significantly different in scores for landline phone ($M$ = 3.45, $SD$ = 1.03) and mobile phone ($M$ = 3.75, $SD$ = 1.65) survey; $t$ (998)= -2.45, $p$ = .015. Those who answered the telephone survey with mobile phones evaluated the ruling party more negatively than those who answered the telephone survey with landline phones.

However, other independent sample $t$-test analyses which dealt with the impact of the survey mode on the evaluation of the president ( $t$ (998)= -1.67, $p$ = .095), the evaluation of the opposition party ( $t$ (998)= -.382, $p$ = .702), and political propensity ( $t$ (998)= .352, $p$ = .725) revealed no statistically significant results.

These results suggest that the mode of telephone survey can have an effect on the survey response for some questions.

**The Effect of Interview Modes and Environmental Pressure on Political Attitudes**

A series of hierarchical regression that involves the interaction were performed. In this model, demographic variables, such as gender and age, are entered in Step 1, and mode, time pressure, presence of another person, place, mode X time pressure, mode X presence of another person, and mode X place are added in step 2 as independent variables. Four questions related to political attitudes were tested as dependent variables.

Table 3 displays the standardized regression coefficients ($ß$) and adjusted $R^2$. Both the mode of the interview and time pressure had no effect on the measurements of political attitudes.

At first, the respondents' age influenced political attitudes. The older respondents evaluated the president and ruling part more positively than the young respondents did. In addition, the older respondents assessed the opposite party more negatively and rated themselves as more conservative than the young respondents did.

Analyses also revealed that the place of the interview was significantly related to the evaluation of the president and the evaluation of the ruling party. Respondents who were in non-private places during the interview gave the president and the ruling party a worse evaluation than those who conducted it in private places. Since the incumbent president of Korea comes from the ruling party, it seems that the respondents in the public place evaluated the reins of power more negatively.

In addition, there were interaction effects between mode and the presence of others on the evaluation of the opposition party and the respondents' political propensity. At first, it seemed that the landline phone respondents evaluated the opposition party more negatively when they were alone (*M*=3.56, *SD*=.92) than when they were not alone (*M*=3.37, *SD*=1.00). However, the mobile phone respondents assessed the opposition party less negatively when they were alone (*M*=3.41, *SD*=1.02) than when they were not alone (*M*=3.68, *SD*=1.02).

Second, those who used a landline phone during the interview reported their political propensity as more conservative when there was no other person around (*M*=3.05, *SD*=.79) than when there was someone around (*M*=2.93, *SD*=.83). On the other hand, those who used mobile phones during the interview reported their political propensity as more conservative when they were with another person (*M*=3.05, *SD*=.84) than when there was no one around (*M*=2.96, *SD*=.79).

To explain these results, an understanding of the political situation in Korea when this study was conducted may be needed. President Lee Myung-bak and the ruling party were supported mostly by the conservatives, whereas the opposing party was supported by the liberals. Our working theory is that landline respondents tend to be more conservative, while mobile phone respondents tend to be more liberal, but both groups make themselves more moderate in front of their friends to avoid offending anyone or preserve their image. Given that, those respondents who used the landline phone during the telephone survey evaluated the opposition party more negatively and assessed themselves as more conservative when they were alone rather than when there was someone around. On the other hand, those respondents who used the mobile phone during the telephone survey evaluated the opposition party more negatively and assessed themselves as more conservative when they were not alone than when they were alone.

Table 3

*Hierarchical Multiple Regression Model Predicting Evaluation of the President, Evaluation of the Ruling Party, Evaluation of the Opposition Party, Political Propensity*

| | Evaluation of the president | Evaluation of the ruling party | Evaluation of the opposition party | Political propensity |
|---|---|---|---|---|
| | *ß* | *ß* | *ß* | *ß* |
| Step 1 | | | | |
| Gender(0=female) | .027 | .107*** | .117*** | .040 |
| Age | -.198*** | -1.24*** | .097** | .165*** |
| Δ $R^2$ | .047*** | .035*** | .024*** | .030*** |
| Step 2 | | | | |
| Mode(0=landline) | .044 | -.128 | -.114 | -.131 |
| Time pressure | .002 | -.107* | -.043 | .013 |
| Presence of others (0=no) | -.048 | -.006 | -.087 | -.069 |
| Private Place(0=private) | .207* | .185* | .053 | -.044 |
| Mode X Time Pressure | -.047 | .149 | .024 | .136 |
| Mode X Presence | .040 | -.001 | .174** | .116* |
| Mode X Place | -.140 | -.103 | -.020 | -.049 |
| Δ $R^2$ | .010 | .016* | .014* | .010 |
| Adjusted *R* | .048 | .042 | .029 | .031 |
| $df^2$ | 973 | 973 | 973 | 973 |

*Notes*: $p$*<.05, $p$**<.01 $p$***<.001.

## Discussion

This study considers the nature of response difference between the use of a mobile phone or a landline phone to respond to an interviewer-administered survey. An important assumption of this study was that factors of the measurement differences such as time constraints, presence of others and place may differ between mobile and landline interviews.

We present two main findings, regarding the questions we posed initially. First, this study reveals that the mode is the cause of the environmental pressure. It was shown that in mobile phone interview situations, another person was present more often than in landline phone interview situations. In addition, landline phone

respondents were more likely to be alone than mobile phone respondents. Interestingly, landline phone respondents felt more time pressure than those who responded to the telephone interview via mobile phone. According to AAPOR Cell Phone Task Force (2010), mobile-phone respondents hurry through interviews and pay less attention to the questions than they might on a landline because of the cost of receiving a call and convenience considerations. However, in Korea, a mobile phone user receives calls for no charge. This may produce apparently contradictory results with previous literature regarding time constrains of landline and mobile phone interviews. This may indicate the importance of considering the unique technical and cultural situation of each country when designing telephone interviews.

Second, it was partially supported that the mode is not the cause, but instead a potentially associated condition affecting interview response behavior. We examined to what extent these relationships endure if aspects of the interview situation (the time availability, presence of third parties and place) change. There were interaction effects between mode and the presence of others on the evaluation of the opposition party and the respondents' political propensity.

It is possible that the spiral of silence (Noelle-Neumann, 1979) plays a role here. In other words, people can estimate public opinion and this perception of public opinion affects what they are willing to say in public, as they do not feel comfortable expressing their honest opinion when it disagrees with what they believe is the opinion of the majority. This causes people to be silent about their real opinion, which confirms theirs and others opinion that this is now the predominant belief. In turn, this causes a change in public opinion as seen in surveys, but it is unclear whether there is a real change in public opinion or not. The spiral of silence can make surveys unreliable, especially when predicting election results, as people who are silent when asked about their opinion may still vote in a way that agrees with their true beliefs.

As with all studies, the present study is subject to limitations that should be pointed out. First, the present study used quota sampling. Thus, the results of this study should be replicated with a study using random sampling. Second, this study assessed the respondents' political attitudes. However, to test the data quality of mixed mode sampling, the topic of the survey questionnaire needs to be expanded in future studies.

Finally, the political attitudes which are used as the outcome variables may not reflect sensitivity to the survey settings or the time availability that the paper attempts to address. Since questions on sensitive subjects may show different results, future studies tackling this issue are needed.

In conclusion, the findings are generally consistent with the literature supporting the data quality and comparability of the mixed mode survey. The mixing of modes, nevertheless, allows the researcher to compensate for the disadvantages of one mode with the advantages of another. For example, telephone interviews via mobile phones cover mobile only households. Furthermore, the combination of different modes of data collection is an effective instrument to reduce both rising implementation costs and increasing nonresponse rates (de Leeuw, 2005). Thus, the results found in this study are encouraging for researchers designing surveys that feature mobile phone data collection.

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