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Matching the Message to the Medium

Results from an Experiment on Internet Survey Email Contacts

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This article reports the results of an experiment that varies whether respondents are informed that they will receive a reminder email if they fail to complete an Internet questionnaire. The findings show that informing respondents about impending reminder emails effectively increases Internet survey response rates. Moreover, this method increases the representativeness of the study without negatively affecting data quality.

Keywords: *web survey; response rate; Internet; email; invitation to participate; contact*

Although there is a growing literature on Internet survey methodology, this line of inquiry has focused primarily on instrument design (e.g., Couper, Tourangeau, Conrad, & Crawford, 2004; Cooper, Tourangeau, & Kenyon, 2004; Couper, Traugott, & Lamias, 2001; Fricker, Galesic, Tourangeau, & Yan, 2005; Heerwegh & Loosveldt, 2002a, 2002b, 2003; Peytchev, Couper, McCabe, & Crawford, 2006; Smyth, Dillman, Christian, & Stern, 2006). Less research has been conducted on different methods of requesting survey participation and their effect on Internet survey response rates (Birnholtz, Horn, Finholt, & Bae, 2004; Crawford, 2004). Moreover, of the studies that assess contact methods, most examine whether conventions used in traditional mail surveys—such as using incentives and personalizing the contact letter—have similar effects in Internet surveys (e.g., Bosnjak & Tuten, 2003; Cook, Heath, & Thompson, 2000; Crawford, Couper, & Lamias, 2001; Crawford et al., 2004; Heerwegh 2005; Kaplowitz, Hadlock, & Levine, 2004; Porter & Whitcomb, 2003). As such, these studies do not consider whether contact techniques used in mail surveys should be tailored to how individuals use the Internet.

This article reports the results of an experiment that varies whether respondents are informed that they will receive a reminder email if they fail to complete the survey. Although research on Internet surveys has examined the graphical design of contact emails

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(e.g., Whitcomb & Porter, 2004), fewer works have examined the content of the message in those requests (e.g., Porter & Whitcomb, 2003; Trouteaud, 2004). The result of our experiment suggests that the reminder reference increases response rates to Internet surveys. We suggest that the reminder reference increases response rate by raising the burden—the level of psychological and/or physical effort—associated with not participating in a survey.¹ This method of increasing response rate increases the representativeness of the study without adversely affecting data quality.

Data and Method

The data used in this study come from the University of Wisconsin–Madison Transportation Survey. This survey was administered in December of 2004 by the University of Wisconsin Survey Center (UWSC) on behalf of the University of Wisconsin–Madison Department of Transportation. The study was conducted to assess the commuting practices of university students, faculty, and staff.

Respondents were contacted by email to complete a questionnaire via the Internet. The text of the email was varied to include or omit language at the beginning of the message stating that, “Your response is very important to us, so if we do not hear from you in three days, we will send you a reminder.”² Each email included a web address, login name, and password that allowed the respondent to access the questionnaire. The web address had a login and password embedded in it, allowing the respondent to reach the questionnaire by clicking a link. The login and password were provided in case the respondent’s email platform did not support hyperlinks. In total, three contact attempts were made, with 3 days between each attempt.³ The same email was used in all three attempts. Copies of the email message can be found in the appendix.

A random sample of 6,500 individuals was selected to participate from a total population of 55,283 students, faculty, and academic staff. Sample records were obtained from the University of Wisconsin–Madison Office of the Registrar. A total of 2,500 faculty and academic staff were selected to participate from a population of 14,373, and 4,000 students from a population of 40,910. In total, 3,215 students, faculty, and staff completed the survey. A total of 49 sample members were either ineligible or undeliverable, yielding an overall response rate of 49.8% (AAPOR Response Rate 1). The response rate was 41.5% for students ($n = 1,657$; 6 noncases) and 63.3% for faculty and staff ($n = 1,558$; 43 noncases). On average, the questionnaire took 12.9 minutes to complete.

Hypotheses

We expect that respondents will be more inclined to complete an Internet survey if we communicate the request to participate with as few contacts as possible. Our hypothesis is based on our understanding of how Internet users perceive the burden—the level of psychological and/or physical effort—associated with responding to a survey request via email. Costs associated with responding to a survey request, especially time, contribute to the burden of that request (Crawford et al., 2001, McCarthy, Beckler, & Qualey, 2006, Sharp &

Table 1
Response Rate by Experimental Condition and Sample Strata

Sample Stratum	Reference to Reminders		
	Not Made	Made	Difference
All respondents	46.8% ($n = 3,224$; $SD = .50$)	52.9% ($n = 3,227$; $SD = .50$)	6.1% ($t = -4.9$, $p < .01$)
University students	37.9% ($n = 1,996$; $SD = .49$)	45.1% ($n = 1,998$; $SD = .50$)	7.2% ($t = -4.6$, $p < .01$)
University faculty and academic staff	61.2% ($n = 1,228$; $SD = .49$)	65.7% ($n = 1,229$; $SD = .48$)	4.5% ($t = -2.3$, $p = .02$)

Frankel, 1983). The average Internet user receives volumes of unsolicited email every day. Therefore, we assume that if respondents are informed that they will receive additional email invitations, they will be more likely to complete the survey to minimize the time and aggravation associated with reading through additional unsolicited email.

We also anticipate that our reminder reference treatment could affect data quality. As a consequence of increasing response rates, the reminder reference technique may end up recruiting less motivated or less interested respondents to complete the questionnaire. This could lead to higher rates of nonresponse behavior, assuming that disinterested and unmotivated respondents will be less likely to fully complete the questionnaire after starting it (e.g., Groves, Singer, & Corning, 2000; Krosnick, 1991). On the other hand, recruiting respondents who would not otherwise be motivated to participate may result in a more representative study. Otherwise stated, if respondents who are more interested in the study topic are more likely to respond (Groves et al., 2000; Groves, Presser, & Dipko, 2004), our contact technique might help minimize biases created by topic saliency by recruiting individuals that are less interested in the survey topic.

Results

Response Rate

The effect of our experiment on response rate is reported in Tables 1 and 2. The top row of Table 1 presents the results for the entire population that was surveyed. These results show that informing respondents they would receive a reminder increased the overall response rate by 6.1%. The remainder of Table 1 shows the result of the reminder reference treatment for the two sample strata: students and university faculty and staff. The results suggest that the reminder reference treatment may have been more effective for students (a 7.2% increase in response rate) than nonstudents (a 4.5% increase in response rate). The statistical significance of this difference is tested in the logistic regression model presented in column 2 of Table 2. This analysis shows that the coefficient for the interaction term between being a student and receiving the reminder reference treatment is not significant. We therefore conclude that faculty and staff were equally responsive to the reminder reference manipulation as students.

Table 2
Logistic Regression Analysis of Response Rate

	Entire Study		After First Mailing	After Second Mailing
	(1)	(2)	(3)	(4)
Treatment effect				
Reminder reference used	.25*** (.05)	.19** (.08)	.17** (.08)	.19** (.08)
Sample strata effect				
Student indicator variable	—	-.95*** (.07)	-.89*** (.08)	-.92*** (.07)
Student * reminder reference	—	.10 (.11)	.13 (.11)	.10 (.11)
Constant	-.13*** (.04)	.45*** (.06)	.31*** (.06)	.18*** (.06)
Log-likelihood	-4,459.36	-4,310.73	-3,968.75	-4,267.47
Pseudo R^2	>.00	.04	.03	.03
<i>n</i> (using listwise deletion)	6,451	6,451	6,451	6,451

** $p \leq .05$. *** $p \leq .01$ (standard errors in parentheses).

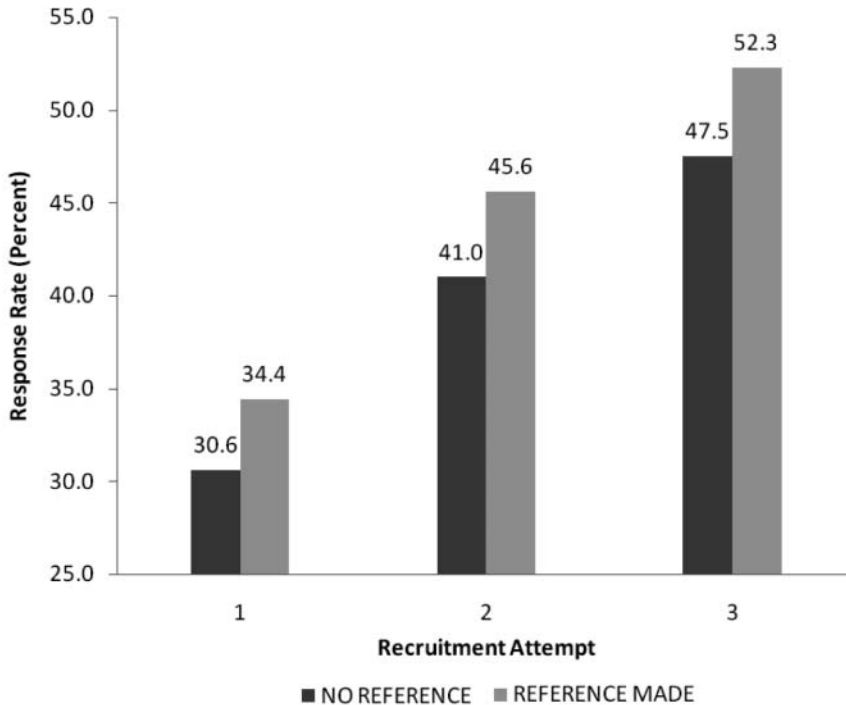
The results presented in Table 1 and in columns 1 and 2 of Table 2 show the effect of the reminder reference on the final study response rate after all three contact attempts were made. We also consider the possibility that the reminder reference had a different impact after each mailing of the contact e-mail. To test when our reminder reference method had a significant effect on response rate, columns 3 and 4 of Table 2 examine response rate over the course of the study. The results show that the reminder reference treatment has a significant impact on response rate after every contact attempt that was made. Moreover, because the student-treatment interaction term is not significant in any of the models presented in Table 2, we conclude that the effect of the treatment did not vary by sample strata at any point during the study.

A visual interpretation of these findings is presented in Figure 1. These results confirm the usefulness of multiple contacts, a standard practice in nonweb studies. After each contact, regardless of experimental condition, response rate increased. However, the increase in response rate after the third request was less than that after the second request in both experimental conditions. With regard to our experiment, the figure shows that the response rate gap between sample members that did and did not receive the reminder reference started at 3.8% after the first e-mail request, grew to 4.6 after the second request, and ended at 4.8% after the third and final request to participate was made. Again, we see that the added value of the third reminder reference treatment was less meaningful than that of the second treatment.

Respondent Characteristics and Nonresponse

As discussed in the hypothesis section, increasing response rate may affect sample representativeness and the quality of the data collected. Table 3 presents a regression analysis of a variety of respondent characteristics and nonresponse behaviors (i.e., as indicated by item nonresponse and breakoffs resulting in partial interviews). We need to account for the fact that students are younger to assess whether our treatment attracted different age groups to complete the questionnaire. The analysis therefore also accounts for whether the

Figure 1
Cumulative Response Rate by Experimental Condition and Recruitment Attempt



respondent is a student to isolate the effect of the treatments independent of the effect of being a student.

The first five columns of Table 3 present an analysis of the characteristics of the respondents who completed the survey. Columns 1 and 2 show that the distributions of age and gender were the same, regardless of whether the reminder reference treatment was used. The next three columns of the table assess whether the respondent commutes by foot (as opposed to commuting by car, bicycle, or bus) and whether the respondent parks on campus regularly. Our assumption is that campus transportation issues are not as salient to individuals that commute by foot and do not park on campus. If that is indeed the case, there is some evidence that our treatment successfully recruited respondents who were less interested in the topic of the questionnaire. The results in column 3 show that respondents who received the reminder reference treatment were 5% more likely to commute by foot during good weather, 2% more likely to commute by foot in poor weather, and 3% more likely to not park on campus regularly.⁴

The last three columns of Table 3 present an analysis of measures of nonresponse behavior. Our concern is that the reminder reference technique will increase these types of behavior as a consequence of recruiting respondents who might be less engaged with the survey topic. However, the results suggest otherwise. Columns 7 and 8 show that the reminder reference treatment had no effect on answering “don’t know” to a question, nor on only partially

Table 3
Effect of Experiments on Respondents and Nonresponse (regression estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Age	Gender (female)	Commute by Foot (good weather)	Commute by Foot (poor weather)	Does Not Regularly Park on Campus	% Items Left Blank ^a	% Don't Know Responses ^a	Partial Interview ^b
Treatment effect								
Reminder reference used	-.05 (.06)	-.08 (.07)	.38*** (.09)	.18** (.09)	.14* (.08)	-.16* (.09)	.08 (.10)	-.21 (.13)
Sample strata effect								
Student indicator variable	-4.45*** (.06)	.15** (.07)	2.77*** (.13)	2.67*** (.15)	1.86*** (.08)	-1.34*** (.09)	-.06 (.10)	.49*** (.14)
Constant	5.73*** (.06)	.15** (.06)	-3.35*** (.14)	-3.46*** (.15)	-.45*** (.06)	2.10*** (.09)	1.87*** (.09)	-2.73*** (.12)
Log-likelihood	—	-2,159.11	-1,499.37	-1,393.42	-1,958.27	-1,624.69	-1,255.10	-888.96
Pseudo/adjusted R ²	.61	< .01	.20	.17	.14	.07	< .01	.01
n (using listwise deletion)	3,141	3,140	3,451	3,439	3,419	3,215	3,215	3,451

Note: The age model in column 1 uses Ordinary Least Squares; the other models use logistic regression.

a. Among those respondents who completed the questionnaire.

b. Among those respondents who at least answered the first question in the questionnaire.

* $p \leq .10$. ** $p \leq .05$. *** $p \leq .01$ (standard errors in parentheses).

completing the questionnaire. Moreover, Column 6 shows that respondents who were exposed to the reminder reference treatment left 3% fewer items blank.

Discussion and Conclusion

Our study suggests that a reminder reference can increase Internet survey response rates without adversely affecting data quality. Although these results point us in the direction of new solutions to improving Internet survey response rates, they also lead to new research questions.

For example, a question that cannot be directly answered in this study is whether references to reminder emails actually affect the perceived burden associated with completing an Internet questionnaire. We assume that our reminder reference technique increased response rate by raising the costs associated with not completing the questionnaire. However, we did not directly measure respondent burden in this study (i.e., we were unable to perform a manipulation check). Response rate has been used in other studies as a measure of the effect of respondent burden (e.g., Crawford et al., 2001). However, we acknowledge that others have measured burden by asking respondents directly how burdensome they found the process of completing the survey to be (e.g., Sharp & Frankel, 1983). Future studies could build on our findings by conducting follow-up interviews to test more directly the proposition that references to reminders affect perceptions of burden.

In a related vein, we also acknowledge that the university environment is unique because Internet access is both free and readily available to students, faculty, and staff. Moreover, all of the participants we surveyed were heavy Internet and email users (University of Wisconsin–Madison Division of Information Technology, 2006). As such, the population examined in our study may have been unusually sensitive to the threat of receiving a reminder email. Subsequent studies should seek to replicate our findings in other contexts to see if respondents who use the Internet less frequently are still responsive to the reminder reference technique.

Finally, future studies could inform the development of new standards by using more complex versions of our experiment. For example, the position of the reminder reference in the email message could be varied. Pilot research not presented here suggests that the reminder reference could be more effective when placed at the beginning of the email message. The content of the reminder reference and timing of sending out the reminder could also be varied (e.g., is informing the respondent that they will receive a reminder in 1 day more effective than 3 days?).

Appendix

Contact Emails

This study made use of two experiments. One varied whether a reminder reference was made at the beginning of the email. The exact phrasing of the reference was, “Your response is very important to us, so if we do not hear from you in three days, we will send you a reminder.” The other experiment varied the length of the email. The results of this experiment are not reported in this article because the length of email manipulation did not have a systematic impact on response rate.

(continued)

Appendix (continued)

Condition 1: Short Email, No Reference to Reminders

Dear [NAME]:

You have been randomly selected from the UW community to participate in the Transportation Survey. Your response is very important to us.

If your email software supports hyperlinks click on this link to take the survey:

[WEB ADDRESS]

If your email software does not support hyperlinks go to this address:

[WEB ADDRESS]

You'll need to enter the following (case-sensitive) username and password:

[USERNAME]

[PASSWORD]

Thank you in advance for your help with this important study. Should you have any questions about the study, feel free to contact the Project Director, [NAME] at [EMAIL]; [PHONE NUMBER].

Condition 2: Short Email, Reference to Reminders Added

Dear [NAME]:

You have been randomly selected from the UW community to participate in the Transportation Survey. Your response is very important to us, so if we do not hear from you in three days, we will send you a reminder.

If your email software supports hyperlinks click on this link to take the survey:

[WEB ADDRESS]

If your email software does not support hyperlinks go to this address:

[WEB ADDRESS]

You'll need to enter the following (case-sensitive) username and password:

[USERNAME]

[PASSWORD]

Thank you in advance for your help with this important study. Should you have any questions about the study, feel free to contact the Project Director, [NAME] at [EMAIL]; [PHONE NUMBER].

Condition 3: Long Email, No Reference to Reminders

Dear [NAME]:

You have been randomly selected from the UW community to participate in the Transportation Survey. Your response is very important to us.

The UW Transportation Department is interested in learning about your travel habits and attitudes about the campus transportation system, including your views about possible changes to that system. Your responses will be input into the University of Wisconsin–Madison's 2005 master planning process. Since every UW community member has a unique set of experiences and opinions, it is important that YOUR voice is heard. No one else can take YOUR place!

Although participation is completely voluntary, we hope you will participate. The responses you give are entirely confidential. The UW Survey Center (UWSC) is collecting the data and will ensure that all opinions of community members are reported as aggregated data with all identifying information removed.

(continued)

Appendix (continued)

If your email software supports hyperlinks, click on this link to take the survey:

[WEB ADDRESS]

If your email software does not support hyperlinks please complete the survey using your Internet browser by going to this address:

[WEB ADDRESS]

You'll need to enter the following (case-sensitive) username and password:

[USERNAME]

[PASSWORD]

Thank you in advance for your help with this important study. Should you have any questions about the study, feel free to contact the Project Director, [NAME] at [EMAIL]; [PHONE NUMBER].

Condition 4: Long Email, Reference to Reminders Added

Dear [NAME]:

You have been randomly selected from the UW community to participate in the Transportation Survey. Your response is very important to us, so if we do not hear from you in three days, we will send you a reminder.

The UW Transportation Department is interested in learning about your travel habits and attitudes about the campus transportation system, including your views about possible changes to that system. Your responses will be input into the University of Wisconsin–Madison's 2005 master planning process. Since every UW community member has a unique set of experiences and opinions, it is important that YOUR voice is heard. No one else can take YOUR place!

Although participation is completely voluntary, we hope you will participate. The responses you give are entirely confidential. The UW Survey Center (UWSC) is collecting the data and will ensure that all opinions of community members are reported as aggregated data with all identifying information removed.

If your email software supports hyperlinks click on this link to take the survey:

[WEB ADDRESS]

If your email software does not support hyperlinks please complete the survey using your Internet browser by going to this address:

[WEB ADDRESS]

You'll need to enter the following (case-sensitive) username and password:

[USERNAME]

[PASSWORD]

Thank you in advance for your help with this important study. Should you have any questions about the study, feel free to contact the Project Director, [NAME] at [EMAIL]; [PHONE NUMBER].

Survey Questions and Variable Coding

Age

Age is an 11-point ordinal scale based on the question, "What is your age: less than 20 years old, 20 to 24 years, 25 to 29 years, 30 to 34 years, 35 to 39 years, 40 to 44 years, 45 to 49 years, 50 to 54 years, 55 to 59 years, 60 to 64 years, or 65 years or older?"

(continued)

Appendix (continued)

Gender (Female)

Gender is an indicator variable for the respondent being female based on the following question: “What is your sex: male or female?”

Commute by Foot (Good Weather)

Commuting by foot in good weather is an indicator variable based on the question, “What is your most frequent mode of traveling to the UW-Madison campus in good weather: driving alone, carpooling or driving with another passenger, motorcycle, moped, state or other van pool, bus, bicycle, walk, other, or combination of the above?” Only respondents that selected “walk” are coded as commuting by foot.

Commute by Foot (Poor Weather)

Commuting by foot in poor weather is an indicator variable based on the question, “What is your most frequent mode of traveling to the UW-Madison campus in bad weather: driving alone, carpooling or driving with another passenger, motorcycle, moped, state or other van pool, bus, bicycle, walk, other or combination of the above?” Only respondents that selected “walk” are coded as commuting by foot.

Does Not Regularly Park on Campus

Not parking on campus is an indicator variable based on the question, “Do you park on or near the UW-Madison campus three or more days per week? If you live on or near campus, please do not consider residential parking.” Respondents that answered “no” were coded as not parking on campus regularly.

Notes

1. Although we assume that these manipulations affect burden, we did not explicitly ask respondents about their perceptions of how burdensome the survey task was. Refer to the conclusion section for a more detailed discussion of this issue.

2. Other experiments were conducted in this study but are excluded from this analysis.

3. Respondents could quit the survey at any time, in which case they did not receive further emails. Respondents who partially completed the questionnaire were not sent further emails. Respondents that explicitly refused to participate, or who were found to be ineligible or undeliverable, did not receive further emails.

4. The substantive meanings of the coefficients in Table 3 were calculated using Clarify, a procedure that allows the Stata statistical computing software program to calculate the expected value of the dependent variable based on the parameters of a regression model (Tomz, Wittenberg, & King, 2003). The expected value is generated by varying the value of the variable of interest, while holding all other variables at their means. This allows us to assess the effect of a treatment for the average respondent in the sample.

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