

## MIXED-MODE CONTACTS IN WEB SURVEYS PAPER IS NOT NECESSARILY BETTER

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**Abstract** This paper investigates the impact of paper and email contacts on web survey response rates. We use six combinations of paper and email prenotifications and reminders to test the impact of mixed-mode contacts. In addition, we use two survey samples that differ in their relationship with the sponsoring institution to test if the impact of contact mode is conditional on relationship between respondents and the survey researchers. Contrary to previous research, we find little differences in response rates across experimental groups.

Scholars widely recognize the need to improve web survey methodology (Couper 2000), and in the past few years there has been a tremendous increase in the number of studies on web survey administration and design. One area of growing concern has been the use of emails to contact sample members. Because spam is a ubiquitous part of the Internet, successful administration of web surveys may be affected if respondents treat legitimate survey contact emails as spam. Almost 40% of the emails sent in 2004 were spam (Kopytoff 2004), and the passage of the federal anti-spam Can Spam Act has paradoxically increased the amount of spam being sent (Zeller 2005). Whether sample members delete survey emails before opening, or treat the content of the email with skepticism, the rising tide of spam on the Internet poses a serious threat to web surveys.

One possible way to increase the efficacy of email contacts is through a mixed-mode contact approach. Instead of sending several emails to sample members, paper contacts such as prenotification letters and reminder postcards can be combined with email contacts. This mixed-mode approach could enhance response rates in several ways. First, there is strong norm among Internet users against the sending of unsolicited emails (Couper 2000; Mehta and

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Sivadas 1995). Beginning the survey process with a paper letter that alerts the recipients that they will soon be receiving an email about the survey may help avoid the appearance of unsolicited emails. Survey contact emails would be less likely to be deleted and perhaps viewed more positively, thus enhancing response rates. Second, paper contacts may increase the perceived legitimacy of the email contacts because spammers rely solely on email. Paper contacts can help distinguish legitimate research requests from spam emails with a marketing focus. Third, the use of more expensive paper contacts may help invoke the norm of reciprocity. These contacts send a signal that the survey researcher has spent significant effort and expense to contact the sample member, thus inducing the respondent to, in turn, devote time in answering the survey. In their discussion of the norm of reciprocity, for example, Groves et al. (1992, p. 481) note that “interviewers who give respondents informational letters, brochures and so on prior to asking for participation will get better compliance than those who do not . . .” Fourth, some people may not use their email on a regular basis; a paper contact may spur them to check their email and thus respond to the survey (Schaefer and Dillman 1998). Fifth, paper contacts allow the use of pre-paid incentives (Church 1993), which can be difficult to deliver electronically.

While a large number of studies in a variety of subject areas have looked at response rates for surveys conducted via paper versus the web (e.g., Cobanoglu, Warde, and Moreo 2001; Kwak and Radler 2002; Mehta and Sivadas 1995; Pealer et al. 2001; Shannon and Bradshaw 2002), fewer studies have focused on the impact of paper and email contacts on response rates in web surveys. Interestingly, the two studies to date that examine the use of a mixed-mode contact strategy with web surveys yield opposite conclusions. Schaefer and Dillman (1998) achieved higher response rates with an email prenotification compared to a paper prenotification, while Kaplowitz et al. (2004) found that paper prenotifications and reminders yielded higher response rates than email only.

These different findings may stem from differences in research design. The study by Schaefer and Dillman (1998) kept the number of contacts constant across their contact groups, but they also allowed respondents to opt out of the email survey and instead use a paper survey, thus complicating response rate comparisons across different contact mode groups. Kaplowitz et al. (2004) did not allow respondents to choose a survey option; however, the number of contacts varied by mode. For example, their paper prenotification and paper reminder group had a total of three contacts, while their email-only group was contacted once. Since the number of contacts in a survey has been shown to be positively correlated with response rates (Fox, Crask, and Kim 1988; Goyer 1982; Heberlein and Baumgartner 1978; Kittleson 1997; Yammarino, Skinner, and Childers 1991), it is not clear from the Kaplowitz et al.’s study whether the difference in mode or difference in number of contacts was responsible for higher response rates in their mixed-mode experimental groups. However, we

also note that the context of email has changed since Schaefer and Dillman conducted their study, and that this change in context may also be responsible for the different findings.

There is also the issue of the relationship between respondent and survey researcher to consider. The findings by Schaefer and Dillman (1998) and Kaplowitz et al. (2004) are conditional on the special populations they surveyed; namely, students and faculty of the universities where the researchers were employed. Previous research has shown that the relationship between the respondent and survey researcher can affect response rates. Guéguen and Jacob (2002), for example, sent survey requests from a student and a faculty member of a university, and found much higher response rates for a sample of students from that university than for a sample randomly selected from the Internet. It may be possible that the effect of paper contacts is quite different when university researchers request participation from their university population versus members of the public.

Understanding the impact of a mixed-mode contact approach in web surveys is important, because while this method may provide a way to differentiate email contacts from spam, it can also impose significant costs on a research project. Our study differs from previous research in three ways. First, we use an experimental design in which the number of contacts is constant across different contact mode groups, allowing us to distinguish between mode effects and number of contacts effects. Second, we did not give respondents the option to choose between paper and web surveys, so the survey instrument is constant across experimental groups. Third, we conducted the experiment using two different populations that differ in their relationship with the survey institution, in order to see if the impact of mixed-mode contacts varies by the relationship between respondents and survey researcher.

## Methodology

This study was conducted in the spring and fall semesters of 2004 using two different samples and web surveys. The first sample consisted of 3,000 high school students who had contacted a selective liberal arts college for information but did not apply, and the survey asked about their perceptions of the college. Given their decision not to apply, these individuals have a weak relationship with the institution; it consists of a past enquiry for information. Previous surveys of students who contacted this institution but did not apply typically yielded response rates of around 15%. While this seems low, it is in line with other web survey response rates; Tourangeau et al. (2004), for example, report response rates of 5% and 12%.

The second sample consisted of 3,000 alumni who had graduated from the institution during the past 10 years, and the survey asked them to provide information about their educational and career activities since graduation. Given their previous attendance and the fact that they had submitted email addresses to

the institution in order to maintain contact, these individuals can be considered to have a strong relationship with the institution. Previous surveys of this population typically yielded response rates around 60%.

To test whether the mode of contact used with web surveys affects response rates, we randomly divided both samples into six experimental groups using a 3 (survey prenotification)  $\times$  2 (survey reminder) design. The three levels of prenotification consisted of a letter sent via postal mail, an email prenotification message, and no prenotification contact. The two levels of follow-up contacts were a postcard reminder delivered via postal mail and an email reminder message. The content of each contact remained constant across modes; for example, the postal and email prenotification contacts were identical in content (see Appendix).

For the high school nonapplicant group, email and postal addresses were collected during the enquiry process. The college actively collects email and postal addresses from alumni. Email addresses for both groups were tested before survey administration to ensure their accuracy. Only a handful of paper mailings were returned as address not found. We note that having correct email and postal addresses for all members of the sample is not common in most web surveys, but this is an additional strength of our research design, as we can be fairly certain that the communications (both paper and email) were received by the members of the samples.

Survey administration schedules were essentially the same for both samples and are presented in Table 1. We slightly staggered the timing of the paper and email prenotifications and the paper and email reminders so that the paper versions would arrive at around the same time as the emails. This was important because previous research has shown that the timing of reminders can affect response rates in surveys (Crawford, Couper, and Lamias 2001). Participants in four of the six experimental groups received advance notification about the survey. Postal prenotification letters were mailed to two groups on day 1 of the survey administration. These prenotification letters were personalized (addressing the recipient by first name), printed on college letterhead, and mailed in envelopes bearing the college logo. On day 3 personalized prenotification email messages were sent to the remaining two experimental groups scheduled to receive survey prenotification. These emails were sent as plain text and were also personalized by addressing the recipient by their first name. The web survey was launched on day 6 when an email requesting survey participation was sent to all participants. This email was personalized and contained a hyperlink to the survey URL.

Postcard reminders were mailed to three of the six experimental groups on day 6, while nonrespondents in the remaining three groups were sent an email reminder message on day 9. Both postal and email reminders contained the survey URL, with the email URL being a clickable link within the email. Nonrespondents in all groups received two additional reminder emails on days 15 and 19.

**Table 1.** Experimental Design

Contact date: Contact type:	Prenotification		Survey notification		Reminder 1		Reminder 2		Reminder 3		Sample N	
	Day 1 Letter	Day 3 Email	Day 6 Email	Day 6 Postcard	Day 9 Email	Day 15 Email	Day 19 Email	Weak relationship	Strong relationship			
Group A	X		X	X		X	X	X	500	500		
Group B	X		X		X	X	X	X	500	500		
Group C		X	X	X		X	X	X	500	500		
Group D		X	X		X	X	X	X	500	500		
Group E			X	X		X	X	X	500	500		
Group F			X		X	X	X	X	500	500		

**Table 2.** Click-and-Response Rates by Experimental Group

Group	Experimental condition	Weak relationship (nonapplicants)		Strong relationship (alumni)	
		Click rate	Response rate	Click rate	Response rate
A	Paper prenote, paper reminder	26.2	21.4	63.0	61.6
B	Paper prenote, email reminder	20.8	16.2	64.5	62.9
C	Email prenote, paper reminder	23.2	18.2	61.6	59.2
D	Email prenote, email reminder	20.8	16.8	60.6	58.6
E	No prenote, paper reminder	19.6	14.8	61.6	60.2
F	No prenote, email reminder	19.4	15.2	58.7	55.3

As seen in Table 1, the design balanced the modes of communication employed for the prenotification and reminder contacts. In the first follow-up reminder, each mode of contact (i.e., postcard or email) was paired to each type of prenotification contact (i.e., letter, email, or no prenotification). For example, of the two groups receiving a prenotification letter, one received postcard reminders while the other received email reminders.

## Results

To test the effect of the various prenotification and reminder email strategies, we examine the rate at which individuals in the two samples clicked to the survey URL and at what rate they responded to the survey. We look at both viewing of the survey and survey response because survey response is strongly influenced by survey salience (Goyder 1982; Groves, Singer and Corning 2000; Heberlein and Baumgartner 1978). Some aspect of the email contact may encourage someone to click through to the survey, but some aspect of the survey (such as content), may cause the person to decline filling out the survey. Thus, click-through rates as well as response rates are an important measure of the effectiveness of the email contact.

Click-through and response rates (American Association for Public Opinion Research 2004; RR2) are presented for all conditions in both samples in Table 2. For the weak relationship sample, click-through rates ranged from 19.4% in the condition that did not receive survey prenotification and received an email reminder to 26.2% in the group receiving a paper prenotification letter and paper reminder. Response rates followed a similar trend, ranging from 14.8% in the no-prenotification, paper reminder condition to 21.4% in the paper prenotification, paper reminder condition. For the strong-relationship sample, the click-through rates ranged from 58.7 in the no-prenotification, email reminder condition to 64.5% in the paper prenotification, email reminder

**Table 3.** Main Effects for Click and Response Rates

Factor	Level	Click rate	Response rate
Prenotification	Postal	43.5 <sub>a</sub>	40.4 <sub>c</sub>
	Email	41.6	38.2
	None	39.7 <sub>a</sub>	36.3 <sub>c</sub>
Reminder	Postal	42.5	39.1
	Email	40.7	37.3
Relationship	Weak (nonapplicants)	21.7 <sub>b</sub>	17.1 <sub>d</sub>
	Strong (alumni)	61.7 <sub>b</sub>	59.6 <sub>d</sub>

NOTE.—For each main effect, rates marked with the same subscript reliably differ from one another ( $p < .05$ ).

condition. Response rates ranged from 55.3% in the no-prenotification, email reminder condition to 62.9% for the paper prenotification, email reminder condition.

To test the effect of prenotification contact, the reminder contacts, and participants' relationship with the sponsoring institution, a 3 (prenotification)  $\times$  2 (reminder)  $\times$  2 (relationship) ANOVA was conducted, with survey click-through rates and response rates serving as dependent measures. In the analysis using click-through rates as the dependent measure, main effects emerged for prenotification ( $F(2,5967) = 3.51, p = .03$ ) and for relationship ( $F(1,5967) = 1178.63, p < .0001$ ). Interaction effects between the relationship factor and the prenotification and reminder factors were not significant, suggesting that the modes of contact had consistent effects on survey participation across the two populations. Post-hoc comparisons (see Table 3) indicated that the main effect for prenotification resulted because the paper prenotification condition ( $M = 43.5$ ) had a higher click-through rate than the no prenotification condition ( $M = 39.7$ ). Click-through rates for the email ( $M = 41.6$ ) versus paper prenotification conditions and the email versus no-prenotification conditions did not significantly differ. The main effect for relationship was due to the higher click-to-URL rate achieved in the alumni survey than in the non-applicant survey (61.7% and 21.7%, respectively).

Results from the analysis of variance using response rates as the dependent measure were identical to results from the analysis of click-through rates; main effects emerged for prenotification ( $F(2,5967) = 4.45, p = .01$ ) and for relationship ( $F(1,5967) = 1415.28, p < .0001$ ). As in the case of the click-through rates, interaction effects were not significant when survey response served as the dependent measure. Post-hoc comparisons indicated that the paper prenotification condition ( $M = 40.4$ ) had a higher response rate than the no-prenotification condition ( $M = 36.3$ ). Response rates for the email and paper prenotification conditions, as well as the email ( $M = 38.2$ ) and no-prenotification conditions did not differ. As with click-through rates, the response rate in the alumni

survey was significantly higher than the non-applicant survey (59.6% and 17.1%, respectively).

## Discussion

The results presented here are in contrast to previous research. Controlling for the number of contacts, we found that the mode of contact in web surveys does not have a large effect on response rates, regardless of the relationship between researcher and respondent. For example, comparing the paper prenotification and reminder group with the all-email group (Groups A and D), responses rates differed for the two samples by only 4.6 and 3 percentage points. While these are positive results, they should be considered in terms of the additional cost. Using paper prenotifications and reminders instead of email cost an extra \$450 for printing and postage costs, so the slight increase in response rates cost approximately \$20 and \$30 per additional response in the weak and strong relationship samples, respectively. Clearly researchers should think carefully about the benefits before adopting a mixed-mode contact strategy for web surveys.

Why did the use of paper contacts not yield a higher response rate? Schaefer and Dillman (1998, p. 390) speculate that respondents may not “cognitively connect the paper prenotice with the electronic questionnaire.” In other words, respondents may not make the connection between a paper prenotification viewed on one day and an email about a survey viewed the following day. If true, then future use of mixed-mode contacts in web surveys appears futile, as the lack of a cognitive connection will be difficult to overcome.

Another possibility is the sponsorship of the survey and the sender’s email. Previous research has shown that academic and government researchers achieve higher response rates in their surveys compared with other researchers (Fox, Crask and Kim 1988; Goyder 1982; Heberlein and Baumgartner 1978). In this experiment, all emails were sent from an email address ending in “college name.edu.” The “.edu” email suffix is limited to educational institutions only, and thus serves as a strong signal of academic involvement. Given that one reason paper contacts may increase web survey response rates is that they increase the legitimacy of later email contacts, sending emails from an academic institution may already heighten legitimacy, thus reducing the impact of paper contacts. If true, this yields two recommendations for researchers. First, when administering a survey through an academic institution, be sure to use an email address ending in “.edu.” Second, when administering a survey in a commercial context, the use of a mixed-mode contact strategy may yield larger benefits than seen here.

Finally, we note that it is difficult to reach definitive conclusions about survey practices on the basis of only one study. However, we have not examined whether there are nonresponse biases associated with the small response rate differences identified. From this perspective, the jury is still out as to



whether paper contacts can increase web survey response rates and reduce overall survey error.

## Appendix

### WEAK RELATIONSHIP

#### *Email prenotification*

Dear [first name]:

As part of your college search, you were sent information about Wesleyan University. Now, we're collecting feedback from a select group of college-bound students and you have been chosen as someone from whom we'd like to hear. In the next few days you'll be receiving an email asking you to take part in a brief online survey. This survey will ask about your impressions of various aspects of Wesleyan, such as academics and student life.

When you receive my email, I hope that you will take a few minutes to complete this survey and let us know what you think about Wesleyan. Your input is extremely valuable to our efforts.

Thanks in advance for your help.

Best regards,

Stephen Porter, Ph.D.  
Director of Institutional Research

#### *Postal prenotification*

Dear [first name]:

As part of your college search, you were sent information about Wesleyan University. Now, we're collecting feedback from a select group of college-bound students and you have been chosen as someone from whom we'd like to hear. In the next few days you'll be receiving an email asking you to take part in a brief online survey. This survey will ask about your impressions of various aspects of Wesleyan, such as academics and student life.

When you receive my email, I hope that you will take a few minutes to complete this survey and let us know what you think about Wesleyan. Your input is extremely valuable to our efforts.

Thanks in advance for your help.

Best regards,

Stephen Porter, Ph.D.  
Director of Institutional Research

## WEAK RELATIONSHIP

*Email reminder*

Dear [first name],

A few days ago, I sent an email asking you to take part in an online survey about your impressions of Wesleyan University. My records indicate that as of today, you have not yet completed this survey. I hope you'll please do so at your earliest convenience. As one of a small group of students selected to provide feedback about our school, your input is very valuable to us.

To access the survey, please visit following the website:

[survey URL]

Thanks again,

Stephen Porter, Ph.D.  
Director of Institutional Research

*Postal reminder*

Dear [first name],

A few days ago, I sent an email asking you to take part in an online survey about your impressions of Wesleyan University. If you've already completed this survey, thanks for your help. If you haven't, I hope you'll please do so at your earliest convenience. As one of a small group of students selected to provide feedback about our school, your input is very valuable to us.

To access the survey, please visit following the website:

[survey URL]

Thanks again,

Stephen Porter, Ph.D.  
Director of Institutional Research

## STRONG RELATIONSHIP

*Email prenotification*

Dear [first name]:

Wesleyan would like to learn more about the educational and career backgrounds of our alumni, and you have been randomly chosen as part of a small group of alumni from whom we'd like to hear. In the next few days you will be receiving an email asking you to take part in a brief online survey. This survey will ask about your current activities and your education since leaving Wesleyan.

When you receive my email, I hope that you will take a few minutes to complete this survey. Your input is extremely valuable to our efforts.

Thanks in advance for your help.

Best regards,

Stephen Porter, Ph.D.  
Director of Institutional Research

*Postal prenotification*

Dear [first name]:

Wesleyan would like to learn more about the educational and career backgrounds of our alumni, and you have been randomly chosen as part of a small group of alumni from whom we'd like to hear. In the next few days you will be receiving an email asking you to take part in a brief online survey. This survey will ask about your current activities and your education since leaving Wesleyan.

When you receive my email, I hope that you will take a few minutes to complete this survey. Your input is extremely valuable to our efforts.

Thanks in advance for your help.

Best regards,

Stephen Porter, Ph.D.  
Director of Institutional Research

STRONG RELATIONSHIP

*Email reminder*

Dear [first name],

A few days ago I sent an email asking you to take part in an online survey about your educational and career activities since leaving Wesleyan. My records indicate that as of today, you have not yet completed this survey. I hope you'll please do so at your earliest convenience. As one of a small group of alumni selected to take part in this survey, your input is very valuable to us.

To access the survey, please visit following the website:

[survey URL]

When you click on the above link, you will automatically be logged in to the survey.

Thanks again,

Stephen Porter, Ph.D.  
Director of Institutional Research

*Postal reminder*

Dear [first name],

A few days ago, I sent you an email asking you to take part in an online survey about your employment and education since leaving Wesleyan. If you've already completed this survey, thanks for your help. If you haven't, I hope you'll please do so at your earliest convenience. As one of a small group of alumni randomly selected to provide information, your input is very valuable to us.

To access the survey, please visit following the website:

[survey URL]

Thanks again,

Stephen Porter, Ph.D.  
Director of Institutional Research

## SURVEY EMAIL

*Strong relationship*

Dear [first name]:

As part of our ongoing efforts to learn more about the educational and career activities our of alumni, we have developed the following short online survey. You have been randomly chosen as part of a small group of alumni from whom we'd like to hear.

[survey URL]

When you click on the above link, you will be logged on to the survey. The survey will take about five minutes to complete and your participation is strictly voluntary. If you should encounter any problems with the survey or have any questions, please contact me at [sreporter@wesleyan.edu](mailto:sreporter@wesleyan.edu) or call me at (860) 685-2530.

Thank you for your help.

Sincerely,

Stephen Porter, Ph.D.  
Director of Institutional Research

*Weak relationship*

Dear [first name]:

Some time ago, you requested information from the Admission Office at Wesleyan University. In order to understand how students who inquired about Wesleyan view our school, we have developed the following short online

survey. You are one of a small group of students who have been selected to provide feedback about our institution:

[survey URL]

When you click on the above link, you will be taken to a copy of the survey. The survey should take less than ten minutes to complete. Your responses will be completely confidential and your participation is strictly voluntary. The website will be closed at midnight on Monday, March 1st.

Every effort has been made to make sure that you have not received this e-mail in error. If you believe that you should not have received this survey, or if for some reason you do not wish to participate in the survey, please notify me by replying to this email.

Thank you very much for your cooperation.

Sincerely,

Stephen Porter, Ph.D.

Director of Institutional Research

## References

- American Association for Public Opinion Research. 2004. "Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys". Lenexa, KS.
- Church, A.H. 1993. "Estimating the effect of incentives on mail survey response rates: a meta-analysis". *Public Opinion Quarterly* 57:62–7.
- Cobanoglu, Cihan, Bill Warde, and Patrick J. Moreo. 2001. "A comparison of mail, fax and web-based survey methods". *International Journal of Market Research* 43(4):441–52.
- Couper, Mick P. 2000. "Web surveys: A review of issues and approaches". *Public Opinion Quarterly* 64:464–94.
- Crawford, Scott D., Mick P. Couper, and Mark J. Lamias. 2001. "Web surveys: perceptions of burden". *Social Science Computer Review* 19(2):146–62.
- Fox, Richard J., Melvin R. Crask, and Jonghoon Kim. 1988. "Mail survey response rate: A meta-analysis of selected techniques for inducing response". *Public Opinion Quarterly* 52(4):467–91.
- Goyder, John C. 1982. "Further evidence on factors affecting response rates to mailed questionnaires". *American Sociological Review* 47(4):550–53.
- Groves, Robert M., Robert B. Cialdini, and Mick P. Couper. 1992. "Understanding the decision to participate in a survey". *Public Opinion Quarterly* 56:475–95.
- Groves, Robert M., Eleanor Singer, and Amy Corning. 2000. "Leverage-saliency theory of survey participation". *Public Opinion Quarterly* 64:299–308.
- Guéguen, Nicolas, and Céline Jacob. 2002. "Solicitation by e-mail and solicitor's status: A field study of social influence on the web". *CyberPsychology and Behavior* 5(4):377–83.
- Heberlein, Thomas A., and Robert Baumgartner. 1978. "Factors affecting response rates to mailed questionnaires: A quantitative analysis of the published literature". *American Sociological Review* 43(4):447–62.
- Kaplowitz, M. D., T. D. Hadlock, and R. Levine. 2004. "A comparison of web and mail survey response rates". *Public Opinion Quarterly* 68(1):94–101.

- Kittleson, Mark J. 1997. "Determining effective follow-up of e-mail surveys". *American Journal of Health Behavior* 21(3):193–96.
- Kopytoff, Verne. 2004. "Spam mushrooms: Despite a new federal law, the barrage of junk email continues to grow, and experts don't foresee much relief". *San Francisco Chronicle*, September 2, C1.
- Kwak, Nojin, and Barry Radler. 2002. "A comparison between mail and web surveys: Response pattern, respondent profile, and data quality". *Journal of Official Statistics* 18(2):257–73.
- Mehta, Raj, and Eugene Sivadas. 1995. "Comparing response rates and response content in mail versus electronic mail surveys". *Journal of the Market Research Society* 37(4):429–39.
- Pealer, Lisa N., Robert M. Weiler, R. Morgan Pigg Jr., David Miller, and Steve M. Dorman. 2001. "The feasibility of a web-based surveillance system to collect health risk data from college students". *Health Education & Behavior* 28(5):547–59.
- Schaefer, David R., and Don A. Dillman. 1998. "Development of a standard e-mail methodology: Results of an experiment". *Public Opinion Quarterly* 62(3):378–97.
- Shannon, David M., and Carol C. Bradshaw. 2002. "A comparison of response rate, response time, and costs of mail and electronic surveys". *Journal of Experimental Education* 70(2):179–92.
- Tourangeau, Roger, Mick P. Couper, and Frederick Conrad. 2004. "Spacing, position, and order: Interpretive heuristics for visual features of survey questions". *Public Opinion Quarterly* 68(3):368–93.
- Yammarino, Francis J., Steven J. Skinner, and Terry L. Childers. 1991. "Understanding mail survey response behavior: A meta-analysis". *Public Opinion Quarterly* 55(4):613–39.
- Zeller, Tom. 2005. "Law barring junk e-mail allows a flood instead". *New York Times*, February 1, 1.