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THE INFLUENCE OF ADVANCE LETTERS ON RESPONSE IN TELEPHONE SURVEYS
A META-ANALYSIS

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Abstract Recently, the leading position of telephone surveys as the major mode of data collection has been challenged. Telephone surveys suffer from a growing nonresponse, partly due to the general nonresponse trend for all surveys and partly due to changes in society and technology influencing contactability and willingness to answer. One way to counteract the increasing nonresponse is the use of an advance letter. In mail and face-to-face surveys, advance letters have been proven effective. Based on the proven effectiveness in face-to-face and mail surveys, survey handbooks advise the use of advance letters in telephone surveys. This study reviews the evidence for this advice and presents a quantitative summary of empirical studies on the effectiveness of advance letters in raising the response rate for telephone surveys. The major conclusion is that advance letters are also an effective tool in telephone surveys, with an average increase in response rate (RR1) from 58 percent (no letter) to 66 percent (advance letter), and an average increase in cooperation rate (COOP1) from 64 percent (no letter) to 75 percent (advance letter).

Telephone surveys have become more and more popular in the last 30 years, reaching their zenith in the 1990s. At the end of the twentieth century, telephone interviews were the major mode of data collection for surveys of households, individuals, and establishments in North America, Canada, Australia, and parts

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of Western Europe (Nathan 2001). Recently, the leading position of telephone surveys has been challenged. Telephone surveys suffer from an increasing nonresponse (Massey, O'Connor, and Krotki 1997; Steeh et al. 2001), partly due to the general nonresponse trends (De Leeuw and de Heer 2002) and partly due to changes in communication technology influencing the contactability by phone (Dillman 2002).

Past research on reducing nonresponse in telephone surveys has focused on both interviewer-dependent and interviewer-independent measures. Interviewer vocal characteristics (Oksenberg and Cannell 1988; Groves et al. 2006), interviewer tactics and persuasion strategies (Hox, De Leeuw, and Snijkers 1998; Pondman 1998; Dijkstra and Smith 2002; De Leeuw and Hox 2004), and interviewer training (Groves and McGonagle 2001) all influence the response in telephone surveys and can be used to raise response rates. An interviewer-independent measure that has been successful in raising response is the use of incentives; for an overview, see Singer (2002) and Cantor, O'Hare, and O'Connor (2006). Less clear is the evidence regarding advance letters.

Meta-analysis has shown that increasing the number of contacts has been very effective in raising response rates in mail surveys, with advance letters as effective as an additional full contact (Heberlein and Baumgartner 1978; Heberlein and Baumgartner 1981; Dillman 2000). Advance letters are also used in face-to-face surveys, and many large statistical agencies use advance letters as a standard procedure in their major surveys (Luppes 1995; Groves and Couper 1998; White et al. 1998). One reason is that interviewers value an advance letter; they gain professional confidence from it (Groves and Snowden 1987) and feel that it helps them to dispel initial suspicion (Collins et al. 1988) and eliminate the surprise of an unexpected cold call (Dillman, Gallegos, and Frey 1976). Advance letters or prenotification e-mails are strongly advised for web surveys as well (Dillman 2000).

Advance letters underscore the legitimacy of a survey, take away suspicion, communicate the value of the survey, and evoke the principles of social exchange and reciprocation, thereby positively influencing response. Based on theoretical considerations (Dillman 1978; Goyder 1987; Groves and Couper 1998), advance letters should be an effective tool to increase response in telephone surveys as well, and their usage is suggested by telephone survey handbooks (e.g., Dillman 1978; Frey 1989; Lavrakas 1993; Fielder and Bouque 2002). However, an advance letter could also produce a negative effect in telephone surveys. It gives a clear forewarning of a survey and enables people to make their decision and prepare their response before they are contacted (Collins et al. 1988). This, in combination with the shorter time available and the fewer means and opportunities for interviewers in telephone surveys to persuade reluctant respondents (De Leeuw and Hox 2004), could make advance letters less successful in telephone surveys. These considerations have led to a number of empirical investigations into the effectiveness of advance letters specifically for telephone surveys.

In this study, we integrate all available evidence and present a quantitative summary of empirical studies on the effectiveness of advance letters in raising the response in telephone surveys.

Methods

ON META-ANALYSIS

Meta-analysis or quantitative synthesis is a set of methods for the systematic combination of information from different sources. Meta-analysis provides a statistical summary of what is common, and analyzes what is different. It provides researchers with a quantifiable summary, which may be used to evaluate past research, and in addition, can help in identifying gaps in the knowledge found in the published literature (Selden 1992; Lipsey and Wilson 2001). Therefore, meta-analysis is both an effective tool to summarize what is known about the effectiveness of advance letters on response in telephone surveys and to suggest future research in this field.

In a meta-analysis, quantitative study outcomes from known research on a particular, well-defined question, here "the effectiveness of advance letters in telephone surveys," are statistically combined. In general, an effect size measure is coded for the dependent variable *study–outcome*. Furthermore, background variables such as year of publication and source of publication are routinely coded, just as age and sex are routinely asked in a survey. Also, several research design characteristics of each study are coded (e.g., sampling method, type of subjects). This coding process results in a data matrix in which the cases (or rows) are the research studies of interest for the meta-analysis. Statistical procedures can then be used. In other words, the basic idea is to apply statistical methods, with the published statistics from previous studies as the data (De Leeuw and Hox 2003).

RETRIEVAL AND SELECTION OF STUDIES

An attempt was made to identify and retrieve the entire population of empirical studies on the effectiveness of advance letters in telephone surveys, including both published and unpublished studies. The following sources were used to identify potentially eligible research reports.

First, we targeted specialized sources and systematically searched the online proceedings of the Survey Methods Section of the American Statistical Association (AMSTAT) 1978–2000 (including the proceedings of the American Association for Public Opinion Research (AAPOR) conferences) at www.amstat.org. As the most recent conference proceedings are not online, we also searched the published AMSTAT conference CD-ROMs of the years 2001–2004. In

addition, we searched both *Public Opinion Quarterly* and the *Journal of Official Statistics* (JOS)-online, and our archives of the international workshop of household survey nonresponse. Finally, the bibliography on telephone survey methodology by Khursid, Anwer, and Sahai (1995) was investigated.

In the second step, we performed a systematic computer search using the international silver platter system of the library of Utrecht University. This included the bibliographical databases of ERIC (Educational Resources Information Center), JSTOR (Journal Storage Archive), PsychINFO, PUBMED (including MEDLINE and PreMedline), Sociological Abstracts, and SSCI (Social Sciences Citation Index).

Third, to acquire as many unpublished papers and reports as possible, we used the electronic survey methodology network. An appeal for help was sent to the list-servers of AAPOR, the World Association for Public Opinion Research (WAPOR), the Survey Research Methodology Section of the AMSTAT (SMRS), and the Research Committee on Logic and Methodology of the International Sociological Association (RC33-BMS). In addition, the data bases of EAGLE (European Association for Grey Literature Exploitation), SIGLE (System of Information for Grey Literature Europe), and the UK center for evidence-based policy and practice (ESRC) were searched for "gray literature." This term refers to papers, reports, technical notes, or other documents produced and published by governmental agencies, academic institutions, and other groups that are not distributed or indexed by commercial publishers. Finally, the bibliographies of retrieved studies were examined for related studies.

The following keywords were used, both singly and in combination: telephone survey, telephone interview(s), advance letter(s), prenotification(s), lead letter, response, response rate(s), contactability, refusal(s). The inclusion criterion was that the study should report the results of a (quasi-) experimental study on the effect of an advance letter on the response in a telephone survey.

The search located 28 publications. In one publication, the experimental treatment "advance letter" was completely confounded with another variable, making it impossible to estimate the effect of the advance letter (i.e., an incentive was sent together with all advance letters, making it impossible to separate the individual effect of advance letter and incentive). A second publication was concerned with monthly Touchtone Data Entry (TDE) reporting of employment and productivity of establishments, instead of a telephone survey. Both publications were excluded from the meta-analysis, resulting in 26 publications eligible for analysis.

One study was reported in two separate publications, and the results of these two publications were combined into one case for the meta-analysis. Some publications reported two independent studies in the same publication; these were coded as separate cases. The net result was that *29 independent studies* on the influence of advance letters on the response in telephone surveys were available for coding. The majority (23) had only one experimental condition (i.e., tested the effect of one advance letter), but several studies investigated more

than one experimental condition. Two studies investigated the effect of two different forms of advance letters, three studies used three different versions of advance letters in the experiment, and one study investigated four different types of advance letters. In sum, the 29 independent studies incorporated 40 experimental conditions with a combined sample size of approximately 64,155 respondents.

Of the 29 independent studies, 12 were published in scientific journals, 3 were book chapters, 7 were published in conference proceedings, 2 were unpublished papers, and 5 were "gray" literature. The oldest publication was published in 1976, the most recent one dated 2005. Twenty-one experiments were performed in the USA, four in Europe, and four in Australia. The majority of the studies (17) were done at universities, eight by government agencies (e.g., department of health), two by national statistical agencies (e.g., census bureau), and two had a market research origin. A variety of topics were covered with health issues the most prominent. For a complete bibliography of publications incorporated in this meta-analysis, see Appendix A.

Only nine of the studies include the text of the advance letters used. We contacted the original authors of the other studies, asking them for the original text of the advance letters. This resulted in the full texts for an additional 12 studies, bringing the total number of *conditions* for which the text of the prenotification is available to 29.

Coding and Analysis

A detailed coding schedule was developed based on the schedule used by De Leeuw (De Leeuw and Van der Zouwen 1988; De Leeuw 1992) and the schedule used by Lensvelt-Mulders et al. (2005). Three categories of information were coded: (1) effect size information, (2) study descriptors, and (3) specific information on the advance letters used (see Appendix B). All eligible studies were coded by two independent coders using a detailed coding schedule. A third reviewer checked all codings for consistency. The independent codings only showed trivial differences, which were reconciled by discussing the original article and codings with the coders and the reviewer.

CODING OF EFFECT SIZE INFORMATION

The main outcome variable in the studies is the response rate. Response rates can be defined in different ways. In this meta-analysis, we used both the *cooperation rate* and the *response rate*. The cooperation rate is defined as the proportion interviewed of all eligible cases contacted. The response rate is defined as the proportion interviewed of all interviews plus the number of noninterviews (refusals, noncontact, others) plus all cases of unknown eligibility. These definitions correspond to the standard definitions COOP1 and RR1 of the

AAPOR (2006).[1] The majority of the studies reported these outcomes, some presented tables of final response dispositions from which these response rates could be calculated.

Most studies reported the number of cases on which these rates were based or information from which these could be inferred; some studies reported only the overall sample size, in which case the assumption was made that all conditions in the experiment had the same sample size. In the end, it was possible to code the cooperation rate for 25 studies, and the response rate for 24 studies. Only 11 studies provided sufficient information to calculate the contact rate. Since the effect of an advance letter occurs only after contact has been made, the contact rate is not used in our analysis.

The outcome variables cooperation rate and response rate are proportions. For our meta-analysis, these must be encoded in an effect size variable that is approximately normally distributed with a known sampling variance (based on the sample size). The appropriate effect size for comparing proportions between an experimental group and a control group is the logged odds ratio (Lipsey and Wilson 2001, p. 53) defined as

$$\text{LOR} = \log\left(\frac{p_{\text{Eresp}}/p_{\text{Enonresp}}}{p_{\text{Cresp}}/p_{\text{Cnonresp}}}\right),$$

with E denoting the experimental condition and C the control condition. The sampling variance for the logged odds ratio is (Lipsey and Wilson 2001, p. 54)

$$S^2_{\text{LOR}} = \frac{1}{N_{\text{Eresp}}} + \frac{1}{N_{\text{Enonresp}}} + \frac{1}{N_{\text{Cresp}}} + \frac{1}{N_{\text{Cnonresp}}}.$$

We present the results of our meta-analysis on the odds-ratio scale. For interpretation, some of the analysis outcomes are also back-transformed to standard response rates (proportions).

CODING OF STUDY DESCRIPTORS

To be able to examine the relationships between effect sizes and study characteristics, a range of study descriptors were coded (cf. Mann 2005b). These

1. AAPOR (2006) standard definitions:
COOP1 is the minimum cooperation rate: the number of completed interviews divided by the number of interviews (complete and partial) plus the number of noninterviews that involve the identification of and contact with an eligible respondent (refusal and break-off plus other). COOP1 = I/(I + P) + R + O.
RR1 is the minimum response rate: the number of completed interviews divided by the number of interviews (complete plus partial) plus the number of noninterviews (refusals and break-off plus noncontacts plus others) plus all cases of unknown eligibility. RR1 = I/(I + P) + (R + NC) + (UH + UO).

included *sampling characteristics* (e.g., type of population, sampling frame), *method/design characteristics* (e.g., experimental design, time between advance letter and telephone call, duration of interview, contact attempts, refusal conversion, and interviewer quality), and *survey characteristics* (e.g., topic saliency and sensitivity, type of data). Also included were *background* variables relating to the context of the research report (e.g., publication type (reviewed or not), year and country of publication).

CODING OF ADVANCE LETTER DESCRIPTORS

Sending *any* advance letter will decrease the amount of surprise from an unexpected call and provide legitimacy and as such be effective (Link 2004). But some letters appear to be more effective than others and researcher search for the most effective arguments to employ (e.g., Luppes 1995; Australian Bureau of Statistics 2002; Link 2004). To help identify the characteristics of the most effective prenotification letter, specific information on the nature of the advance letters was coded. *Content* characteristics were comprehensively coded; the descriptors used were based on advice for content letters as published by Dillman (1978), Luppes (1995), and White, Martin, Bennett, and Freeth (1998). Among the characteristics coded were if the research agency and a contact for information were mentioned, if the goal and usefulness of the study was mentioned, if sampling procedures were explained, if a confidentiality statement was given, and if an explicit thank you was offered. In addition, it was coded if, in the text of the content letter, arguments were used derived from social psychological theory on compliance (see Cialdini 1984; Groves, Cialdini, and Couper 1992), and on social exchange (see Dillman 1978, 2000). These *compliance arguments* included use of authority (e.g., requests from proper authority such as government), scarcity (e.g., emphasis on rare opportunity to get your voice heard), social validation (e.g., others similar to you also participate), altruism (you will really help), and reciprocation/social exchange (e.g., immaterial thank you or promise of results, explicit incentive).

ANALYSIS

The data set includes 29 independent studies with 40 experimental conditions. These data can be viewed as two-level data with conditions nested within studies. However, preliminary analyses using multilevel meta-analysis (Hox 2002; Raudenbush and Bryk 2002; Hox and De Leeuw 2003) showed that the sample size of about 1.4 conditions per study is too small to separate study-level and condition-level variance. As a consequence, the data were analyzed using standard meta-analysis procedures (Lipsey and Wilson 2001) with conditions as the unit of analysis (a reanalysis with studies as the unit of analysis produced

the same results). Since all analyses showed large and significant variability between outcomes, the analyses reported below are based on random effects weighted multiple regression using maximum likelihood estimation or REML (Hox and De Leeuw 2003).

Results

GENERAL CHARACTERISTICS OF STUDIES

The search of the literature yielded 29 eligible empirical studies. Table 1 summarizes the characteristics of these studies. The majority of the advance letter experiments were implemented in surveys of the general population, using random sampling procedures. In most of the cases, the questions were about the respondent, and only in a small number of cases, questions were asked about others, such as household members. What is striking is the lack of information in some of the publications. In only 9 out of 29 studies, the text of the advance letter was included in the publication, which gives a missing data rate of 69 percent. In a special attempt, we were able to retrieve the texts of advance letters in an additional 12 studies, reducing the missing information to 28 percent. Some of these studies used more than one experimental condition; as a result, the number of available advance letters is 29. In three studies, important background characteristics, such as target and topic of the survey, were not mentioned. One study could be clearly identified as an outlier, and was therefore removed.[2]

MEAN EFFECT ADVANCE LETTER

Sending an advance letter does have a positive effect on both response rate and cooperation rate. The odds ratio for cooperating is 1.62 larger in the advance letter condition than in the control condition ($p < 0.001$, 95 percent CI is 1.47–1.78), and the odds ratio for the response rate is 1.37 larger in the experimental condition ($p < 0.001$, 95 percent CI is 1.28–1.46). The small p-values and the

2. This condition shows a large negative effect of the advance letter. It concerns a study of the French ASCF Group 1992, in which two types of advance letter were used: a standard advance letter and a modified advance letter. The paper is about a national survey of the French National Health Institute (INSERM) into health and sexual behavior. The standard advance letter just mentioned that it concerned a large health survey, and stressed the importance of the study, but also stated that one had the option not to answer and gave a strict anonymity assurance. The French ethical commission CNIL requested that the respondents were clearly informed that the survey was on sexual behavior and Aids. The modified advance letter stating this explicitly and at length had a large negative effect on the response rate, while the standard advance letter had the expected positive effect. Since an outlier can bias results, especially of multivariate analyses (Tabachnick, Barbara, and Fidell 2001), we decided to exclude this outlier from the analysis. Removal of this outlier, in fact, did not greatly change the results discussed below.

Table 1. General Characteristics of the 29 Studies Included in the Meta-Analysis

	N_{tot}[a] (percent)	N (percent)
Sampling characteristics		
Population	29 (100)	
General		20 (69)
Special		9 (31)
Sampling frame	29 (100)	
RDD		8 (28)
Telephone book		9 (31)
National lists		6 (21)
Lists from organizations		5 (17)
Panel		1 (3)
Sampling procedure	29 (100)	
Random		29 (100)
Nonrandom		0 (0)
Survey and design characteristics		
Assignment to conditions	29 (100)	
Random		27 (93)
Nonrandom		2 (7)
Text letter in publication	29 (100)	
Yes		9 (31)
No		20 (69)
Time between letter and interview	12 (100)	
Less than 4 days		5 (42)
Between 5 and 7 days		3 (25)
More than a week		4 (33)
Maximum # of contact attempts	15 (100)	
Minimum		2
Maximum		24
Average # of contact attempts needed	4 (100)	
Minimum		2.5
Maximum		7.6
Refusal conversion used	16 (100)	
Yes		7 (44)
No		9 (56)
Duration interview	17 (100)	
Short (<5 minutes)		2 (12)
Medium		14 (82)
Long (>30 minutes)		1 (6)
Interviewer quality	24 (100)	
Experienced		17 (71)
Specially trained for occasion		7 (29)
Topic saliency	26 (100)	
Nonsalient		2 (8)

Continued

Table 1. Continued

	N_{tot}[a] (percent)	N (percent)
Neutral		8 (31)
Salient		15 (58)
Very salient		1 (4)
Topic sensitivity	26 (100)	
Not sensitive		11 (42)
Somewhat		9 (35)
Sensitive		5 (19)
Definitely very sensitive		1 (4)
Target questionnaire	26 (100)	
Self		22 (85)
Household/family		4 (15)

[a]N_{tot} indicates the number of codable cases (i.e., information provided in publication).

confidence intervals (CI) indicate that both odds ratios are significantly larger than one. Thus, the results clearly indicate that sending an advance letter helps. This effect is larger for the cooperation rate than for the response rate. This makes excellent sense. The cooperation rate reflects the willingness of people to respond *after* being contacted, and is a pure measure of the success of the advance letter. The response rate is an overall practical index, reflecting both the success in contacting persons, which cannot be influenced by an advance letter, and the success in convincing persons, which can be influenced.

We will discuss design characteristics and a moderator analysis in a subsequent section. However, one design characteristic is very relevant for using advance letters in a telephone survey, and this is whether the survey employs a sample based on random digit dialing (RDD) or a list-based sample. In RDD sampling, addresses are not available and must be obtained using a matching procedure. Advance letters can only be sent to that part of the RDD sample for which an address can be obtained. The effectiveness of an advance letter is expected to be much lower in an RDD than in a list-based survey. When the data are summarized separately for RDD and list-based designs, we find that this is indeed the case. In RDD studies, the odds ratio for cooperating is 1.27 larger in the advance letter condition than in the control condition ($p < 0.001$, 95 percent CI is 1.16–1.39), and the odds ratio for the response rate is 1.23 larger in the experimental condition ($p < 0.001$, 95 percent CI is 1.14–1.33). In list-based studies, the odds ratio for cooperating is 1.87 larger in the advance letter condition than in the control condition ($p < 0.001$, 95 percent CI is 1.65–2.13), and the odds ratio for the response rate is 1.48 larger in the experimental condition ($p < 0.001$, 95 percent CI is 1.35–1.63).

Table 2 presents the increase in cooperation and response rates for the total sample and for RDD and list surveys separately as proportions, which facilitates

Table 2. Average Cooperation and Response Rates for RDD- and List-Based Samples

	Outcome			
	COOP1		RR1	
Sample	No letter	Advance letter	No letter	Advance letter
RDD sample	0.58	0.63	0.47	0.51
LIST sample	0.68	0.81	0.62	0.71
Total	0.64	0.75	0.58	0.66

interpretation and comparison. The results clearly indicate that sending an advance letter helps in both RDD and list surveys, but that the effect is much larger in list-based surveys, where, in principle, all sample members can be reached by mail. We will come back to the issue if RDD and the problem of finding matching addresses in the discussion.

VARIABILITY IN RESULTS

The meta-analysis of the effect sizes showed that the results are not homogeneous, meaning that the observed variability of the effect size estimates is much larger than expected from sampling error alone. For the response rate, the chi-square of the homogeneity test is 69.6 ($df = 28$, $p = 0.00$), and for the cooperation rate, the chi-square is 168.8 ($df = 34$, $p = 0.00$).

Homogeneity means that all variance between conditions is only sampling variance. In our case, there are real and significant differences between the conditions. In fact, the amount of systematic (nonsampling) variance between conditions is estimated as 65.7 percent for response rate and 86.1 percent for cooperation rate. It is clear that, in addition to sampling, other sources contribute considerably to the variation in outcomes. As a consequence of the heterogeneity, a random effects model was adopted for all analyses.

The next step in meta-analysis is to examine, and possibly, to explain the observed variability. Accordingly, we investigated if study and design characteristics could explain heterogeneity. The results are discussed below.

EFFECTIVENESS OF ADVANCE LETTERS AND STUDY DESCRIPTORS

For each outcome (RR1 and COOP1), we carried out three separate series of regression analyses. One regression used the methodological variables, one used the study design variables, and one used the advance letter characteristics.

First, we investigated if heterogeneity could be explained by characteristics of the studies themselves. Two types of "study" variables are available to explain these differences: methodological characteristics of the experiments and design characteristics of the studies themselves. The former gives an indication of

Table 3. Predicting Variability in Response and Cooperation Rates Using Design Characteristics

	Predictor			
Outcome	Beta	p	R^2	N of cases
Cooperation rate (COOP1)				
List sample (vs. RDD)	0.54	0.00	0.29	35
Refusal conversion used	−0.48	0.01	0.23	17
Average # contact attempts needed	−0.93	0.00	0.87	5
Response rate (RR1)				
List sample (vs. RDD)	0.47	0.00	0.22	29
Average # contact attempts needed	−0.89	0.00	0.80	5

NOTE.—The results are univariate regressions on a logged odds-ratio scale.

methodological rigor; the latter tells for which type of survey advance letters are most effective.

Only a small number of study characteristics turned out to have a significant effect on the results found. Since many coded characteristics were not codeable for all studies and conditions (cf. table 1), there is a considerable amount of incomplete information. A full multivariate analysis including all study characteristics is impossible, since the resulting data set would have far more variables than cases. Therefore, we first report the results in table 3 as univariate regressions for those characteristics that show a significant effect. Table 3 gives for each variable the following results: standardized (beta) regression coefficient, p-value of the test on the significance of the regression, R^2, and the number N of available cases for that variable. The results given in table 3 are reported on the logged odds-ratio scale.

None of the methodological variables showed a significant effect on the effectiveness of the advance letter for either cooperation or response rates. This means that the methodological differences in the 29 studies have no effect on the results found.

In general, the proportion of explained variance is larger for the cooperation rate than for the response rate. This is reasonable, because the response rate is diminished by noncontacts, which are removed in calculation of the cooperation rate. Advance letters do not reduce noncontacts, they help convince potential respondents after contact has been made.

For the cooperation rate, studies that are characterized by a large number of contact attempts needed before a contact was made showed a smaller effect of advance letters. These studies are apparently targeting a difficult-to-reach population, and it is possible that in the experimental group, many advance letters, in fact, did not reach their intended addressees. However, this explanatory variable could only be coded in five experimental conditions out of a total of four studies. This small number of cases makes it impossible to include this

variable together with other explanatory variables in one multivariate analysis. A multiple regression including the two remaining study characteristics (list vs. RDD and refusal conversion) resulted in both predictors failing significance. Inspection of the correlations showed that using refusal conversion correlated −0.89 with using lists. Apparently, investigators almost never use refusal conversion in combination with list-based samples, which makes it impossible to disentangle the effects of these two variables.

For the interpretation, it is important to realize that the results in table 3 are based on logged odds-ratios. Thus, the effects must be seen as interaction effects. For example, the significant effect of list-versus-RDD means that the effect of an advance letter is larger in list-based samples, but it does not mean that an advance letter is useless when RDD is used. The same goes for refusal conversion: the effect of an advance letter is larger when combined with refusal conversion, but this does *not* imply that when refusal conversion is not used, an advance letter does not work. We discussed this earlier in the context of list versus RDD-based samples; table 2 provides the response rates that underlie the regression analyses reported in table 3.

It should be emphasized that no significant effects were found for population, topic, sponsor, or any of the other variables listed in table 1 but not included in table 3. In other words, there are no indications that advance letters work differently for different population or topics. This means that advance letters are a general tool that can be applied in many different types of surveys. Year of publication also could not explain the heterogeneity, indicating that the effect of advance letters is not different over time. There was also no difference between different types of publication (refereed vs. nonrefereed).

CHARACTERISTICS OF MOST EFFECTIVE ADVANCE LETTERS

Advance letters do work, but what makes an advance letter most successful? Three types of variables code for differences in content of advance letters were available: those referring to format, those referring to content characteristics, and those referring to compliance arguments (see also Coding of Advance Letter Descriptors). Only 9 out of 29 studies presented the text of the advance letters used in the original publication, but we were able to retrieve the texts of advance letters used in 12 more studies, which brings the number of studies for which the full text of the advance letters was available to 21 out of 29.[3] In addition, publications that did not include the full text of the advance letter usually provided a limited description of its contents. As a result, some letter characteristics could be coded from this description. Still, considerable amounts

3. We really appreciate the extra effort authors made to provide us with copies of the advance letters used.

Table 4. Characteristics of 40 Advance Letters (29 Coded from Original Letter, 11 Coded from Information in Publication)[a]

	N_{tot}	N_{letter}	Percentage	N_{publ}	Percentage
Format letter					
Letter type	37	29	100	8	100
Postcard		1	3	1	13
Short (max. one page with broad margins)		9	31	3	38
Medium (extended, one full page)		18	62	4	50
Long (more than one page)		1	3	0	
Letter length (number of words body text)	29	29	100		–
Mean			234.4		–
Median			231.0		–
Standard deviation			80.3		–
Language letter	40	29	100	11	100
Native speakers only		27	93	11	100
Translations/bilingual		2	7	0	
Form of address	39	29	100	10	100
Individually personalized		14	48	7	70
Addressed to household		4	14	1	10
Not personalized at all		11	38	2	20
Content characteristics					
Research agency mentioned	*40*	*29*	*100*	*11*	100
Yes		29	100	11	100
No		0		0	
Contact info for questions, etc.	37	29	100	8	100
Yes		22	76	6	75
No		7	24	2	25
What survey is about	28	29	100	8	100
Yes		27	93	7	88
No		2	7	1	13
Usefulness mentioned	34	29	100	5	100
Yes		25	86	5	100
No		4	14	0	
Anonymity/confidentiality	34	29	100	5	100
Yes		23	79	5	100
No		6	21	0	
How did we get your address/phone	33	29	100	4	100
Yes		15	52	4	100
No		14	48	0	
Why you are sampled	31	29	100	4	100
Yes		11	38	3	75
No		18	62	1	25
Duration mentioned	33	29	100	4	100
Yes		23	79	0	
No		6	21	4	100

Continued

Table 4. Continued

	N_{tot}	N_{letter}	Percentage	N_{publ}	Percentage
Duration in minutes (if mentioned, was between 10 and 20 minutes)	22	22	100	–	
Mean			14.4	–	
Median			15.0	–	
Standard deviation			5.1	–	
Summary of results promised	33	29	100	4	100
Yes		1	3	0	
No		28	97	4	100
Explicit "thank you"	33	29	100	4	100
Yes		18	62	4	100
No		11	38	0	
Compliance arguments used					
Reciprocity/social exchange	33	29	100	4	100
Yes		5	17	0	
No		24	83	4	100
Authority	34	29	100	5	100
Yes		26	90	4	80
No		3	10	1	20
Scarcity	33	29	100	4	100
Yes		3	10	0	
No		26	90	4	100
Social validation	33	29	100	4	100
Yes		1	3	0	
No		28	97	4	100
Altruism	33	29	100	4	100
Yes		25	86	3	75
No		4	14	1	25

[a]Forty experimental conditions were used in 29 studies. This means that 40 different advance letters were tested. Hence, the maximum N_{tot} of the coded characteristics is 40. A smaller number indicates that the information was completely missing in those publications. N_{letter} refers to characteristics coded from the available full letter, N_{publ} refers to those cases in which characteristics had to be coded from the information in the publication because no letter was available.

of missing data remain in some cases. Table 4 gives an overview of the final codes and their source (letter itself or description of letter in publication).

Inspecting table 4, we learn that most letters do *not* use well-known compliance principles from the nonresponse literature. Only one letter promises a summary of results and one-third (33 percent) of the letters does not even end with an explicit "thank you" (cf. Dillman 1978). However, most letters do evoke the authority principle (overall 88 percent) and appeal to altruism (overall 85 percent); see Groves, Cialdini, and Couper (1992) for a discussion of compliance principles. What is really surprising is that some letters (three) do

Table 5. Predicting Variability in Response and Cooperation Rates Using Letter Characteristics

	Predictor			
Outcome	Beta	p	R^2	N of cases
Cooperation rate (COOP1)				
Language adaptation	−0.32	0.04	0.10	35
Reciprocation	0.41	0.01	0.17	31
Explain why sampled	0.34	0.04	0.11	31
Response rate (RR1)				
Reciprocation	0.50	0.00	0.25	23

NOTE.—The results are univariate regressions on a logged odds-ratio scale.

not even mention the goal of the survey or its value. But the question remains: does the content of the letter really matter?

To answer this question, we analyzed response differences between conditions using known characteristics of the advance letters. Table 5 presents the results of regression analyses on both the response and cooperation rate.

Table 5 shows the importance of using a reciprocity argument in the advance letter for both cooperation and response rate. Reciprocity is founded on social exchange theory (Dillman 1978). Explaining sampling, that is why a person or household was sampled, only affected cooperation rate. The negative effect of language adaptation on cooperation rate appears peculiar, but language adaptation in our studies means that a very general letter is used that is English on one side and Spanish on the other side. We will come back to this in the discussion.

For cooperation rate, an additional analysis was carried out using all three letter characteristics (reciprocity, language adaptation, and explanation why sampled) in a multiple regression model. In this model, the regression coefficients are similar to the results in table 5, but explaining the sampling is no longer significant. The explained variance in the multivariate model is 0.26. For the interpretation, it is important to realize that the results in table 5 are based on logged odds-ratios. Thus, the effects must be seen as interaction effects: advance letters work, but they work better when the norm of reciprocity is evoked.

Discussion

Our meta-analysis showed that sending an advance letter improves the cooperation rate in telephone surveys on average by about 11 percent and the response rate by about 8 percent. No significant interaction effects were found for population, topic, or sponsor. Advance letters appear to be a general tool that can be applied in many different types of surveys. Can we generalize this conclusion to

telephone surveys in general? A relevant issue in meta-analysis is the so-called *file drawer problem*, which refers to the possibility that studies are more easily published if they are significant. In other words, the studies included in the meta-analysis could be a biased sample of the population of studies, because studies that produce nonsignificant results do not get published but linger in their investigators' file drawer. The file drawer problem can be addressed in several ways. One approach is to calculate the *fail-safe N*, which is an estimate of how many studies reporting null results must be hidden away in file drawers to render the combined results of the studies that were located insignificant at the 5 percent level. In our case, our significant effect of an advance letter on the cooperation rate can be swept away provided we find 4,822 hidden studies all reporting no effect. The effect of an advance letter on the response rate disappears if we find 2,132 hidden studies reporting no effect. This is highly implausible, so the file drawer problem is unlikely to bias our results. The file drawer problem can also be examined using funnel plots and by calculating the correlation between the absolute effect size and the sample size (Lipsey and Wilson 2001). The funnel plot did not indicate publication bias, and the correlations between the effect size and the sample size were low and insignificant. It appears that the validity of our meta-analysis is not endangered by publication bias. However, it should be noted that the studies in our meta-analysis mainly concern university-based or governmental research, and it is unclear how well our results generalize to commercial and market research.

Another limitation of our meta-analysis is that one of the inclusion criteria was that there must be an explicit comparison with a control group. This increases the internal validity of our research, especially given our finding that none of the methodological variables had an effect. Thus, studies using random assignment found basically the same results as studies using a different assignment method. However, the result is that relatively only a small number of studies is available for our meta-analysis, which may weaken the generalizability of our results.

Our main finding is that advance letters clearly have a positive effect on response in telephone surveys, both with RDD- and list-based samples. When the sample is based on a list with known addresses, the effect is larger. There is considerable variation in the effectiveness of the advance letter, as indicated by the heterogeneity of the outcomes. One possible reason is variation in the content and style of the advance letters. The publications themselves provide, in most cases, very little information about the letter sent, so initially we could not analyze this factor. But after contacting the individual authors, we were able to get the text of advance letters for 21 of the 29 studies investigated, which corresponds to 29 full texts on a total of 40 experimental conditions (letters).

We found no evidence that the length of the advance letter influences the response rate. This could mean that a postcard is just as effective as a complete letter. This may have advantages, not only because a postcard costs less to

produce and send, but also because a letter from an unknown sender may be viewed with some suspicion, especially at times when anthrax or otherwise contaminated letters are being mailed (cf. Hembroff et al. 2005). Still there were only two studies that explicitly compared postcards; advance postcards proved to be effective compared to not sending anything (Iredell et al. 2004), but advance postcards were less effective than advance letters with respect to response rates and less cost-effective as well (Hembroff et al. 2005). More research into postcards as a form of advance letters seems to be indicated.

Some letter characteristics hardly vary across the studies, reflecting the best practice recommendations from the literature (e.g., Dillman 2000; Australian Bureau of Statistics 2002; Link and Mokdad 2005). For instance, all letters mention the research agency, and authority is almost universally used, if only by sending the letter on official letterhead paper. On the other hand, very few letters promised a summary. So if we fail to find an effect for authority or the sending of a summary, this does not necessarily mean that it does not work, it is more likely to be the result of restriction of range (almost no variance) in this predictor. Other letter characteristics have more variance, but still do not show up in statistical analysis as effective, e.g., the altruism argument (28 used it, 5 did not). In such cases, it is more likely that this characteristic indeed does not have an effect.

What did work was using a reciprocity argument in the advance letter. Reciprocity means that in the advance letter, the researcher is not only asking information from the respondent, but also offering information, e.g., by providing explanations about study and the sampling process or promising a summary report. This is consistent with social exchange theory (Dillman 1978, 2000) and with the positive effect reported in the literature for using incentives (Singer et al. 1999; Singer 2002). The negative effect of using language-adapted letters is interpreted as indicating a clear absence of tailoring (cf. Groves and Couper 1998). The studies that used language adaptation in their advance letters did send out a very general letter, English on one side and Spanish on the other side. In our view, the implicit message such a letter conveys is the opposite of personalization and tailoring: "we do not know who you are; we even do not know which language you speak." This does not mean that language adaptation cannot and should not be used in advance letters. Especially in surveys of special populations, or follow-up studies, tailored language adaptations may be effective. If a tailored approach is not possible, we suggest drawing upon well-established principles, such as social exchange, to counteract the impersonal image of a multiple language letter. For instance, by explaining how important it is for this special study to have respondents from different cultural backgrounds and emphasizing that this is the reason why the researchers have prepared special language adapted versions of the letter. Availability of a toll-free number and multilingual staff for questions will further invoke the reciprocity norm and should, if possible, be emphasized in the letter too.

A different reason for the variation in the effect of advance letters could be an interaction with the text and style of the introduction at the start of the telephone call. An unexpected telephone call from stranger can give such a strong negative reaction that respondents are oblivious to even substantial variation in the introduction of the call (Dillman, Gallegos, and Frey 1976). An advance letter not only eliminates the elements of surprise, it also provides tangible evidence that the interview is legitimate and the telephone call is neither a sales gimmick, nor a practical joke (Dillman 1978, p. 243). As a result, the recipient is likely to be more receptive and listens better to what is being said.

As a final discussion point, finding an effect of an advance letter assumes that the advance letter has indeed been received and noticed. The first problem here is obtaining the addresses if RDD or a similar method is used. It is not always possible to match an address to a telephone number. The matching rate of addresses and telephone numbers will also vary from country to country. In the USA, from a practical point of view, matching addresses to phone numbers in a RDD survey is becoming more and more difficult. The matching rate varies from state to state and is lower in urban areas (Traugott, Groves, and Lepkowski 1987; Camburn et al. 1995; Brick and Collins 1997; Parsons, Owens, and Skogan 2002; Link 2004). At present, the average matching rate for an equal probability RDD is around 40 percent. This data is for mailable addresses that can be send a prenotification. Not all listed numbers have a mailable address. Some people choose to list their phone number but not their complete address, for example, omitting street and apartment number. Others list where they live but not where they receive their mail (Survey Sampling International, personal communication, January 19, 2006).

In addition, the intended respondent may not receive or may fail to notice the advance letter. Iredell et al. (2004) report how many contacted respondents recall being sent a postcard. In their total sample of 155 respondents who were sent a postcard, 107 (69 percent) remembered receiving it. In this group, 86 percent agreed to participate in the survey, as compared to 56 percent of the respondents who were sent a postcard but did not remember receiving it. In the comparison group who were not sent a postcard, the response rate was 59 percent (Iredell et al. 2004: table 5). In several advance letter experiments, respondents were explicitly asked if they recall the letter. Link and Mokdad (2005) report that 61 percent remembered seeing the prenotification letter, but this percentage varied between subgroups, with a higher percentage for the higher educated and white non-Hispanic subgroups. Parsons, Owen, and Skogan (2002) report that 50–58 percent of the respondents that were mailed a letter remembered receiving it with the lower percentage in the city of Chicago and the higher in the state of Illinois. Groves and Snowden (1987) report that in the general population (NHIS), about 75 percent of the respondents recall receiving the advance letter. In an evaluation study by Snow, Prather, and Hutchinson (1986), an exceptional high proportion (90 percent) remembered

having received a letter. This high percentage may be caused by the special nature of the study: the respondents were all part of a very intensive training program and were very involved. In sum, a sizeable group of respondents does not remember receiving an advance notification. Why people remember advance letters is a topic for future research, as it would appear important to maximize the visibility of the advance letter or postcard. This is also important for the balance of costs versus benefits. Those studies that investigate the cost factor report that advance letters appear cost effective, although this obviously depends strongly on the cost structure of the organization sending out the survey (Singer, Hoewyk, and Maher 2000; Hembroff et al. 2005).

Finally, increasing the response rate to a survey, telephone or otherwise, is never the result of varying just one factor in the design. Advance letters appear to work well, but other factors such as using incentives are also known to be important (Singer et al. 1999; Singer 2002; Cantor, O'Hare, and O'Connor 2006). It is also possible that such factors interact, for instance, when an advance letter is used to provide a monetary incentive (Singer, Hoewyk, and Maher 2000). Good survey design should aim to combine all factors that are known to stimulate response rates in a comprehensive system (Dillman 2000). In addition, further research into the effect of advance letters in telephone surveys should aim to include such possible interactions in the design and make them an explicit object of study. It should be noted that a higher response rate can *potentially* reduce nonresponse error, but a high response rate is not enough. Nonresponse error has two components: the nonresponse error for a particular statistic is the product of the nonresponse rate and the difference between respondents and nonrespondents (e.g., Groves and Couper 1998; Couper and De Leeuw 2003). However, auxiliary information on both respondents and nonrespondents is rarely available as is reflected in our meta-analysis where almost all studies focused on reducing the nonresponse rate. Although difficult, it is not impossible to collect information for both respondents and nonrespondents in nonresponse studies (Groves and Couper 1998), especially for special populations (e.g., Goldstein and Jennings 2002; Mann 2005a). We therefore strongly advise to focus on nonresponse error in future response inducing studies.

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Appendix A

BIBLIOGRAPHY OF STUDIES INCORPORATED IN THE META-ANALYSIS

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Appendix B

CODING SCHEDULES USED IN THE META-ANALYSIS

Note: Coders also had access to the AAPOR response rate definitions, to excerpts from the book by Groves and Couper 1998 on nonresponse in household

surveys and annotated examples of letters from the books by Dillman 1987 and Dillman 2000 on mail, telephone, and Internet surveys.

Coding Schedule Used to Code General Study Information + Control Condition

Note: if no information whatsoever about a coded characteristic: *missing (leave blank)*. If information available but characteristic is absent: Code *No*

General Research Characteristics	
Coder	1. 2. 3.
Full bibliographical info APA style (Authors, year, title, publication, pages). Only on this code schedule, not in SPSS-file.	Publication:
Study identification (not for coder, but centrally)	Number of study (1, 2, 3, . . ., etc.)
Publication form	1: Book 2: Journal article 3: Book chapter 4: Thesis or doctoral 5: Unpublished conference paper or technical report 6: Published paper or technical report (e.g., in conference proceedings) 7: Gray literature / Internet 8: Others
Publication type	1: Not reviewed 2: Reviewed
Publication year	In numbers
Country in which study was done	1: USA 2: Europe 3. Canada 4. Australia 5: Other
Origin (sponsor)	1: Official statistics (census, bls, etc) 2: Government (department health, etc) 3: University 4: Market research 5: Other, that is . . .
Sampling Characteristics	
Population	1: General population 2: Special population (restricted group, e.g., elderly)

Sampling frame	1: RDD (random digit dialing) 2: (Inter)national lists 3: List from organization, for instance, university or commercial organizations 4: Telephone book 5. Panel 6: Others
Sampling procedure	1: Random 2: Nonrandom
Design/Research Procedures	
Assignment to experimental conditions (letters)	1: Random 2: Nonrandom
More than 1 experimental condition? That is are there other experimental conditions studied in same experiment (e.g., incentives)	1: Yes 2: No
Is the extra condition used in a factorial design?	1: Yes 2: No
Methodological details in publication	1: None 2: Some 3: Detailed (almost) complete
Quality of study (based a.o. on sampling procedure, assignment to conditions, methodological details)	1: Poor 2: Fair 3: Good
Maximum number of contact attempts (by phone, that is how often should one try before it is allowed to classify it as unreachable/no answer)	. . . . .
Average number of contact attempts needed	. . . . .
Refusal conversion used	1: Yes 2: No
Time between letter and first tel. call	**In days:**
Text advance letter(s) in publication	1: Yes 2: No
Duration interview in minutes	**In minutes:**
Duration interview	1: Short (<5 minutes) 2: Medium 3: Long (>30 minutes)
Interviewer quality (e.g., mention of large experience or special training, may mark more than one)	0: Not mentioned 1: Experienced 2: Specially trained for the occasion

Survey/Questionnaire Characteristics

Topic (may circle more than one)	1: Consumer 2: Finances, budget 3: Health 4: Media research 5: Education 6: Travel 7: Voting/election 8: Living conditions 9: Crime/victimization 10: General (social) attitudes 11: Omnibus
Topic salience	1: Nonsalient (repulsive/very boring) 2: Neutral 3: Salient 4: Very salient
Topic sensitivity (see enclosed list for examples)	0: Not sensitive at all 1: Somewhat sensitive 2: Sensitive 3: Definitely very sensitive
Target of questionnaire (May circle more than one)	1: Self 2: Household/family 3: Work organization/ establishment 4: Other, that is . . .
Type of data requested	1: Factual 2: Behaviour 3: Attitudinal/evaluation/ satisfaction 4: Mixed

Outcome control condition (coded separately by statistician based on marked parts in articles/papers) AAPOR Definitions used

Contact rate	
N. of contact rate	
Cooperation rate	
N. of coop rate	
Response rate	
N. of response rate	
Unmatch1	0 if case removed, 1 if transferred to control (no letter) group, 9 if not applicable, leave blank if uncodeable
Unmatch2	Proportion unmatchable cases

Coding Schedule for Experimental Condition

Note: if no information whatsoever about a coded characteristic: *missing (leave blank)*. If information available but characteristic is absent: Code *No*

General Research Characteristics	
Coder	1. 2. 3.
Full bibliographical info APA style (authors, year, title, publication, pages). Only on this code schedule, not in file	Publication:
Study identification. (Write also on master copy done centrally, not by coder) Coder, please do: if more than one experimental condition identify by a, b, c	Number of study: experimental condition (a,b,c, etc):
Characteristics letter	
Letter type	0: Postcard 1: Short /basic (less than one page, one page with a lot of white space, broad margins) 2: Medium: extended (a full page, small margins) 3: Long (more than one page)
Length letter in number of words (count in letter if in appendix). Note: count text only, so not letterhead & signature	Number words:
Language letter	1: Only native speakers 2: Language adaptations/ translations
Way letter is addressed	1: Really personalized (personal individual name mentioned) 2: Household (address mentioned in letter) 3. Not personalized at all
Content letter: research agency mentioned letterhead or in letter	1: Yes 2: No
Content letter: contact for more information mentioned (phone, or web, or address)	1: Yes 2: No
Content letter: goal mentioned what is survey about	1: Yes 2: No
Content letter: usefulness study (saliency) mentioned	1: Yes 2: No
Content letter: anonymity/confidentiality mentioned	1: Yes 2: No

Content letter: explanation source address (how did we get your address/phone #)	1: Yes 2: No
Content letter: mentions reason why you (or household) is sampled (explanation sample)	1: Yes 2: No
Content letter: explanation further sampling procedure on phone (e.g., oldest female, next birthday, kish method, etc.)	1: Yes 2: No
Content letter: duration mentioned	1: Yes, . . . , minutes 2: No
Incentive	0: No incentive used 1: Incentive enclosed 2: Incentive promised
Content letter: incentive mentioned	1: Yes 2: No
Content letter: summary of results promised	1: Yes 2: No
Content letter: explicit thank you (e.g., at end)	1: Yes 2: No
Content letter: principle of reciprocation/social exchange used (tit-for-tat, obligation, material as an incentive or immaterial thank you)	1: Yes 2: No
Content letter: principle of authority is used (request clearly comes from authority, e.g., federal agencies, research firms with legitimacy, signed by VIP)	1: Yes 2: No
Content letter: scarcity principle is used (e.g., emphasis on rare opportunity to get your voice heard	1: Yes 2: No
Content letter: principle of validation is used (others like you also . . .)	1: Yes 2: No
Content letter: altruism (you will help us, help . . .)	1: Yes 2: No
Letter available in report/article	1: Yes 2: No

Outcome experimental condition (coded separately based on marked parts by statistician) AAPOR definitions used

Contact rate
N. of contact rate
Cooperation rate
N. of cooperation rate
Response rate
N. of response rate

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