SHPRC Research Short Notes (June 2024)

The *SHPRC RSN* is a valuable source of information that can be utilized for conducting surveys or writing research papers.

Do Respondents in a National RDD Smartphone Web Survey Answer at Their Convenience?: Insights from an Analysis of Paradata and Response Data

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Face-to-face surveys (CAPI) are often used for creating official statistics or public policymaking on general populations at the national or state level. On the other hand, telephone surveys (CATI) are frequently used for public opinion or social research. These surveys are interviewer-administered, and the success rates (completion rates), which influence accuracy and costs, vary greatly depending on when the interviewers call or visit. Thus, an optimal (or efficient) calling strategy is developed to reduce call attempts and to maximize respondent contact and completed interviews. Numerous studies have been conducted worldwide to determine effective calling strategies. For example, in 2010, from November 1 to December 27, Park et al. (2012) in South Korea conducted a probability-based dual-frame random-digit-dialing (RDD) CATI survey that included both landline and cell phone numbers at the national level. They attempted to call those numbers up to a maximum of 17 times. Based on Figure 1 and Figure 2, which are the findings from the analysis of the paradata and success rates, they proposed an optimal call scheduling strategy in Table 1. The strategy for using cell phones, landlines, or both varies by day (weekdays, weekends) and time (afternoons, and evenings).

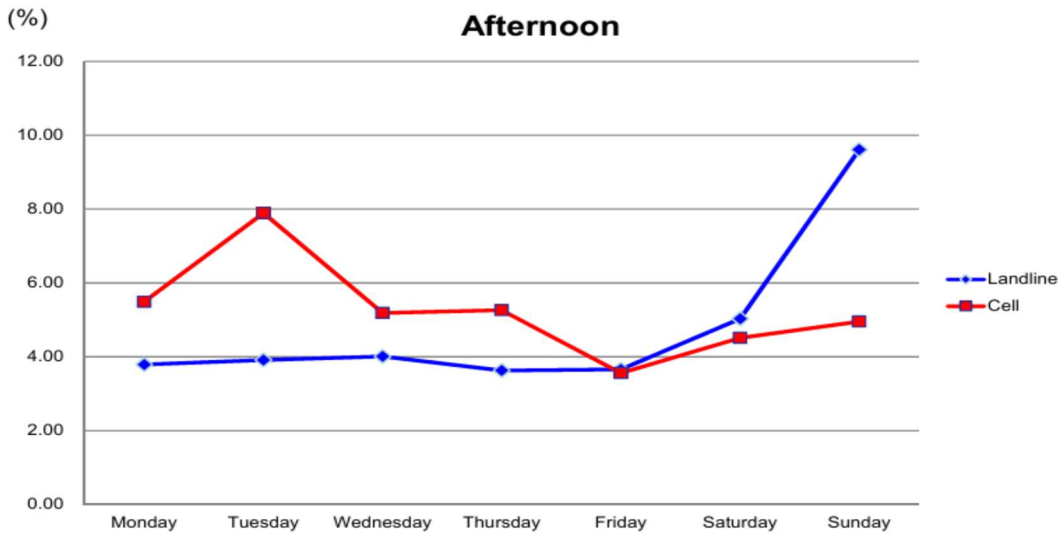

Figure 1. Success rates between 12:00 and 18:00 (afternoon)

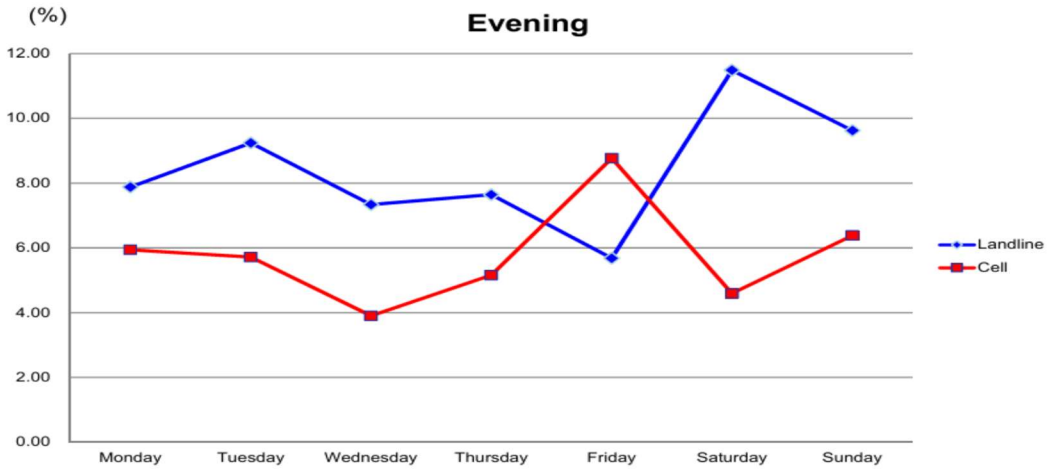

Figure 2. Success rates between 18:00 and 21:00 (evening)

Table 1. Optimal Call Scheduling Strategy

	12:00 – 18:00 (Afternoon)	18:00 – 21:00 (Evening)
Monday	Cell, Landline	Cell, Landline
Tuesday	Cell	Landline
Wednesday	Cell, Landline	Landline
Thursday	Cell, Landline	Cell, Landline
Friday	Cell, Landline	Cell, Landline
Saturday	Cell, Landline	Landline
Sunday	Landline	Landline

Using an original data set of paradata from 2010 to 2017 and a machine learning technique for variable selection, Shino and McCarty (2020) in the U.S. found that early and late afternoon shifts are as productive as late evening shifts for both landline and cell phone RDD samples. Also, early weekdays are more productive than the weekends for the cell phone RDD samples. This is quite similar to the findings of Park et al. (2012) presented in Figure 1, Figure 2, and Table 1.

Despite using an optimal call scheduling strategy, interviewer-administered surveys (CATI or CAPI) have a significant drawback that is often overlooked. Interviewers may contact or visit potential respondents who are not yet ready to participate in the survey. In other words, the timing of the interviewer's calls or visits to potential respondents is mostly predetermined, without considering the respondents' circumstances and the conditions under which surveys are conducted. This lack of consideration may impact the authenticity of survey participation and the accuracy of responses, particularly for sensitive topics commonly included in surveys.

How should we solve such a problem? One possible solution to the problem is to use self-administered web surveys. This approach allows participants to respond at a location and time that is convenient for them. It also eliminates the need for interviewers, who can introduce other errors (e.g., fewer reports of socially undesirable attitudes and behavior) and add to the overall costs of the survey. However, web surveys often suffer from low quality due to incomplete sampling frames and low response rates. Therefore, we need innovative approaches

that go beyond traditional web methodologies.

The combination of RDD sampling and smartphone technology could create a new opportunity for collecting data through web-based self-administered surveys. Kim and Couper (2021, 2023) demonstrated that a smartphone web survey (SWS) using cell phone RDD samples and SMS (text message) invitations on the national level is a viable alternative to traditional web methodologies. SWS provides high-quality data at low costs, better than or comparable to CAPI and CATI surveys. These would be some notable benefits of using SWS. However, the question remains whether respondents in SWS answered at their convenience in practice.

We analyzed the paradata and response data in Kim and Couper (2023)'s SWS, called the 2020 National Survey of Life and Health (NSLH), to determine whether respondents answered at their convenience. Among the total number of 1,532 respondents, we used the data of 1,493 respondents, which excluded 39 respondents who took more than 1 hour to complete the survey. R software was used for analysis.

Analysis Results

The NSLH sent three follow-up reminders, spaced one week apart, after sending the invitations. They were all sent at 17:30 on the designated dates (Mondays for the invitation and first reminder; and Sundays for the second and third reminders). The survey was completed by about two-thirds (65.2% of the 1,532) of respondents between 17:30 and 19:00 (within one hour and a half), with the remaining one-third responding at other times. Details for completed interviews between 17:30 and 19:00 are shown in Table 2.

Table 2. Completed interviews between 17:30 and 19:00

	Number	%
Invitation	283	18.5
First reminder	335	21.9
Second reminder	230	15.0
Third reminder	151	9.8
Total	999	65.2

Figure 3 describes the respondents to the invitation. Figure 4 displays the cumulative respondents up to the first follow-up reminder. Figure 5 pertains to those up to the second reminder, and Figure 6 pertains to those up to the third reminder, encompassing the entire respondents. Each figure is a bubble plot of respondents with four variables: survey start time, age, gender, and time taken to complete the survey. The data on survey start time and time taken to complete the survey is paradata, whereas the data on age and gender is response data. The bubbles in the figures represent each of the respondents. The horizontal axis (x-axis) in each figure shows the survey start time in 30-minute intervals throughout the day when respondents answered the survey. Selected 30-minute intervals only, depending on each figure, are displayed. The vertical axis (y-axis) represents age. Gender is indicated by the color of the bubbles (red for the male and green for the female). The size of the bubbles corresponds to the time taken in seconds to complete the survey. For instance, if the bubble displays "Duration (sec) 3000," it took 50 minutes to complete. In reference, excluding extremely high outliers, the NSLH took an average of 10.7 minutes (a median of 8.2 minutes) to complete, as Kim and Couper (2023) mentioned.

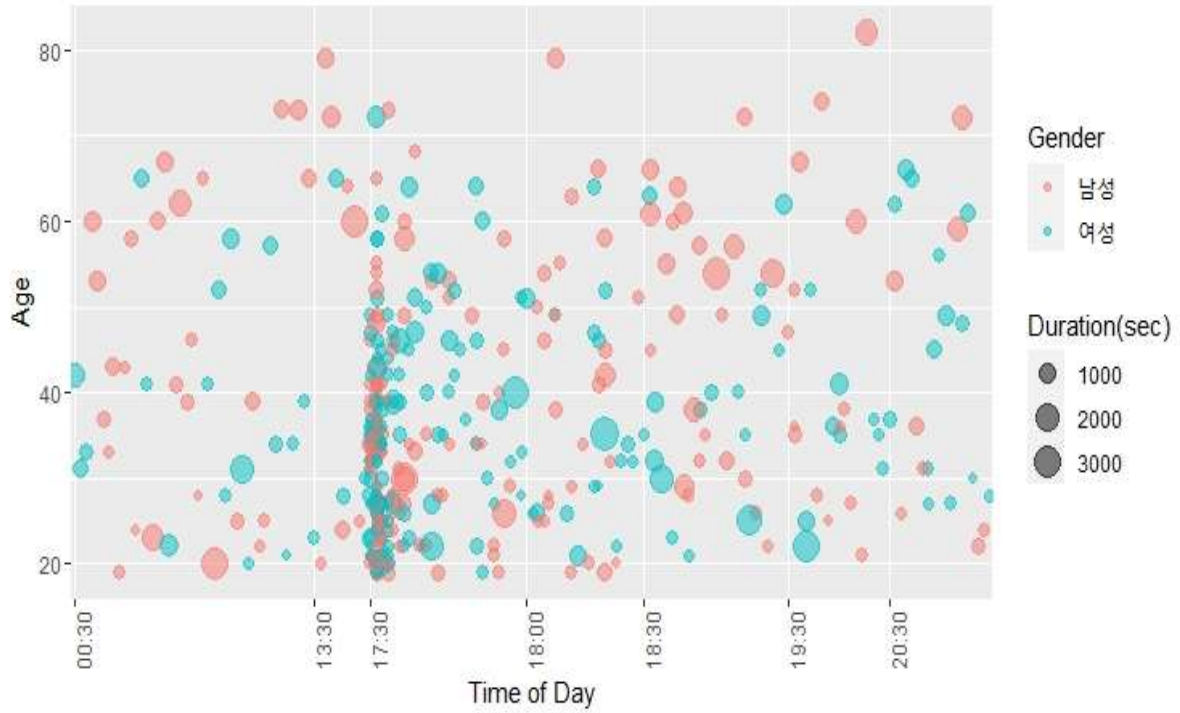

Figure 3. Bubble plot of respondents with four variables to the invitation

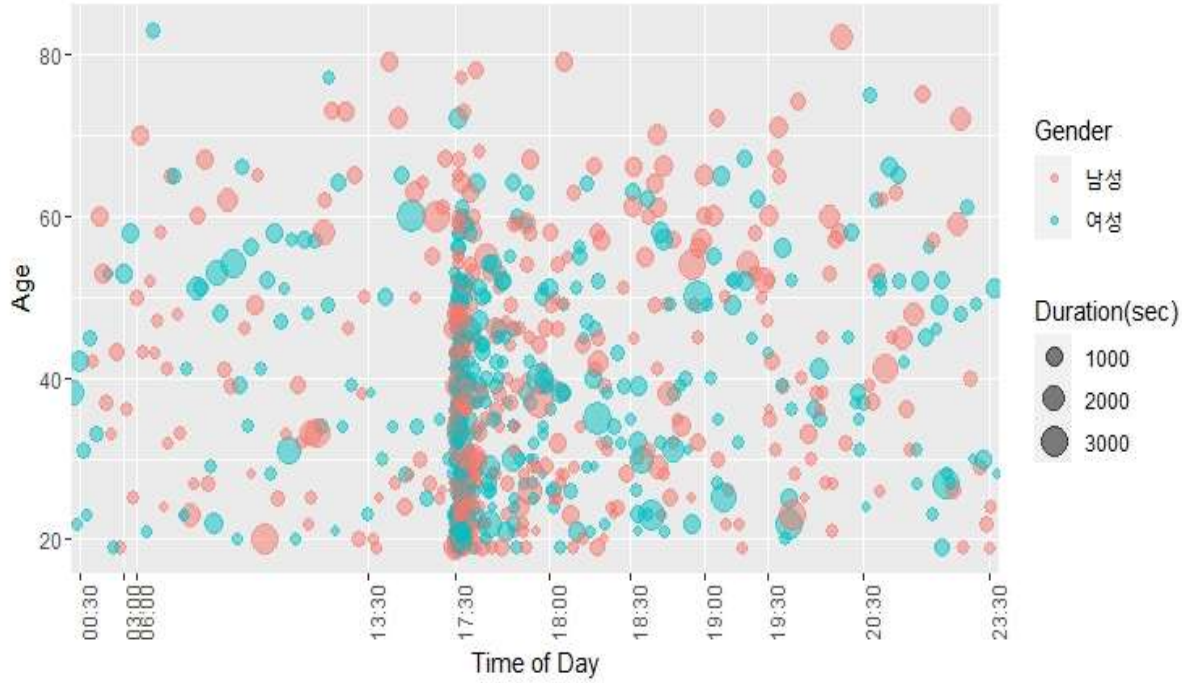

Figure 4. Bubble plot of respondents with four variables up to the first reminder

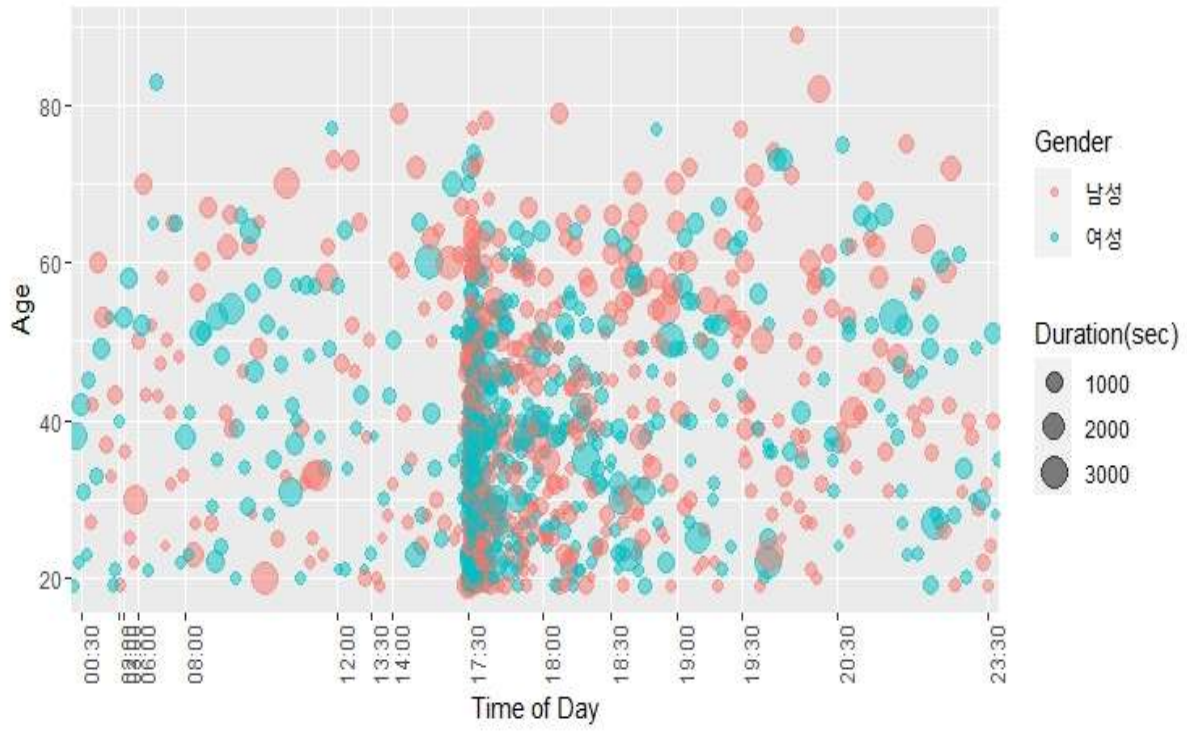

Figure 5. Bubble plot of respondents with four variables up to the second reminder

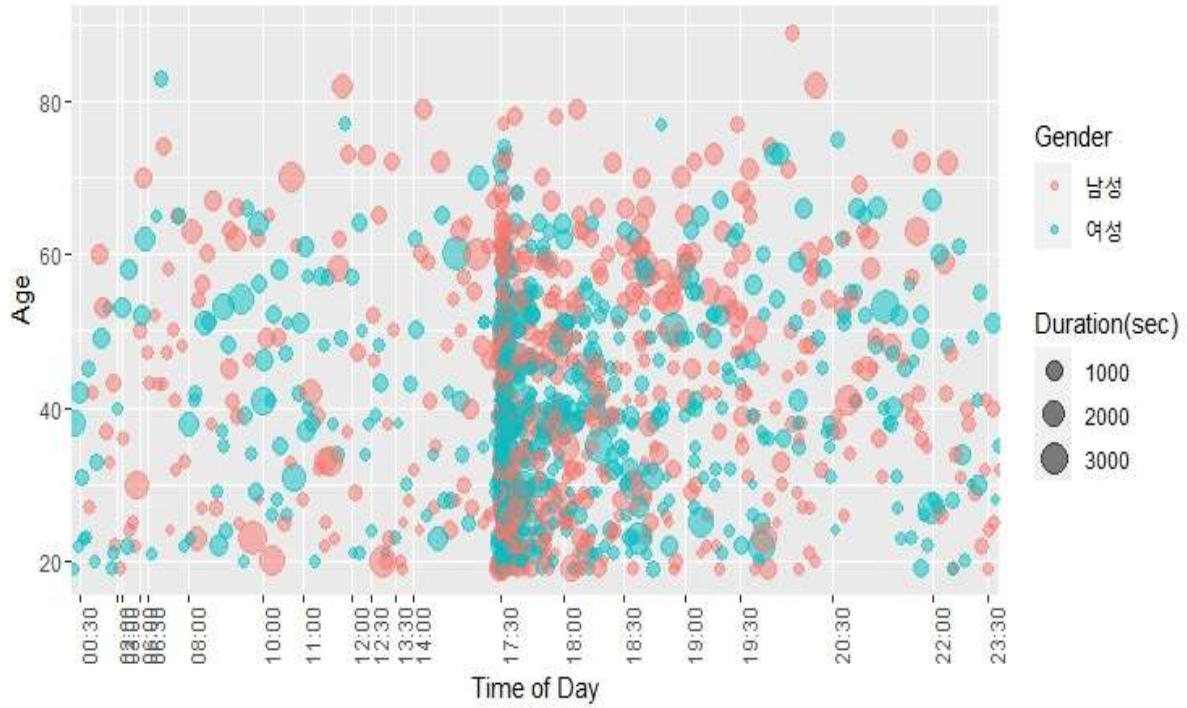

Figure 6. Bubble plot of respondents with four variables up to the third reminder

When looking for any pattern in each figure, it would be helpful to differentiate between respondents from 17:30 to 19:00 and those who responded at other times. However, as shown in the figures, as the number of 30-minute intervals displayed on the horizontal axis increases or the number of respondents increases from Figure 3 to Figure 6, there are no distinct patterns in the distribution of respondents with four variables. They consistently represent the respondents as being almost randomly distributed (lacking any discernible pattern) across all values or categories of the variables, including the early morning hours and late at night. These times are practically impossible for conducting face-to-face or telephone surveys. Thus, based on these figures, it can be inferred that respondents in SWS tend to complete the survey at their convenience. This enhances the authenticity of survey participation and the accuracy of responses. As a future study, comparing respondents who answered between 17:30 and 19:00 with those who did at other times may be useful. To achieve this, the Appendix, an expanded version of Figure 6, would be beneficial.

References

Kim, S. W., and Couper, M. P. (2021). "Feasibility and quality of a national RDD smartphone web survey: comparison with a cell phone CATI survey," *Social Science Computer Review,* 39(6)**,** 1218-1236, https://doi.org/10.1177/0894439320964

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Appendix

An Expanded Version of Figure 6