

E-Mail Contacts

A Test of Complex Graphical Designs in Survey Research

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A web survey of high school students was used to understand how the visual design of the e-mail contact affects survey response. Respondents were contacted with one of six e-mail designs that varied by format (text vs. HTML), color of background (white vs. black), and graphical design (simple vs. complex). The results indicate that e-mails with nonwhite backgrounds and complex graphical designs can suppress response rates more than 5 percentage points.

Keywords: web surveys; e-mail contact; e-mail appearance; response rates

With their low cost, relative ease of administration, and immediate access to respondent data, surveys administered via the web can be a powerful tool for researchers. As with any type of survey administration, whether paper, telephone, in-person, or electronic, we need to know how to use web survey methods effectively to ensure quality data. Currently, we know much about how to design web surveys (e.g., Couper, 2000; Couper, Traugott, & Lamias, 2001; Crawford, Couper, & Lamias, 2001; Dillman & Bowker, 2001; Dillman, Tortora, Conradt, & Bowker, 1998; Tourangeau, Couper, & Steiger, 2001), but experimental research on methods of contact in web surveys is still limited (Porter & Whitcomb, 2003).

The purpose of this research is to understand how the visual design of the e-mail contact affects web survey response. Now that almost all e-mail software programs accept e-mail in HTML format as well as e-mail in text file format, the design possibilities are endless. Rather than being constrained to simple black text on white background, it is now possible to send e-mails with different colored backgrounds, different font types and sizes, and embedded graphics.

What is unknown, however, is whether these fancier e-mail contacts increase response rates, have no effect, or perhaps even decrease response rates. For example, Dillman and colleagues (1998) have shown that adding design features such as complex graphics and alternating background colors to a survey actually reduced the response rate by 11 percentage points.

Using a web survey of prospective college applicants, we conducted an experiment to test the effect of e-mail design on response rates in a web-based survey. In this experiment, we sought to answer three research questions. First, Is survey response different for HTML and text e-mail messages? Because HTML-based e-mails usually have longer download times than simple text e-mails, the use of HTML e-mails in a survey could result in lower response

rates—not because of cognitive design issues but simply because some respondents became frustrated at the length of time necessary to access the message.

Second, Does the background color of the e-mail affect survey response? Given the Dillman et al. (1998) findings, it seems possible that the use of nonwhite backgrounds in e-mail contacts could have the same negative impact as their use in web survey design. Dillman et al. hypothesized a lower response rate because of download time differences between their fancy survey and their plain survey. However, it may also be possible that respondents simply prefer simple designs to more complex designs. Too complex a design is a frequent criticism of web sites, with simpler designs generally viewed as aesthetically preferable.

Third, Does the inclusion of photographs and graphics in e-mail messages affect survey response? Although Dillman et al. (1998) found that the inclusion of graphics in a survey suppressed response rates, some researchers would argue that the skillful use of photographs and graphics in an e-mail contact would possibly pique the respondent's interest and, at a minimum, would result in a more professional look than a simple text e-mail. Moreover, given the extra time required to design such an e-mail message, respondents could infer that the sender spent more resources on the contact, much in the same way that a postage stamp affixed to an envelope rather than metered postage sends a message of time spent on a survey mailing. Conversely, colored backgrounds and graphic images are often used by spammers in their messages and, thus, may reduce response rates.

METHOD

The study is based on a web survey of high school students who had contacted a selective liberal arts college for information but did not apply for admission. The survey was conducted in February 2003 and asked more than 50 questions about perceptions of the college and reasons for not applying to the college. In terms of design, the survey consisted of black text on a white background, with the exception of the use of alternating white and grey bands for questions with multiple item responses.

The salience of this survey is low, as evidenced by the 15% response rate in a similar version of the survey administered 1 year previously. After 595 bad e-mail addresses were removed using a script that checks the validity of each e-mail address on the e-mail server, the remaining sample size was 6,090.

All students in the sample were sent an initial e-mail, and nonrespondents were sent up to two follow-up e-mails. The e-mail design remained constant for each experimental group, and each e-mail contained a unique URL that automatically logged the student into the survey. The overall response rate for the survey was 10.9% ($N = 663$).

To test the effects of the file format and design features incorporated into e-mail contacts, we divided the sample into six experimental groups. As seen in Table 1, two groups were sent text e-mail messages, whereas the remaining four groups were contacted using e-mails in HTML format. Within the text e-mail condition, one group received a plain text message without a header that simply began with the salutation, "Dear Student." The second group received an e-mail message with a text header at the top of the page, consisting of the sponsoring institution name between two lines:

INSTITUTION NAME

Because of the limited design capabilities of text files, all text e-mails consisted of black text on a white background.

TABLE 1
Experimental Design and Response Rates

| <i>Experimental Group</i> | <i>E-Mail File Format</i> | <i>Design Features</i> | | | <i>Response Rate (%)</i> | <i>N</i> |
|---------------------------|---------------------------|------------------------|---------------------------|--|--------------------------|----------|
| | | <i>Background</i> | <i>Header^b</i> | <i>Download Time (Seconds)^c</i> | | |
| A | Text | White ^a | None | < 1 | 10.0 | 1,015 |
| B | Text | White ^a | Simple | < 1 | 11.8 | 1,015 |
| C | HTML | White | Simple | 3 ^d | 13.6 | 1,015 |
| D | HTML | White | Complex | 13 ^d | 11.5 | 1,015 |
| E | HTML | Black | Simple | 1 | 10.2 | 1,015 |
| F | HTML | Black | Complex | 11 | 8.2 | 1,015 |
| Total | | | | | 10.9 | 6,090 |

a. White is the default background for text e-mails.

b. A simple header consisted of the name of the sponsoring university, a complex header consisted of the name of the sponsoring university as well as an image of campus and a quote from the president.

c. Download time is estimated in seconds using a 28.8K modem.

d. Download times are slightly longer for HTML files with white backgrounds because the graphic file used to insert the name of the sponsoring university in these pages was 3 KB larger than the graphic file used in the HTML files with black backgrounds.

In the four HTML e-mail groups, two aspects of the e-mail were altered: the type of header (simple or complex) and background color of the e-mail (white or black). Simple headers consisted of the institution name only, whereas complex headers directly mimicked the university homepage by including the institution's name, a campus photograph, and a quotation from the university president. Unlike the text header, which consisted of plain text, the header and quotation text used colored fonts of various sizes. Black and white were chosen as background colors for two reasons. First, using white as a background in an HTML e-mail allows a comparison with a text e-mail whose default background color is white. Second, the black background mirrored the design of the institution's homepage and seemed a natural color choice given that many of the sample members had previously viewed the institution's web site.

This experimental design allows us to make several comparisons between simple and more complex e-mail designs, between complex text and HTML-based e-mails, and between HTML e-mails with different colors and graphic elements. By comparing the two text e-mail groups, we can test the impact of more complex graphical designs in a non-HTML format, albeit a rudimentary graphical design. Comparison of the text and HTML simple header groups shows the impact using HTML versus text while employing similar graphical designs. Finally, the four HTML groups allow us to investigate the effects of background color and more complex graphical designs on survey response, and to test if the Dillman et al. (1998) findings about surveys also apply to e-mail contacts.

RESULTS

To determine whether the file format and header design of our e-mail contacts affected survey response, we conducted a series of chi-square analyses, comparing specific experimental groups. Survey response rates for the six experimental groups are presented in Table 1, with more detailed information for the four HTML groups presented in Table 2.

TABLE 2
Response Rates by HTML E-Mail Category

| <i>Background Color</i> | <i>E-Mail Header</i> | | <i>Total</i> |
|-------------------------|----------------------|----------------|--------------|
| | <i>Simple</i> | <i>Complex</i> | |
| White | 13.6 | 11.5 | 12.6 |
| Black | 10.2 | 8.2 | 9.2 |
| Total | 11.9 | 9.9 | |

Inclusion of a Header in Text E-Mails

Although the response rates for respondents receiving text e-mails with a simple header differed from those receiving a text e-mail with no header (10.0% and 11.8%, respectively), chi-square analyses revealed that this difference was not statistically significant— $\chi^2(1) = 1.83, p = .18$). Design features at the most basic level—text headers in text e-mail files—did not affect the probability of response.

Format of the E-Mail File

To test whether the file format of the e-mail message (i.e., text or HTML) affects survey response, we compared the response rates of two pairs of experimental groups. First, we compared the response rate of participants mailed an HTML message with a white background and a simple header to the response rate of participants sent a text e-mail with a header (Group C vs. Group B). Because these two e-mails appear very similar to the end recipient, this comparison tests the effect of using HTML versus text e-mail messages. Give their similarity in appearance, it is not surprising that the response rates of these two groups did not significantly differ: The response rate for the HTML e-mail with a white background and simple header was 13.6%; the response rate for the text e-mail with a header was 11.8%.

In the next test, we examined whether participants sent an HTML message with a white background and a simple header were more likely to respond to our survey than participants solicited using a plain text e-mail without a header (Group C vs. Group A). In this analysis, we are examining the cumulative effect of sending e-mail messages as HTML and the inclusion of a header. Chi-square analyses revealed that participants sent the HTML e-mail with a white background and a simple header were more likely to respond to the survey than participants mailed the bare-bones text message, with a modest difference in response rates of 3.6 percentage points— $\chi^2(1) = 6.49, p = .01$).

HTML Design Features

The results described above suggest a trend of increasing survey response as we move from plain text e-mail contacts (10.0%), to text e-mails with a header (11.8%), to HTML e-mails with a white background and simple header (13.6%). We further tested this trend by examining the impact of using simple versus complex headers, and white versus black backgrounds in HTML e-mails (Groups C, D, E, and F). Chi-square analysis demonstrated that the survey responses rates of these four groups significantly differed— $\chi^2(3) = 15.81, p = .001$.

As seen in Table 2, the use of black as the background color suppressed response rates by more than 3 percentage points. This effect holds within the simple header condition (13.6% vs. 10.2%, $\chi^2(1) = 5.77, p < .05$), within the complex header condition (11.5% vs. 8.2%, $\chi^2(1) = 6.01, p < .05$), and overall (12.6% vs. 9.2%, $\chi^2(1) = 11.74, p < .001$).

The impact of header design in HTML e-mail was smaller. The response rates of participants receiving HTML e-mails with complex headers were 2 percentage points lower than the response rates for participants receiving HTML e-mails with simple headers. This finding was only statistically significant when both background color conditions were combined (see Table 2); the overall response rate for HTML e-mails with simple headers was 11.9%, whereas the response rate for HTML e-mails with complex headers was 9.9%, $\chi^2(1) = 4.06, p < .05$.

Finally, as seen in Table 2, we can see a cumulative effect of background color and header complexity. Among the six experimental groups, the group with the highest response rate was the HTML with white background and simple header group, with 13.6%, and the group with the lowest response rate was the HTML with black background and complex header group, with 8.2%. The HTML e-mail group with the simplest design was significantly more effective in soliciting survey response than the HTML e-mail group with the most complex design, $\chi^2(1) = 14.75, p < .001$. In addition to the statistical significance of this finding, the magnitude of this effect, 5.4 percentage points, is not inconsequential.

DISCUSSION

The results presented here indicate a difference in survey response of more than 5 percentage points simply because of the design of the contact e-mails sent to respondents asking their participation in a web survey. Although this difference is modest, it should be borne in mind that this result occurred with a traditionally uncooperative population using a simple design alteration. To put this finding in perspective, Dillman et al.'s (1998) experiment altering the background of the survey itself found an 11 percentage point difference between the simple and complex experimental groups.

Interestingly, the results of the Dillman et al. (1998) research imply that experimental Group A, the simple text e-mail group, should have had the largest response rate, but the group with the largest response rate received an HTML e-mail with a white background and simple header listing the name of the institution (Group C). This indicates that perhaps some design elements in a contact e-mail may increase response rates, but that researchers must also strike a balance in design. Too much detail may result in cognitive overload; alternatively, too much detail may remind e-mail recipients of spam e-mail, which often uses bright colors and varying fonts and graphics.

One question that remains unanswered is why respondents tend to prefer simple contact and survey designs over more complex designs. Unfortunately complex designs that include graphics have longer download times in comparison to simpler designs (see Table 1). Thus, we cannot distinguish between differences due to download time and differences due to cognitive overload.

Research on the readability of web pages sheds some light on our findings that response rates were higher for groups that received e-mails with black text on white backgrounds versus white text on black backgrounds. One study testing participants' reaction time searching for a target word in a text on a computer screen found that reaction times were lower for black-on-white texts than for white-on-black texts (Hill & Scharff, 1999). Similarly, a study of reading performance on computer displays found that white-on-black text resulted in significantly poorer reading performance than black-on-white (Bangor, 1998). User prefer-

ences also tend toward darker text on light backgrounds over lighter texts on darker backgrounds (Takahashi, Yamanishi, & Sasaki, 2001).

The impact of text and background color on response rates may also result from preferences for certain design choices rather than perceptual ability. For example, respondents view black-on-white web pages as being much more “professional” than white-on-black web pages (Hall & Hanna, 2003).

Because web surveys are becoming more common, the visual design of a survey and its e-mail contacts are increasingly important, as researchers struggle for cooperation among a sea of competing surveys and spam e-mails. However, the search for design features that will allow researchers’ e-mail solicitations to stand apart from ubiquitous spam is a delicate balancing act. As spam filtering software becomes more sophisticated and widely used, the features that improve the effectiveness of e-mail solicitations for survey participation may also increase the likelihood that the incoming message is labeled as spam. For example, the e-mail filtering software package SpamAssassin assigns so-called spam points to e-mail messages that are written in HTML, contain the salutation “Dear (someone),” use various font and background colors, contain images, or contain HTML links that ask the reader to “click here.”

More important, it is not entirely clear if simple designs and black-on-white texts are the best choice in designing contact e-mails and web surveys, nor if other visual aspects of e-mails and surveys may suppress response rates. In their response time experiment, for example, Hill and Scharff (1999) found that color combinations other than black-on-white yielded the fastest response times, whereas another study found a significant effect of text width and margin width on readability (Youngman & Scharff, 1999). Clearly, survey researchers must begin to think more about visual design aspects of their surveys and how these design elements affect respondent behavior.

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