A Matter of Time: The Value and Optimal Timing of Follow-up Questionnaire Mailings in a Multimode Survey

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Abstract

Mail surveys remain popular in the United States primarily due to their lower costs relative to other interview-based methods of data collection. Inclusion of a mail component in a larger, multimode survey design may be used to increase response rates, obtain the requisite number of interviews, and contain survey costs. Dillman's Tailored Design Method provides a framework for the ideal frequency and timing of follow-up contacts to increase response rates in multimode surveys that include a mailed, self-administered questionnaire (SAQ) component. As the timing of mailings has not been tested recently, we seek to examine assumptions about the effectiveness, efficiency, and optimal timing of follow-up SAQ contacts in a survey of minority populations.

We use data for this analysis from the Racial and Ethnic Approaches to Community Health Across the U.S. (REACH U.S.) survey, a multi-year project sponsored by the Centers for Disease Control and Prevention to eliminate health disparities among racial and ethnic minority populations. REACH U.S. used a multimode, address-based survey design involving telephone, mail, and face-to-face interviews. In the last round (2011-2012), the REACH U.S. Survey incorporated a second SAQ mailing to non-respondents in all communities. The second SAQ mailing was sent six weeks after the initial mailing, in accordance with Dillman's Tailored Design Method.

In our analysis, we find significant gains in the response rate by adding a second SAQ mailing. Additionally, we find that adding a second SAQ mailing is more cost efficient than additional contacts in other modes to achieve a target number of completed interviews. We also analyze the optimal time to mail a second SAQ mailing to achieve maximum response at minimum cost.

Key Words: Follow-up Mailings, Multimode Survey

1. Introduction

Previous research about mail surveys supports the effectiveness of follow-up contacts to increase response rates (Blumberg, Fuller, & Hare, 1974; Dillman, 1972; Linsky, 1975). Mail survey researchers have established practical guidelines surrounding the ideal interval between initial and follow-up questionnaire mailings (Dillman, 2007) though little research has been devoted directly to developing or evaluating them. The few existing studies that examine the optimal timing of follow-up questionnaire mailings do so exclusively in terms of response rate. In these studies, the length of the follow-up interval has not been found to influence response rate (Claycomb et al., 2000; Foushee & McLellan, 19990; Peterson et al., 1989).

More recently, research has evaluated response rates for single versus multiple modes of data collection. These studies compare the response rate when respondents are contacted exclusively via mail with that when mail contacts are combined with contacts in alternate modes, including telephone or web. Brick et al (2011) found that recruiting and interviewing respondents via mailed questionnaires achieved a similar response rate to contacting respondents via mail and telephone modes of data collection. Two studies also compare mode switching options for web/mail mixed mode surveys and suggest that incorporating follow-up requests via mail is advantageous compared to offering the two modes simultaneously or offering the web mode exclusively (Messer & Dillman, 2011; Millar & Dillman, 2011).

While extant research supports the ability of follow-up mailings to boost response rates in mail only and multimode surveys, too few studies have examined the relationship between optimal timing of follow-up contacts and response rate, particularly in the context of multimode surveys. Additionally, no research has been devoted to the potential cost implications for varying the interval between initial and follow-up mailings, a particularly important issue for the sustainability of survey research. Finally, a number of years have elapsed since the questions of the value and optimal timing of follow-up mailings have been investigated and in that time, the landscape of survey research has evolved.

We use data from the 2011-2012 Racial and Ethnic Approaches to Community Health Across the U.S. (REACH U.S.) Risk Factor Survey (RFS), a multimode, community-based survey of health risk behaviors sponsored by the Centers for Disease Control and Prevention (CDC) to examine the value of follow-up questionnaire mailings in terms of return rate and cost. We also seek to evaluate the optimal time to mail a follow-up questionnaire in terms of these two factors.

2. Data and Methods

2.1 REACH U.S. Risk Factor Survey Design

Sponsored by the CDC, the REACH U.S. RFS was conducted annually in 28 communities across the U.S. The aim of the program was to understand and eliminate racial and ethnic health disparities in areas, such as breast and cervical cancer, cardiovascular disease, diabetes, adult immunizations, infant mortality, asthma, and hepatitis B. Each REACH community targeted one or more specific racial or ethnic group for community-based health interventions. The racial and ethnic populations served by REACH U.S. included African Americans, American Indians/Alaska Natives, Hispanics/Latinos, Asian Americans, and Pacific Islanders.

The REACH U.S. RFS primarily employed a multimode, address-based sample design involving telephone, mail, and limited face-to-face components. The analysis for this paper focuses on the telephone and mail modes.

Where possible, a telephone number for the sampled address was identified and contacted through a computer-assisted telephone interview system (CATI). CATI non-respondents were mailed a self-administered questionnaire (SAQ) packet. Addresses that could not be matched to a telephone number were contacted exclusively via mail (Figure 1).

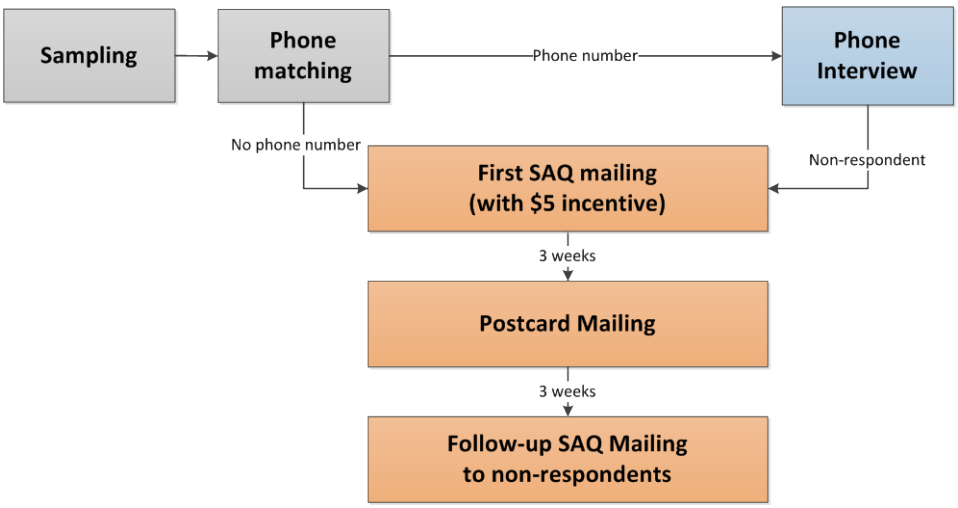

Figure 1: REACH U.S. RFS Data Collection Operations

REACH U.S. RFS mailings followed Dillman's Tailored Design Method, which recommends that researchers send a thank you/reminder contact and a replacement questionnaire to respondents within approximately six weeks of the initial questionnaire mailing (Figure 1) (Dillman, 2007). REACH U.S. households were mailed an initial SAQ packet containing a cover letter, two SAQ booklets[1], a $5 bill, and a postage-paid business reply envelope. Approximately three weeks after the initial SAQ mailing, we sent a thank you/reminder postcard. A follow-up SAQ packet was mailed to non-respondents six weeks after the initial mailing and contained a cover letter, two SAQ booklets, and a postage paid business reply envelope. A monetary incentive was not included in the follow-up mailing.

NORC receipted returned SAQ booklets and recorded whether the booklet was completed by a respondent or if the USPS returned the SAQ package as undeliverable. Mailings returned as undeliverable were considered out of scope (i.e., non-households) and were not contacted further.

2.2 Analytic Objectives

Using 2011-2012 REACH U.S. RFS paradata, we examine the following research questions:

1. Do follow-up SAQ mailings increase return rates and, if so, by how much?
2. Assuming the target number of interviews is fixed, is it more cost-effective to send a follow-up SAQ mailing to non-respondents or is it more cost-effective

[1] The REACH U.S. RFS had two components: a screening section, which determined eligibility of each household member, and a main interview, which asked respondents about health status and behaviors. In CATI, the screening interview preceded the main interview and the main interview was only conducted with household members selected for participation. For the mailed SAQ survey, screening and main interview questions were asked simultaneously and eligibility was determined after the booklets were returned. All adult household members were instructed to fill out a survey booklet. Households with more than two adults could call an 800-line to request additional booklets.

to release additional sample and pursue with less rigorous data collection methods (i.e., without mailing a second SAQ)?
3. When is the optimal time to mail a follow-up SAQ considering the rate of receipted mail and data collection costs?

Data from 19 REACH U.S. communities, totaling 55,609 sample lines, are included in the analysis. Of the sample lines contacted via mail, 14,009 households returned one or more SAQ booklets for a total of 19,903 booklets returned. Approximately 30 percent of the sample had previously been attempted via CATI but were CATI non-respondents. The remaining 70 percent of the sample was contacted exclusively via mail as they were never matched to a telephone number.

3. Results

3.1 Effect on return rate (Research Question 1)

We calculate the household return rate assuming NORC had mailed only an initial SAQ and compare it with the household return rate for the combined initial plus follow-up SAQ mailings at a 6 week mailing interval. We define household return rate as the number of households that returned one or more SAQ booklets divided by the number of sample lines mailed, excluding undelivered mail from both the numerator and denominator.

At the conclusion of data collection, the cumulative household return rate without the follow-up SAQ mailing was 23 percent compared to 28 percent when we included a follow-up SAQ mailing to non-respondents. Including a follow-up SAQ mailing boosted the cumulative household return rate by over 20 percent ($t=50.09$, $p<0.001$, one-tailed).

3.2 Cost-effectiveness of follow-up SAQ (Research Question 2)

Given that REACH U.S. is a multimode survey, we have two options for achieving a targeted number of completed interviews. We could either (1) send a follow-up SAQ mailing to non-respondents to yield additional interviews from the current sample, or (2) release additional sample lines and contact these households via telephone and mail *without* a follow-up SAQ mailing to non-respondents. Keeping the number of completed interviews constant and assuming all else is equal, we should choose the option that incurs the lowest cost per completed interview. Our analysis includes all variable costs (i.e., those costs that fluctuate per sample line released) such as sample purchase, appendage of telephone numbers, printing and prepping of outgoing mail, postage (outgoing and incoming), CATI interviewer and supervisor labor, clerk labor for receipting incoming mail, and data entry. We examine these costs in isolation and in the context of overall data collection costs.

To examine the two options in isolation, we focus on the cost of sending a follow-up SAQ mailing to non-respondents and identify the "late" completed interviews gained by the additional mailing. We calculate the average cost per complete of sending a follow-up SAQ mailing to non-responding cases, or "late completing cases" and compare the cost per "late" complete to the cost per complete had we released additional sample lines. The latter includes all costs associated with fielding the number of sample lines necessary to make up for the interviews lost because a follow-up SAQ packet was not sent. We divide the average cost per complete for the follow-up mailing to "late completing cases" by the average cost per complete given additional sample release. The resulting cost ratio

informs the effectiveness of contacting non-respondents through the follow-up mailing, looking at the follow-up mailing in isolation from other data collection costs.

Because completed interviews gained via the follow-up mailing represent only about 10% of all completed interviews in REACH U.S., it is also valuable to determine the impact of including a follow-up mailing on overall data collection costs. To this end, we repeat our cost ratio analysis in a different way. We calculate variable costs and completes associated with ***all*** data collection operations including the follow-up SAQ mailing to non-respondents. We also calculate the variable costs and completes associated with data collection operations without the follow-up SAQ mailing but with the inclusion of additional sample lines to achieve the same target number of interviews. We divide the average cost per complete for operations with the follow-up mailing to those without. The calculation yields a cost ratio that looks at the cost of the follow-up mailing in the context of overall data collection costs.

Figure 2 displays both the cost ratio for pursuing our "late completing cases" via a follow-up mailing and the potential cost implications of including a follow-up mailing on our overall data collection costs. The black dotted line at 1.0 is our benchmark, representing the average cost of data collection operations per complete without the follow-up mailing. The two cost ratios compare the cost of including a follow-up SAQ mailing to this benchmark.

At a value of 0.98, the "Late Cases" cost ratio indicates that sending a follow-up SAQ mailing to achieve "late" completes from non-respondents is marginally less expensive than releasing additional sample and pursuing standard REACH U.S. data collection operations without the follow-up SAQ mailing. The "Overall" cost ratio is equal to 1.0, indicating that including a follow-up SAQ mailing is cost neutral with respect to overall data collection costs. This finding is not surprising given that the cost of pursuing "late" completing cases in isolation is close to 1.0. Even if the cost of pursuing "late" completes had deviated further from the benchmark, the proportion of total costs spent on the follow-up mailing may not have been influential enough to outpace that spent on an initial mailing to all respondents.

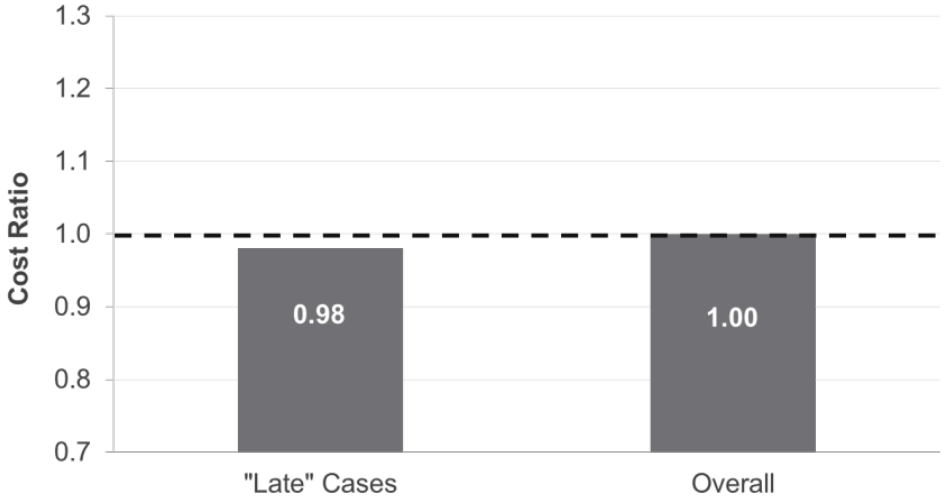

Figure 2: Cost Ratio of Mailing a Follow-up SAQ Mailing Compared to Releasing Additional Sample

3.3 Optimal Time to Mail (Research Question 3)

Thus far, all analyses have assumed a six week time lag between the initial and follow-up mailing since this was the time lag used for REACH U.S. For the final analysis, we examine the optimal time to mail a follow-up SAQ mailing in terms of receipt rate and cost. We simulate a variety of lag times between the two mailings, ranging from one week to 27 weeks between the mailings.

We calculate the receipt rate for each simulated time lag as all returned mail (regardless of whether it was returned by a household or as undelivered mail) divided by the number of sample lines mailed. All receipted mail has an impact on the amount of outgoing mail as well as on incoming and outgoing costs. This makes the receipt rate more relevant than the return rate, which excludes undelivered mail from the numerator and denominator.

The longer the time lag between the mailings, the later the follow-up mailing is sent and the fewer weeks it has to be productive in the field during a fixed data collection period. Given 32 weeks of data collection, our greatest time lag of 27 weeks allocates our shortest field period for follow-up mail: only five weeks for follow-up SAQ booklets to be mailed and receipted in-house.

For this analysis, we assume that there is no correlation between time lag between the mailings and likelihood to return a SAQ booklet. In other words, a longer or shorter time between the two mailings has no impact on the respondent's likelihood to complete and return the booklet. For example, with 5 weeks in the field (or 27 weeks between mailings), we assume that the number of follow-up booklets returned is consistent with the amount returned after five weeks in the REACH U.S. RFS even though the timing of the mailing is different.

Figure 3 displays the receipt rate for each simulated time lag between the mailings. At the shortest time lag between the first and follow-up mailings (i.e., one week between initial and follow-up mailings), the follow-up SAQ mailing has the most amount of time to be productive in the field (31 weeks). As a result, the receipt rate is highest at this point. As shown in Figure 3, the receipt rate for the follow-up SAQ stays relatively constant through week 17 (i.e., a lag of 17 weeks between the initial and follow-up mailing). Given a field period of 32 weeks, a 17 week lag between mailings still allows for 15 weeks for the follow-up SAQ to be returned. Very few SAQs are returned later than 15 weeks in the field, so mailing the follow-up SAQs sooner affords little benefit to the receipt rate.

Lags longer than 17 weeks result in noticeable declines in the receipt rates, suggesting that the follow-up SAQ mailing does not have sufficient time in the field to be completed and returned. These data suggest that while the time lag between mailings may be quite elastic, the follow-up SAQ mailing requires a minimum period of 14 weeks in the field in order to maximize the receipt rate. A field period of 32 weeks is exceptionally long. With a shorter field period, follow-up mailings will not have the same flexibility in delay between mailings. As the field period becomes shorter, the lag will also need to be smaller to ensure adequate time for the follow-up SAQ to be completed and returned.

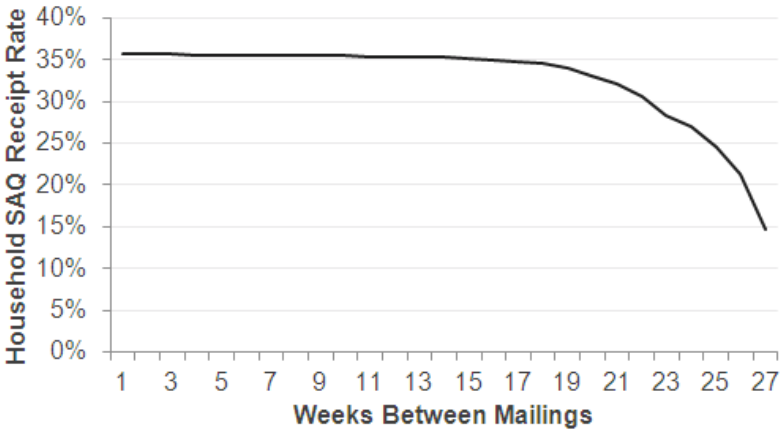

Figure 3: Receipt Rate of First and Follow-up SAQ Mailings by Lag Time Between Mailings

We also evaluate how costs vary for each simulated time lag. As before, our analysis includes all variable costs associated with each time lag. At the shortest interval between mailings, few booklets from the first mailing will have been returned necessitating more follow-up mailings to non-respondents resulting in higher incoming and outgoing mailing costs. At the same time, follow-up mail will have more time in the field to be productive and will yield a higher number of returned booklets.

As the interval between mailings increases, there will be fewer non-respondents, fewer follow-up mailings, and lower incoming and outgoing data collection costs. However, the shorter time in the field will translate to fewer completed booklets returned. Again, we assume no correlation between time lag and propensity to return a booklet. At 27 weeks between the mailings, for example, the incoming and outgoing mailing costs for follow-up SAQ booklets and the amount of receipted booklets will mimic those observed in the REACH U.S. RFS after five weeks in the field.

As with receipt rate, we apply the average cost per complete for first and follow-up mailings observed in REACH U.S. to each time lag in our simulation. We divide the cost per complete for each lag by the cost per complete given a time lag of one week between the first and follow-up mailings. We model both the cost ratio for our "late completing cases" and the overall data collection cost ratio for each artificial time lag.

The examination of optimal timing in terms of the "late" and the "overall" cost ratios are shown in Figure 4. For both cost ratios, highest costs are observed when there is the least amount of time between the first and follow-up mailings. With the shortest time lags between mailings, the initial SAQ mailing has less time in the field to be productive before it is necessary to contact non-respondents via a follow-up mailing. As the time lag increases, fewer follow-up SAQ mailings are necessary, thereby decreasing outgoing costs. The cost ratios stay relatively constant until about 27 weeks between the first and follow-up mailings. Here, the follow-up SAQ mailing does not have sufficient time in the field to yield completed booklets, rendering the money spent on them less efficient.

Neither the "late" cost ratio nor the "overall" cost ratio demonstrate an ideal time lag between the first and follow-up mailing. Rather, the results indicate that timing is irrelevant from a cost perspective as long as sufficient time is allotted for productivity of first and follow-up SAQ mailings.

Combining the results from the receipt rate and cost ratio analyses, as shown in Figure 4, further demonstrates that there is not an ideal time lag that optimizes receipt rate and minimizes cost. As long as the follow-up SAQ mailing is mailed less than 17 weeks after the first mailing, there is little difference observed in terms of cost and little is lost in terms of receipt rate. Interestingly, the results indicate that while there might be practical reasons for mailing a follow-up SAQ mailing six weeks after the first SAQ mailing, as suggested by Dillman (2007), this time lag is optimal in terms of receipt rate but is not in terms of cost.

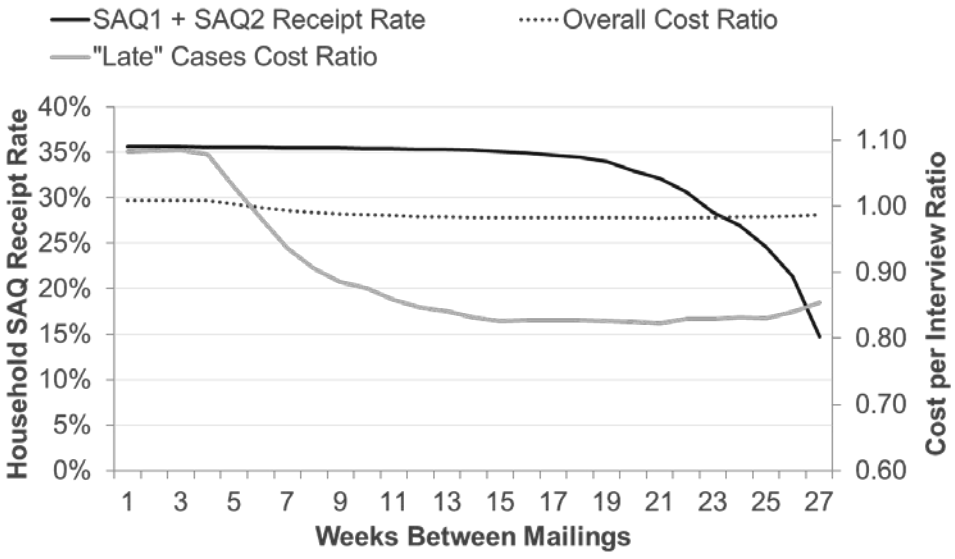

Figure 4: Receipt Rate and Cost per Interview by Lag Time

4. Discussion

We evaluated the increase in return rate achieved by sending a follow-up SAQ mailing, the cost-effectiveness of contacting non-respondents via a follow-up mailing, and the optimal time to mail a follow-up questionnaire in terms of receipt rate and cost.

A follow-up SAQ mailing six weeks after the initial mailing boosted the return rate by over 20%, which is consistent with results previously observed by Dillman (2007). This increase in return rate was achieved at approximately the same cost as releasing additional sample lines and pursuing households using REACH U.S. RFS data collection operations that would have excluded a second mailing. Despite current guidelines for the timing between follow-up contacts (Dillman, 2007), the data from our optimal timing model suggest there is no consequence to waiting longer than six weeks to contact non-respondents with a follow-up mailing. Maximum receipt rate at minimum costs can still be achieved up until about 17 weeks between the first and follow-up mailing assuming a field period of 32 weeks.

As we simulated various intervals between initial and follow-up mailings, as opposed to experimentally testing them, our findings are limited in their generalizability. We assumed that propensity to complete and return a booklet was independent of the time lag between the first and follow-up mailings as observed by Claycomb et al (2000). It is possible that the follow-up mailing served as a reminder for respondents to complete and return their initial mailing. If this is the case, sending a follow-up mailing sooner might increase the response rate for the initial mailing. Conversely, waiting to send a follow-up mailing might actually depress the response rate for the initial mailing.

In addition, it is important to note that REACH U.S. used pre-sorted standard mail for outgoing mailings and Business Reply Envelopes (BREs) for returned SAQs. As both impact the return time of a SAQ, the results of this analysis may not be comparable to studies which used differing mailing methods. Finally, the REACH U.S. RFS was conducted with minority populations in communities across the U.S. Therefore, the application of results to a general population survey may be limited.

Even with advances in technology that introduce new options for contacting respondents, mail remains an important mode of data collection. The results of this analysis uphold the effectiveness and cost-efficiency of the follow-up mailing in boosting return rate. However, they suggest that survey researchers may adhere to less stringent guidelines for timing of follow-up contacts. More research is necessary to continue to explore the optimal time to send a follow-up mailing to non-respondents in a multi-mode survey. We recommend future research that experimentally varies the time between mailings and examines the consequences in terms of receipt rate and cost.

References

Blumberg, H, Fuller, C, Hare, A. (1974). Response Rates in Postal Surveys. *Public Opinion Quarterly*, 38(1): 113-123.

Brick, JM, Williams, D, Montaquila, JM. (2011). Address-Based Sampling for Subpopulation Surveys. *Public Opinion Quarterly*, 75(3): 409-428.

Claycomb, C, Porter, S, Martin, C. (2000). Riding the Wave: Response Rates and the Effects of Time Intervals between Successive Mail Survey Follow-up Efforts. Journal of Business Research, 48: 157-162.

Dillman, D. (1972). Increasing Mail Questionnaire Response in Large Samples of the General Public. *Public Opinion Quarterly*, 41: 254-257.

Dillman, D. (1978). Mail and Telephone Surveys: The Total Design Method. New York, NY: John Wiley & Sons.

Dillman, D. (2007). Mail and Internet Surveys: The Tailored Design Method, 2nd Ed. Hoboken, NJ: John Wiley & Sons.

Foushee, K.D. & McLellan, R.W. (1990). The Effect of the Timing of Follow-Up on Response Rates to International Surveys. *International Journal of Hospitality Management*, 9:21-25.

Linsky, A. (1975). Stimulating Responses to Mailed Questionnaires: A Review. Public Opinion Quarterly, 39: 82-101.

Messer, B, Dillman, D. (2011). Surveying the General Public Over the Internet Using Address-Based Sampling and Mail Contact Procedures. *Public Opinion Quarterly*, 75 (3): 429-457.

Millar, M, Dillman, D. (2011). Improving Response to Web and Mixed-Mode Surveys. *Public Opinion Quarterly*, 75(2): 249-269.

Nichols, R, Meyer, MA. (1966). Timing Postcard Follow-ups in Mail-Questionnaire Surveys, 30(2): 306-307.

Peterson, R.A., Albaum, G., Kerin, R.A.(1989). A Note on Alternative Contact Strategies in Mail Surveys. *Journal of the Market Research Society*, 31: 409-418.