

LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE



LSHTM Research Online

Edwards, P; Roberts, I; Clarke, M; DiGuseppi, C; Pratap, S; Wentz, R; Kwan, I; (2002) Increasing response rates to postal questionnaires: systematic review. *BMJ (Clinical research ed)*, 324 (7347). pp. 1183-5. ISSN 0959-8138 DOI: <https://doi.org/10.1136/bmj.324.7347.1183>

Downloaded from: <http://researchonline.lshtm.ac.uk/17516/>

DOI: <https://doi.org/10.1136/bmj.324.7347.1183>

Usage Guidelines:

Please refer to usage guidelines at <https://researchonline.lshtm.ac.uk/policies.html> or alternatively contact researchonline@lshtm.ac.uk.

Available under license: Creative Commons Attribution Non-commercial
<http://creativecommons.org/licenses/by-nc/3.0/>

<https://researchonline.lshtm.ac.uk>

Increasing response rates to postal questionnaires: systematic review

Phil Edwards, Ian Roberts, Mike Clarke, Carolyn DiGuseppi, Sarah Pratap, Reinhard Wentz, Irene Kwan

Abstract

Objective To identify methods to increase response to postal questionnaires.

Design Systematic review of randomised controlled trials of any method to influence response to postal questionnaires.

Studies reviewed 292 randomised controlled trials including 258 315 participants

Intervention reviewed 75 strategies for influencing response to postal questionnaires.

Main outcome measure The proportion of completed or partially completed questionnaires returned.

Results The odds of response were more than doubled when a monetary incentive was used (odds ratio 2.02; 95% confidence interval 1.79 to 2.27) and almost doubled when incentives were not conditional on response (1.71; 1.29 to 2.26). Response was more likely when short questionnaires were used (1.86; 1.55 to 2.24). Personalised questionnaires and letters increased response (1.16; 1.06 to 1.28), as did the use of coloured ink (1.39; 1.16 to 1.67). The odds of response were more than doubled when the questionnaires were sent by recorded delivery (2.21; 1.51 to 3.25) and increased when stamped return envelopes were used (1.26; 1.13 to 1.41) and questionnaires were sent by first class post (1.12; 1.02 to 1.23). Contacting participants before sending questionnaires increased response (1.54; 1.24 to 1.92), as did follow up contact (1.44; 1.22 to 1.70) and providing non-respondents with a second copy of the questionnaire (1.41; 1.02 to 1.94). Questionnaires designed to be of more interest to participants were more likely to be returned (2.44; 1.99 to 3.01), but questionnaires containing questions of a sensitive nature were less likely to be returned (0.92; 0.87 to 0.98). Questionnaires originating from universities were more likely to be returned than were questionnaires from other sources, such as commercial organisations (1.31; 1.11 to 1.54).

Conclusions Health researchers using postal questionnaires can improve the quality of their research by using the strategies shown to be effective in this systematic review.

Introduction

Postal questionnaires are widely used to collect data in health research and are often the only financially viable option when collecting information from large, geographically dispersed populations. Non-response to postal questionnaires reduces the effective sample size and can introduce bias.¹ As non-response can affect the validity of epidemiological studies, assessment of response is important in the critical appraisal of health research. For the same reason, the identification of effective strategies to increase response to postal questionnaires could improve the quality of health research. To identify such strategies we conducted a systematic review of randomised controlled trials.

Methods

Identification of trials

We aimed to identify all randomised controlled trials of strategies to influence the response to a postal questionnaire. Eligible studies were not restricted to medical surveys and included any questionnaire topic in any population. Studies in languages other than English were included. Strategies requiring telephone contact were included, but strategies requiring home visits by investigators were excluded for reasons of cost. We searched 14 electronic bibliographical databases (table 1). Two reviewers independently screened each record for eligibility by examining titles, abstracts, and keywords. Records identified by either reviewer were retrieved. We searched the reference lists of relevant trials and reviews, and two journals in which the largest number of eligible trials had been published (*Public Opinion Quarterly* and *American Journal of Epidemiology*). We contacted authors of eligible trials and reviews to ask about unpublished trials. Reports of potentially relevant trials were obtained, and two reviewers assessed each for eligibility. We estimated the sensitivity of the combined search strategy (electronic searching and manual searches of reference lists) by comparing the trials identified by using this strategy with the trials identified by manually searching journals. We used ascertainment intersection methods to estimate the number of trials that may have been missed during screening.²

Editorial by Smeeth and Fletcher

CRASH Trial
Co-ordinating
Centre, Department
of Epidemiology
and Population
Health, London
School of Hygiene
and Tropical
Medicine, London
WC1B 1DP
Phil Edwards
senior research fellow
Ian Roberts
*professor of
epidemiology and
public health*

Cochrane Injuries
Group, Department
of Epidemiology
and Population
Health
Sarah Pratap
research fellow
Reinhard Wentz
information specialist
Irene Kwan
research fellow

UK Cochrane
Centre, Oxford
OX2 7LG
Mike Clarke
*associate director
(research)*

Department of
Preventive Medicine
and Biometrics,
University of
Colorado Health
Sciences Center,
Campus Box C245,
4200 East Ninth
Avenue, Denver,
CO 80262, USA
Carolyn DiGuseppi
*associate professor of
preventive medicine
and biometrics*

Correspondence to:
P Edwards
phil.edwards@
lshtm.ac.uk

bmj.com 2002;324:1183

Data extraction and outcome measures

Two reviewers independently extracted data from eligible reports by using a standard form. Disagreements were resolved by a third reviewer. We extracted data on the type of intervention evaluated, the number of participants randomised to intervention or control groups, the quality of the concealment of participants' allocation, and the types of participants, materials, and follow up methods used. Two outcomes were used to estimate the effect of each intervention on response: the proportion of completed or partially completed questionnaires returned after the first mailing and the proportion returned after all follow up contacts had been made. We wrote to the authors of reports when these data were missing or the methods used to allocate participants were unclear (for example, where reports said only that participants were "divided" into groups).

Interventions were classified and analysed within distinct strategies to increase response. In trials with factorial designs, interventions were classified under two or more strategies. When interventions were evaluated at more than two levels (for example, highly, moderately, and slightly personalised questionnaires), we combined the upper levels to create a dichotomy. To assess the influence of a personalised questionnaire on response, for example, we compared response to the least personalised questionnaire with the combined response for the moderately and highly personalised questionnaires.

Data analysis and statistical methods

We used Stata statistical software to analyse our data. For each strategy, we estimated pooled odds ratios in a random effects model. We calculated 95% confidence intervals and two sided P values for each outcome. Selection bias was assessed by using Egger's weighted regression method and Begg's rank correlation test and funnel plot.³ Heterogeneity among the trials' odds ratios was assessed by using a χ^2 test at a 5%

significance level. In trials of monetary incentives, we specified a priori that the amount of the incentive might explain any heterogeneity between trial results. To investigate this, we used regression to examine the relation between response and the current value of the incentive in US dollars. When the year of the study was not known, we used the average delay between year of study and year of publication for other trials (three years). We also specified a priori that, in trials of questionnaire length, the number of pages used might explain any heterogeneity between trial results, and to investigate this, the odds of response were regressed on the number of pages.

Results

We identified 292 eligible trials including a total of 258 315 participants that evaluated 75 different strategies for increasing response to postal questionnaires. The average number of participants per trial was 1091 (range 39-10 047). The trials were published in 251 reports—80 (32%) in medical, epidemiological, or health related journals, 58 (23%) in psychological, educational, or sociological journals, 105 (42%) in marketing, business, or statistical journals, and 8 (3%) in engineering journals or dissertations, or they had not yet been published (see Appendix A).

All tests for selection bias were significant ($P < 0.05$) in five strategies: monetary incentives, varying length of questionnaire, follow up contact with non-respondents, saying that the sponsor will benefit if participants return questionnaires, and saying that society will benefit if participants return questionnaires. Tests were not possible in 15 strategies where fewer than three trials were included. The method of randomisation was not known in most of the eligible trials. Where information was available, the quality of the concealment of participants' allocation was poor in 30 trials and good in 12 trials. The figure shows the pooled odds ratios and 95% confidence intervals for

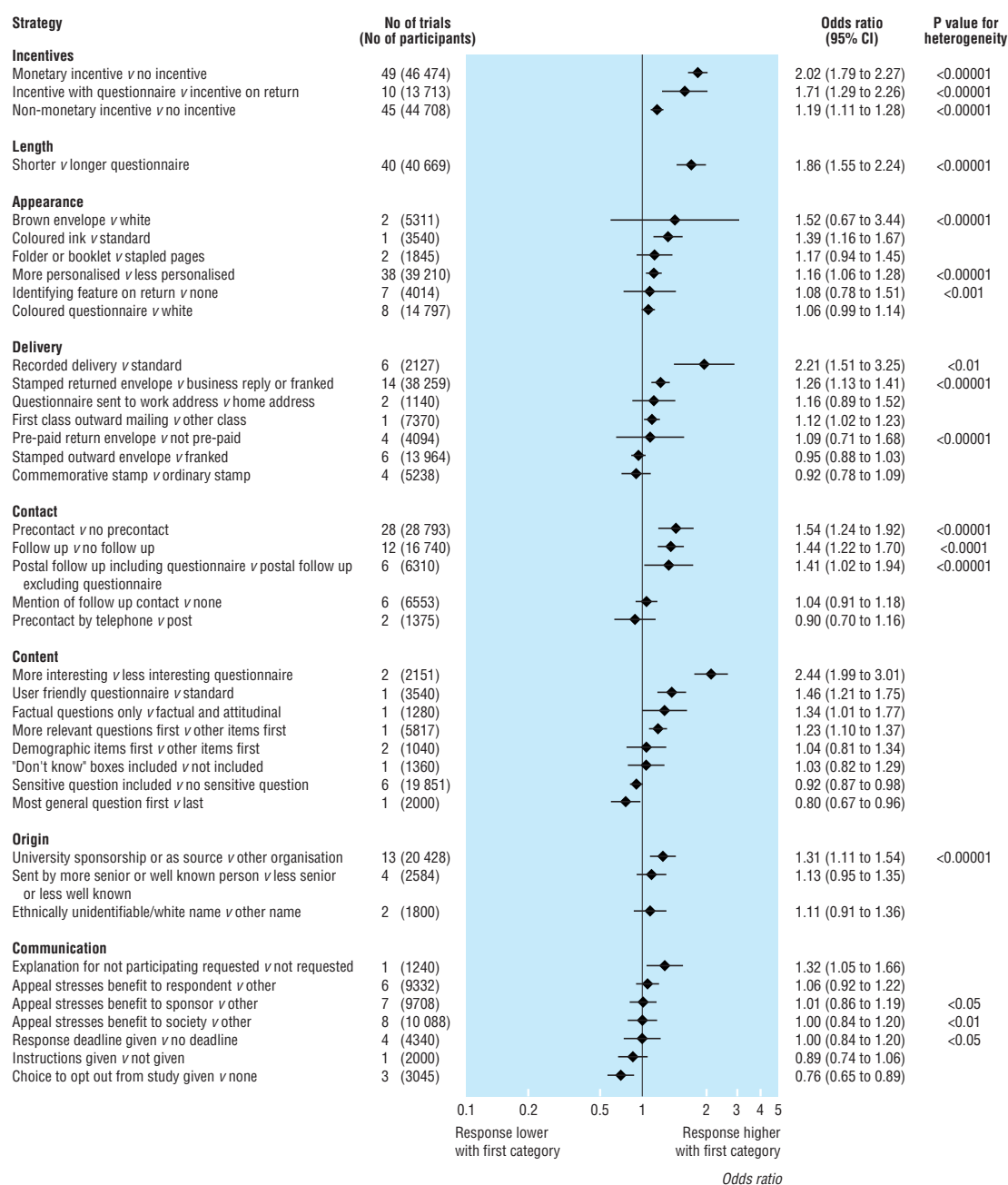
Table 1 Electronic bibliographical databases and search strategies used in systematic review of response to postal questionnaires

Database (time period or version)	Search strategy
With study type filters of known sensitivity and positive predictive value†:	
CINAHL (1982-07/1999)	A. questionnaire* or survey* or data collection
Cochrane Controlled Trials Register (1999.3)	B. respon* or return*
Dissertation Abstracts (1981-08/1999)	C. remind* or letter* or postcard* or incentiv* or reward* or money* or monetary or payment* or lottery or raffle or prize or personalis* or sponsor* or anonym* or length or style* or format or appearance or color or colour or stationery or envelope or stamp* or postage or certified or registered or telephon* or telephon*
Embase (1980-08/1999)	or notice or dispatch* or deliver* or deadline or sensitive
ERIC (1982-09/1998)	D. control* or randomi* or blind* or mask* or trial* or compar* or experiment* or "exp" or factorial
Medline (1966-1999)	E. A and B and C and D
PsycLIT (1887-09/1999)	
Without study type filters of known sensitivity and positive predictive value‡:	
Science Citation Index (1980-1999)	((survey* or questionnaire*) and (return* or respon*))
Social Science Citation Index (1981-1999)	
Social Psychological Educational Criminological Trials Register (1950-1998)	((survey* or questionnaire*) and (return* or respon*))
EconLit (1969-2000)	((survey\$ or questionn\$) and (return\$ or respon\$)).ti or ((survey\$ or questionn\$) and (mail\$ or post\$)).ti
Sociological Abstracts (1963-2000)	((return\$ or respon\$) and (mail\$ or post\$)).ti
Index to Scientific and Technical Proceedings (1982-2000)	((survey*, questionn*)+(return*, respon*))@TI,((return*, respon*)+ (mail, mailed, postal))@TI, ((survey*, questionn*)+(mail, mailed, postal))@TI
National Research Register (Web version: 2000.1)	((survey*:ti or questionn*:ti) and (return*:ti or respon*:ti)) or ((return*:ti or respon*:ti) and (mail:ti or mailed:ti or postal:ti)) or ((survey*:ti or questionn*:ti) and (mail:ti or mailed:ti or postal:ti))

Search strategies were developed to achieve a balance between sensitivity and positive predictive value.

†Highly sensitive subject searches (search statements A, B, C) were designed and their positive predictive value increased by using study type filters (search statement D). These searches were not restricted to the abstract or title fields.

‡The positive predictive value of the search strategies was increased by restricting search terms to the title field only, by using permutations of subject term combinations, or by using fewer search terms.



Effects on questionnaire response of 40 strategies where combined trials included over 1000 participants

the 40 different strategies in which the combined trials included more than 1000 participants.

Table 2 may be used to translate odds ratios into response rates from different baseline rates. At least one strategy in each category was found to influence response. For example, when incentives were used the odds of response were more than doubled when money was the incentive (odds ratio 2.02; 95% confidence interval 1.79 to 2.27) and were almost doubled when incentives were not conditional on response (1.71; 1.29 to 2.26). The length of questionnaires influenced response: short questionnaires made response more likely (1.86; 1.55 to 2.24). The use of coloured ink as opposed to blue or black ink increased response

(1.39; 1.16 to 1.67) as did making questionnaires and letters more personal (1.16; 1.06 to 1.28). When recorded delivery was used the odds of response were more than doubled (2.21; 1.51 to 3.25), and they were increased when stamped return envelopes were used (1.26; 1.13 to 1.41) and questionnaires were sent by first class post (1.12; 1.02 to 1.23). Contacting participants before sending questionnaires increased response (1.54; 1.24 to 1.92), as did follow up contact (1.44; 1.22 to 1.70) and providing non-respondents with a second copy of the questionnaire (1.41; 1.02 to 1.94). Questionnaires designed to be of more interest to participants were more likely to be returned (2.44; 1.99 to 3.01), but questionnaires containing questions of a sen-

Table 2 Conversion of odds ratios to response rates from different baseline rates

Baseline rate (%)	Odds ratio										
	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
10	5	8	10	12	14	16	18	20	22	23	25
20	11	16	20	24	27	30	33	36	38	41	43
30	18	24	30	35	39	43	46	49	52	54	56
40	25	33	40	45	50	54	57	60	63	65	67
50	33	43	50	56	60	64	67	69	71	73	75
60	43	53	60	65	69	72	75	77	79	80	82
65	48	58	65	70	74	76	79	81	82	84	85
70	54	64	70	74	78	80	82	84	85	87	88
75	60	69	75	79	82	84	86	87	88	89	90
80	67	75	80	83	86	88	89	90	91	92	92
85	74	81	85	88	89	91	92	93	93	94	94
90	82	87	90	92	93	94	95	95	96	96	96
95	90	93	95	96	97	97	97	98	98	98	98

sitive nature were less likely to be returned (0.92; 0.87 to 0.98). Questionnaires originating from universities were more likely to be returned than questionnaires from other sources, such as commercial organisations (1.31; 1.11 to 1.54).

We found significant heterogeneity among trial results in 17 out of the 31 strategies that included more than one trial. For trials of monetary incentives the heterogeneity among the results was significant ($P < 0.0001$). In regression analysis, the relation was positive between the size of the incentive and the odds of response:

$$\text{Log}(OR) = 0.69[SE\ 0.05] + 0.084[SE\ 0.03] \times \text{Log}(\text{Amount in US\$})$$

The model predicts, for example, that the odds of response with a \$1 incentive will be twice that with no incentive. The model also predicts that the marginal benefit will diminish, in terms of increasing the odds of response, for each additional \$1 increase in the amount given (for example, the odds of response with a \$15 incentive will be only 2.5 times that with no incentive). For trials examining the effect of questionnaire length, heterogeneity between results was apparent on inspection of the forest plot ($P < 0.00001$). In regression analysis a relation was found between the number of pages used and the odds of response:

$$\text{Log}(OR) = 0.36[SE\ 0.21] - 0.64[SE\ 0.15] \times \text{Log}(\text{Pages in short}) + 0.32[SE\ 0.18] \times \text{Log}(\text{Pages in long})$$

The model predicts, for example, that the odds of response with a single page will be twice that with three pages.

Discussion

Several reviews and meta-analyses of strategies to increase response to postal questionnaires have been published in the literature on research surveys over the past 40 years. Our review, which was based on a systematic search of published and unpublished literature in English and other languages, includes more than twice as many trials as any previously published review.⁴ The trials identified were not restricted to medical surveys: one third were medical, epidemiological, or health related; one quarter were psychological, educational, or sociological; and two fifths were marketing, business, or statistical.

We have identified a range of strategies that seem to increase response to postal questionnaires. The pooled

effect measures for some strategies are precise because large numbers of participants were included in the combined trials. Before these results are implemented, several methodological issues must be considered.

Identification and inclusion of all relevant trials

Identifying and including all relevant trials in systematic reviews reduces random error in meta-analyses and, because ease of identification of trials is associated with the size of treatment effects, complete ascertainment may reduce bias.⁵ We estimate that our search strategy retrieved nearly all eligible trials (estimated sensitivity 95%; 84% to 99%) and that we missed very few relevant records during screening.² We excluded some trials because we could not confirm that participants had been randomly allocated to intervention or control groups, and we have not examined whether the results of these trials differ systematically from the included trials. Tests for selection bias were significant in five strategies. Although these results may be due to true heterogeneity between trial results rather than bias in the selection of trials,³ we cannot rule out the possibility of selection bias having an effect on the results.

Methodological quality of trials

Inadequate allocation concealment can bias the results of clinical trials.⁶ In our review, information on allocation concealment was unavailable for most of the included trials. If they had inadequate concealment, this may have biased the results, which is unlikely in this context because the researchers making the allocations would find it difficult to predict propensity to respond to a questionnaire.

Heterogeneity among trial results

We found substantial heterogeneity among the results of trials in half of the strategies, and for these it may be inappropriate to combine results to produce a single estimate of effect.⁷ Before undertaking the analyses we developed hypotheses concerning underlying differences in the trials of monetary incentives and length of questionnaire that might explain heterogeneity. Regression analyses identified relations between response and amounts of incentive and between response and questionnaire length. These models explain some of the heterogeneity. For other strategies, variation between trial interventions and populations is likely to explain some of the heterogeneity. For example, among trials evaluating non-monetary

What is already known on this topic

Postal questionnaires are widely used in the collection of data in epidemiological studies and health research

Non-response to postal questionnaires reduces the effective sample size and can introduce bias

What this study adds

This systematic review includes more randomised controlled trials than any previously published review or meta-analysis no questionnaire response

The review has identified effective ways to increase response to postal questionnaires

The review will be updated regularly in the *Cochrane Library*

incentives, the types of incentive used are very different, ranging from donations to charity to free key rings. Much of the heterogeneity between results may disappear when subgroups of trials are analysed. Further exploratory subgroup analyses may show important sources of variation—for example, according to methodological quality, questionnaire topic, age of the study, or type of population. In this review, our aim was to identify eligible trials systematically, critically appraise them, and present the relevant data. We did not intend to produce single effect estimates for every strategy. For many statistically heterogeneous strategies the direction of the effects is the same. For these strategies we cannot be sure about the size of the effect, but we can be reasonably confident that there was an effect on response.

Conclusions

Researchers can increase response to postal questionnaires by using the strategies shown to be effective in

this systematic review. Some strategies will require additional materials or administrative time, whereas others can be implemented at little extra cost.

We have presented odds ratios for methodological reasons,⁷ but the practical implications of the odds ratio for a strategy may be difficult to interpret without knowing the response at baseline without the strategy. If the size of the effect that would be expected if a specific strategy were used is an important consideration for researchers, the data used in this review may be accessed through the *Cochrane Library*, where they will be updated regularly.⁸

We thank Peter Sandercock, Iain Chalmers, and Catherine Peckham for their help and advice with the study.

Contributors: MC, CDG, PE, and IR contributed to study design, record screening, reviewing reports, data extraction, and drafting the report. PE and IR analysed the data. SP and IK contributed to data searches and data extraction. RW conducted the electronic searches. PE and IR are guarantors.

Funding: The study was supported by a grant from the BUPA Foundation and a Nuffield Trust short term fellowship.

Competing interests: None declared.

- 1 Armstrong BK, White E, Saracci R. *Principles of exposure measurement in epidemiology. Monographs in epidemiology and biostatistics*. Vol 21. New York: Oxford University Press, 1995:294-321.
- 2 Edwards P, Clarke M, DiGiuseppe C, Pratap S, Roberts I, Wentz R. Identification of randomised controlled trials in systematic reviews: accuracy and reliability of screening records. *Stat Med* (in press).
- 3 Egger M, Davey Smith G, Schneider M, Minder C. Bias in meta-analysis detected by a simple graphical test. *BMJ* 1997;315:629-34.
- 4 Yammarino FJ, Skinner SJ, Childers TL. Understanding mail survey response behavior: a meta-analysis. *Publ Opin Q* 1991;55:613-39.
- 5 Clarke MJ, Stewart LA. Obtaining data from randomised controlled trials: how much do we need for reliable and informative meta-analyses? *BMJ* 1994;309:1007-10.
- 6 Schulz KF, Chalmers I, Hayes RJ, Altman DG. Empirical evidence of bias: dimensions of methodological quality associated with estimates of treatment effects in controlled trials. *JAMA* 1995;273:408-12.
- 7 Engels EA, Schmid CH, Terrin N, Olkin I, Lau J. Heterogeneity and statistical significance in meta-analysis: an empirical study of 125 meta-analyses. *Stat Med* 2000;19:1707-28.
- 8 Edwards P, Roberts I, Clarke M, DiGiuseppe C, Pratap S, Wentz R, Kwan I. Methods to influence response to postal questionnaires. *Cochrane Library*. Issue 2. Oxford: Update Software, 2002.

Appendix A: References to reviewed trials

- Adams LL, Gale D. Solving the quandary between questionnaire length and response rate in educational research. *Res Higher Educ* 1982;17:231-40.
- Albaum G. Do source and anonymity affect mail survey results? *J Acad Marketing Sci* 1987;15:74-81.
- Albaum G, Strandkov J. Participation in a mail survey of international marketers: effects of pre-contact and detailed project explanation. *J Global Marketing* 1989;2:7-23.
- Alutto JA. Some dynamics of questionnaire completion and return among professional and managerial personnel: the relative impacts of reception at work site or place of residence. *J Appl Psychol* 1970;54:430-2.
- Andreasen AR. Personalizing mail questionnaire correspondence. *Public Opin Q* 1970;34:273-7.
- Asch DA, Christakis NA. Different response rates in a trial of two envelope styles in mail survey research. *Epidemiology* 1994;5:364-5.
- Asch DA. Use of a coded postcard to maintain anonymity in a highly sensitive mail survey: cost, response rates, and bias. *Epidemiology* 1996;7:550-1.
- Asch DA, Christakis NA, Ubel PA. Conducting physician mail surveys on a limited budget. A randomized trial comparing \$2 bill versus \$5 bill incentives. *Med Care* 1998;36:95-9.
- Bachman DP. Cover letter appeals and sponsorship effects on mail survey response rates. *J Marketing Educ* 1987;9:45-51.
- Barker PJ, Cooper RF. Do sexual health questions alter the public's response to lifestyle questionnaires? *J Epidemiol Community Health* 1996;50:688.
- Berdie DR. Questionnaire length and response rate. *J Appl Psychol* 1973;58:278-80.
- Bergen AV, Spitz JC. De Introductie van een schriftelijke enquête. *Nederlandsche Tijdschrift voor Psychologie* 1957;12:68-96.
- Berk ML, Edwards WS, Gay NL. The use of a prepaid incentive to convert non responders on a survey of physicians. *Eval Health Professions* 1993;16:239-45.
- Berry S. Physician response to a mailed survey. An experiment in timing of payment. *Public Opin Q* 1987;51:102-14.
- Biggar RJ, Melbye M. Responses to anonymous questionnaires concerning sexual behaviour: a method to examine potential biases. *Am J Public Health* 1992;82:1506-12.
- Biner PM. Effects of cover letter appeal and monetary incentives on survey response: a reactance theory application. *Basic Appl Soc Psychol* 1988;9:99-106.
- Biner PM, Barton DL. Justifying the enclosure of monetary incentives in mail survey cover letters. *Psychol Marketing* 1990;7:153-62.
- Biner PM, Kidd HJ. The interactive effects of monetary incentive justification and questionnaire length on mail survey response rates. *Psychol Marketing* 1994;11:483-92.
- Blass T, Leichman SR, Brown RA. The effect of perceived consensus and implied threat upon responses to mail surveys. *J Soc Psychol* 1981;113:213-6.
- Blass-Wilhelms W. Influence of 'real' postage stamp versus stamp 'postage paid' on return rate of response cards. *Zeitschrift für Soziologie* 1982;11:64-8.
- Blomberg J, Sandell R. Does a material incentive affect response on a psychotherapy follow-up questionnaire? *Psychother Res* 1996;6:155-63.
- Blythe BJ. Increasing mailed survey responses with a lottery. *Soc Work Res Abst* 1986;22:18-9.
- Boser JA. Surveying alumni by mail: effect of booklet/folder questionnaire format and style of type on response rate. *Res Higher Educ* 1990;31:149-59.
- Brechner K, Shippee G, Obitz FW. Compliance techniques to increase mailed questionnaire return rates from alcoholics. *J Stud Alcohol* 1976;37:995-6.
- Brennan M. The effect of a monetary incentive on mail survey response rates. *J Market Res Soc* 1992;34:173-7.
- Brennan M, Seymour P, Gendall P. The effectiveness of monetary incentives in mail surveys: further data. *Marketing Bull* 1993;4:43-51.
- Brook LL. The effect of different postage combinations on response levels and speed of reply. *J Market Res Soc* 1978;20:238-4.
- Brown ML. Use of a postcard query in mail surveys. *Public Opin Q* 1965;29:635-7.
- Brown GH. *Randomised inquiry vs conventional questionnaire method in estimating drug usage rates through mail surveys (technical report)*. Human Resources Research Organisation (HumRRO). Alexandria VA: US Army Research Institute for the Behavioural and Social Sciences, 1975.
- Buchman TA, Tracy JA. Obtaining responses to sensitive questions: conventional questionnaire versus randomized response technique. *J Account Res* 1982;20:263-71.
- Campbell MJ, Waters WE. Does anonymity increase response rate in postal questionnaire surveys about sensitive subjects? A randomised trial. *J Epidemiol Community Health* 1990;44:75-6.
- Camunas C, Alward RR, Vecchione E. Survey response rates to a professional association mail questionnaire. *J NY York State Nurses Assoc* 1990;21:7-9.
- Carpenter EH. Personalizing mail surveys: a replication and reassessment. *Public Opin Q* 1974;38:614-20.
- Cartwright A. Some experiments with factors that might affect the response of mothers to a postal questionnaire. *Stat Med* 1986;5:607-17.
- Childers TL, Skinner SJ. Gaining respondent cooperation in mail surveys through prior commitment. *Public Opin Q* 1979;43:558-61.
- Childers TL, Pride WM, Ferrell OC. A reassessment of the effects of appeals on response to mail surveys. *J Marketing Res* 1980;17:365-70.
- Childers TL, Skinner SJ. Theoretical and empirical issues in the identification of survey respondents. *J Market Res Soc* 1985;27:39-53.
- Choi BC, Pak AW, Purdham JT. Effects of mailing strategies on response rate, response time, and cost in a questionnaire study among nurses. *Epidemiology* 1990;1:72-4.
- Clarke R, Breeze E, Sherliker P, Shipley M, Youngman L. Design, objectives, and lessons from a pilot 25 year follow up re-survey of survivors in the Whitehall study of London civil servants. *J Epidemiol Community Health* 1998;52:364-9.
- Corcoran KJ. Enhancing the response rate in survey research. *Soc Work Res Abstracts* 1985;21:2.
- Cox EP, Anderson T, Fulcher DG. Reappraising mail survey response rates. *J Marketing Res* 1974;11:413-7.
- Deehan A, Templeton L, Taylor C, Drummond C, Strang J. The effect of cash and other financial inducements on the response rate of general practitioners in a national postal study. *Br J Gen Pract* 1997;47:87-90.
- Del Valle ML, Morgenstern H, Rogstad TL, Albright C, Vickrey BG. A randomised trial of the impact of certified mail on response rate to a physician survey, and a cost-effectiveness analysis. *Eval Health Professions* 1997;20:389-406.
- Denton J, Tsai C-Y, Chevette P. Effects on survey responses of subjects, incentives, and multiple mailings. *J Exper Educ* 1988;56:77-82.
- Denton JJ, Tsai C-Y. Two investigations into the influence of incentives and subject characteristics on mail survey responses in teacher education. *J Exper Educ* 1991;59:352-66.
- Dillman DA, Sinclair MD, Clark JR. Effects of questionnaire length, respondent-friendly design, and a difficult question on response rates for occupant-addressed census mail surveys. *Public Opin Q* 1993;57:289-304.
- Dodd DK, Markwiese BJ. Survey response rate as a function of personalized signature on cover letter. *J Soc Psychol* 1987;127:97-8.
- Dommeyer CJ. Experimentation on threatening appeals in the follow-up letters of a mail survey. Doctoral dissertation, University of Santa Clara, California, 1980.
- Dommeyer CJ. Does response to an offer of mail survey results interact with questionnaire interest? *J Market Res Soc* 1985;27:27-38.
- Dommeyer CJ. The effects of negative cover letter appeals on mail survey response. *J Market Res Soc* 1987;29:445-51.
- Dommeyer CJ. How form of the monetary incentive affects mail survey response. *J Market Res Soc* 1988;30:379-85.
- Dommeyer CJ. Offering mail survey results in a lift letter. *J Market Res Soc* 1989;31:399-408.
- Dommeyer CJ, Elganayan D, Umans C. Increasing mail survey response with an envelope teaser. *J Market Res Soc* 1991;33:137-40.
- Doob A, Zabrack M. The effect of freedom-threatening instructions and monetary inducement on compliance. *Can J Behav Sci* 1971;3:408-12.
- Doob AN, Freedman JL, Carlsmith JM. Effects of sponsor and prepayment on compliance with a mailed request. *J Appl Psychol* 1973;57:346-7.
- Dorman PJ, Slattery JM, Farrell B, Dennis MS, Sandercock PAG. A randomised comparison of the EuroQol and SF-36 after stroke. United Kingdom Collaborators in the International Stroke Trial. *BMJ* 1997;315:461.
- Eaker S, Bergstrom R, Bergstrom A, Hans-Olov A, Nyren O. Response rate to mailed epidemiologic questionnaires: a population-based randomized trial of variations in design and mailing routines. *Am J Epidemiol* 1998;147:74-82.
- Easton AN, Price JH, Telljohann SK, Boehm K. An informational versus monetary incentive in increasing physicians' response rates. *Psychol Rep* 1997;81:968-70.
- Edwards P, Roberts I. A comparison of two questionnaires for assessing outcome after head injury. 2001 (unpublished).
- Egger JM. Survey questionnaire format effect on response rate and cost per return. Paper presented at the Annual Meeting of the American Educational Research Association, Atlanta 1993.
- Etter J-F, Perneger TV, Rougemont A. Does sponsorship matter in patient satisfaction surveys? A randomized trial. *Med Care* 1996;34:327-35.
- Etter J-F, Perneger TV. Questionnaire color and response patterns in mailed surveys: a randomised trial and meta-analysis. Institute of Social and Preventive Medicine, Geneva, 1997 (unpublished).
- Etter J-F, Perneger TV, Ronchi A. Collecting saliva samples by mail. *Am J Epidemiol* 1998;147:141-6.
- Etter J-F, Perneger TV, Laporte J-D. Unexpected effects of a prior feedback letter and a professional layout on the response rate to a mail survey in Geneva. *J Epidemiol Community Health* 1998;52:128-9.
- Everett SA, Price JH, Bedell A, Telljohann SK. The effect of a monetary incentive in increasing the return rate of a survey to family physicians. *Eval Health Professions* 1997;20:207-4.
- Faria AJ, Dickinson JR. Mail survey response, speed, and cost. *Ind Marketing Manage* 1992;21:51-60.
- Faria MC, Mateus CL, Coelho F, Martins R, Barros H. Postal questionnaires: a useful strategy for the follow up of stroke cases. *Acta Med Portuguesa* 1997;10:61-5.
- Feild HS. Effects of sex of investigator on mail survey response rates and response bias. *J Appl Psychol* 1975;60:772-3.
- Ferrell OC, Childers TL, Reukert RW. Effects of situational factors on mail survey response. *Educ Conf Proc* 1984:364-7.
- Finn DW. Response speeds, functions, and predictability in mail surveys. *J Acad Marketing Sci* 1983;11:61-70.
- Fiset L, Milgrom P, Tarnai J. Dentists' response to financial incentives in a mail survey of malpractice liability experience. *J Public Health Dent* 1994;54:68-72.
- Ford NM. The advance letter in mail surveys. *J Marketing Res* 1967;4:202-4.
- Friedman HH, Goldstein L. Effect of ethnicity of signature on the rate of return and content of a mail questionnaire. *J Appl Psychol* 1975;60:770-1.
- Friedman HH, San Augustine AJ. The effects of a monetary incentive and the ethnicity of the sponsors signature on the rate and quality of response to a mail survey. *J Acad Marketing Sci* 1979;7:95-101.
- Furse DH, Stewart DW. Monetary incentives versus promised contribution to charity: new evidence on mail survey response. *J Marketing Res* 1982;XIX:375-80.
- Furst LG, Blitchington WP. The use of a descriptive cover letter and secretary pre-letter to increase response rate in a mailed survey. *Personnel Psychol* 1979;32:155-9.

- Futrell CM, Swan J. Anonymity and response by salespeople to a mail questionnaire. *J Marketing Res* 1977;14:611-6.
- Futrell CM, Stern DE, Fortune BD. Effects of signed versus unsigned internally administered questionnaires for managers. *J Business Res* 1978;6:91-8.
- Futrell CM, Lamb C. Effect on mail survey return rates of including questionnaires with follow up letters. *Percept Mot Skills* 1981;52:11-5.
- Futrell CM, Hise RT. The effects of anonymity and a same-day deadline on the response rate to mail surveys. *Eur Res* 1982;10:171-5.
- Gajraj AM, Faria AJ, Dickinson JR. A comparison of the effect of promised and provided lotteries, monetary and gift incentives on mail survey response rate, speed and cost. *J Market Res Soc* 1990;32:141-62.
- Gendall P, Hoek J, Brennan M. The tea bag experiment: more evidence on incentives in mail surveys. *J Market Res Soc* 1998;40:347-51.
- Gibson PJ, Koepsell TD, Diehr P, Hale C. Increasing response rates for mailed surveys of Medicaid clients and other low-income populations. *Am J Epidemiol* 1999;149:1057-62.
- Giles WF, Feild HS. Effects of amount, format, and location of demographic information on questionnaire return rate and response bias of sensitive and non sensitive items. *Personnel Psychol* 1978;31:549-59.
- Gillespie DF, Perry RW. Survey return rates and questionnaire appearance. *Austr N Z J Sociol* 1975;11:71-2.
- Gillpatrick TR, Harmon RR, Tseng LP. The effect of a nominal monetary gift and different contacting approaches on mail survey response among engineers. *IEEE Transact Engineering Manage* 1994;41:285-90.
- Gitelson RJ, Drogin EB. An experiment on the efficacy of a certified final mailing. *J Leisure Res* 1992;24:72-8.
- Glisan G, Grimm JL. Improving response rate in an industrial setting: will traditional variables work? *Southern Marketing Assoc Proc* 1982;20:265-8.
- Godwin K. The consequences of large monetary incentives in mail surveys of elites. *Public Opin Q* 1979;43:378-87.
- Goldstein L, Friedman HH. A case for double postcards in surveys. *J Advertising Res* 1975;15:43-7.
- Goodstadt MS, Chung L, Kronitz R, Cook G. Mail survey response rates: their manipulation and impact. *J Marketing Res* 1977;14:391-5.
- Green KE, Stager SE. The effects of personalization, sex, locale, and level taught on educators' responses to a mail survey. *J Exper Educ* 1986;54:203-6.
- Green KE, Kvidahl RF. Personalization and offers of results: effects on response rates. *J Exper Educ* 1989;57:263-70.
- Greer TV, Lohita R. Effects of source and paper color on response rates in mail surveys. *Ind Marketing Manage* 1994;23:47-54.
- Gullahorn JT, Gullahorn JE. Increasing returns from non-respondents. *Public Opin Q* 1959;23:119-21.
- Gullahorn JE, Gullahorn JT. An investigation of the effects of three factors on response to mail questionnaires. *Public Opin Q* 1963;27:294-6.
- Gupta L, Ward J, D'Este C. Differential effectiveness of telephone prompts by medical and nonmedical staff in increasing survey response rates: a randomised trial. *Aust N Z J Public Health* 1997;21:98-9.
- Hackler JC, Bourgette P. Dollars, dissonance and survey returns. *Public Opin Q* 1973;37:276-81.
- Hancock JW. An experimental study of four methods of measuring unit costs of obtaining attitude toward the retail store. *J Applied Psychol* 1940;24:213-30.
- Hansen RA, Robinson LM. Testing the effectiveness of alternative foot-in-the-door manipulations. *J Marketing Res* 1980;17:359-64.
- Hansen RA. A self-perception interpretation of the effect of monetary and nonmonetary incentives on mail survey respondent behaviour. *J Marketing Res* 1980;17:77-83.
- Hawes JM, Crittenden VL, Crittenden WF. The effects of personalisation, source, and offer on mail survey response rate and speed. *Akron Business Econ Rev* 1987;18:54-63.
- Hawkins DI. The impact of sponsor identification and direct disclosure of respondent rights on the quantity and quality of mail survey data. *J Business* 1979;52:577-90.
- Heaton E. Increasing mail questionnaire returns with a preliminary letter. *J Advertising Res* 1965;5:36-9.
- Hendrick C, Borden R, Giesen M, Murray EJ, Seyfried BA. Effectiveness of ingratiation tactics in a cover letter on mail questionnaire response. *Psychonom Sci* 1972;26:349-51.
- Henley JR. Response rate to mail questionnaires with a return deadline. *Public Opin Q* 1976;40:374-5.
- Hensley WE. Increasing response rate by choice of postage stamp. *Curr Opin Q* 1974;38:280-3.
- Hewett WC. How different combinations of postage on outgoing and return envelopes affect questionnaire returns. *J Market Res Soc* 1974;16:49-50.
- Hoffman SC, Burke AE, Helzlsouer KJ, Comstock GW. Controlled trial of the effect of length, incentives, and follow-up techniques on response to a mailed questionnaire. *Am J Epidemiol* 1998;148:1007-11.
- Hopkins KD, Hopkins BR, Schon I. Mail surveys of professional populations: the effects of monetary gratuities on return rates. *J Exp Educ* 1988;56:173-5.
- Hornik J. Time cue and time perception effect on response to mail surveys. *J Marketing Res* 1981;18:243-8.
- Horowitz JL, Sedlacek WE. Initial returns on mail questionnaires: a literature review and research note. *Res Higher Educ* 1974;2:361-7.
- Houston MJ, Jefferson RW. The negative effects of personalization on response patterns in mail surveys. *J Marketing Res* 1975;12:114-7.
- Houston MJ, Nevin JR. The effect of source and appeal on mail survey response patterns. *J Marketing Res* 1977;14:374-8.
- Hubbard R, Little EL. Promised contributions to charity and mail survey responses: replication with extension. *Public Opin Q* 1988;52:223-30.
- Hubbard R, Little EL. Cash prizes and mail survey response rates: a threshold analysis. *J Acad Marketing Sci* 1988;16:42-4.
- Huck SW, Gleason E. Using monetary inducements to increase response rates from mailed surveys. *J Applied Psychol* 1974;59:222-5.
- Hyett GP, Farr DJ. Postal questionnaires: double-sided printing compared with single-sided printing. *Eur Res* 1977;5:136-7.
- Iglesias CP, Torgerson DJ. Does length of questionnaire matter? A randomised trial of response rates to a mailed questionnaire. *J Health Serv Res Policy* 2000;5:219-21.
- Jacobs LC. Effect of the use of optical scan sheets on survey response rate. Paper presented at the annual meeting of the American Educational Research Association, 1986.
- Jacoby A. Possible factors affecting response to postal questionnaires: findings from a study of general practitioner services. *J Public Health Med* 1990;12:131-5.
- James J, Bolstein R. The effect of monetary incentives and follow-up mailings on the response rate and response quality in mail surveys. *Public Opin Q* 1990;54:346-61.
- James J, Bolstein R. Large monetary incentives and their effect on mail survey response rates. *Public Opin Q* 1992;56:442-53.
- Jensen JL. The effect of survey format on response rate and patterns of response. Doctoral dissertation, University of California, 1994.
- Jobber D, Sanderson S. The effects of a prior letter and coloured questionnaire paper on mail survey response rates. *J Market Res Soc* 1983;25:339-49.
- Jobber D, Sanderson S. The effect of two variables on industrial mail survey returns. *Ind Marketing Manage* 1985;14:119-21.
- Jobber D, Birro K, Sanderson SM. A factorial investigation of methods of stimulating response to mail surveys. *Eur J Operational Res* 1988;37:158-64.
- Jobber D. An examination of the effects of questionnaire factors on response to an industrial mail survey. *Int J Res Marketing* 1989;6:129-40.
- Johansson L, Solvoll K, Opdahl S, Bjorneboe G-E, Drevon CA. Response rates with different distribution methods and reward, and reproducibility of a quantitative food frequency questionnaire. *Eur J Clin Nutr* 1997;51:346-53.
- John EM, Savitz DA. Effect of a monetary incentive on response to a mail survey. *Ann Epidemiol* 1994;4:231-35.
- Jones WH, Linda G. Multiple criteria effects in a mail survey experiment. *J Marketing Res* 1978;15:280-4.
- Jones WH, Lang JR. Sample composition bias and response bias in a mail survey: a comparison of inducement methods. *J Marketing Res* 1980;17:69-76.
- Kahle LR, Sales BD. Personalization of the outside envelope in mail surveys. *Public Opin Q* 1978;42:547-50.
- Kaplan S, Cole P. Factors affecting response to postal questionnaires. *Br J Prev Soc Med* 1970;24:245-7.
- Keown CF. Foreign mail surveys: response rates using monetary incentives. *J Int Business Studies* 1985;16:151-3.
- Kephart WM, Bressler M. Increasing the response to mail questionnaires: a research study. *Public Opin Q* 1958;21:123-32.
- Kerin RA. Personalization strategies, response rate and response quality in a mail survey. *Soc Sci Q* 1974;55:175-81.
- Kerin RA, Harvey MG. Methodological considerations in corporate mail surveys: a research note. *J Business Res* 1976;4:277-81.
- Kerin RA, Peterson RA. Personalization, respondent anonymity, and response distortion in mail surveys. *J Applied Psychol* 1977;62:86-9.
- Kerin RA, Barry TE, Dubinsky AJ, Harvey MG. Offer of results and mail survey response from a commercial population: a test of Gouldner's Norm of Reciprocity. *Proc Am Inst Decision Sci* 1981:283-5.
- Kernan JB. Are 'bulk rate occupants' really unresponsive? *Public Opin Q* 1971;35:420-2.
- Kindra GS, McGown KL, Bougie M. Stimulating responses to mailed questionnaires. An experimental study. *Int J Res Marketing* 1985;2:219-35.
- King JO. The influence of personalization on mail survey response rates. *Arkansas Business Econ Rev* 1978;11:15-8.
- Koo MM, Rohan TE. Printed signatures and response rates. *Epidemiology* 1995;6:568.
- Koo MM, Rohan TE. Types of advance notification in reminder letters and response rates. *Epidemiology* 1996;7:215-6.
- Kurth LA. Message responses as functions of communication mode: a comparison of electronic mail and typed memoranda. Doctoral dissertation, Arizona State University, 1987.
- La Garce R, Kuhn LD. The effect of visual stimuli on mail survey response rates. *Ind Marketing Manage* 1995;24:11-18.
- Labrecque DP. A response rate experiment using mail questionnaires. *J Marketing* 1978;42:82-3.
- Larsson I. Increasing the rate of returns in mail surveys. A methodological study. *Didaktometry Sociometry* 1970;2:43-70.
- Leigh Brown AP, Lawrie HE, Kennedy AD, Webb JA, Torgerson DJ, Grant AM. Cost effectiveness of a prize draw on response to a postal questionnaire: results of a randomised trial among orthopaedic outpatients in Edinburgh. *J Epidemiol Community Health* 1997;51:463-4.
- Linsky AS. A factorial experiment in inducing responses to a mail questionnaire. *Sociol Soc Res* 1965;49:183-9.
- London SJ, Dommeyer CJ. Increasing response to industrial mail surveys. *Ind Marketing Manage* 1990;19:235-41.
- Lund DB, Malhotra NK, Smith AE. Field validation study of conjoint analysis using selected mail survey response rate facilitators. *J Business Res* 1988;16:351-68.
- Lund E, Gram IT. Response rate according to title and length of questionnaire. *Scand J Soc Med* 1998;26:154-60.
- Maheux B, Legault C, Lambert J. Increasing response rates in physicians' mail surveys: an experimental study. *Am J Public Health* 1989;79:638-9.
- Marrett LD, Kreiger N, Dodds L, Hilditch S. The effect on response rates of offering a small incentive with a mailed questionnaire. *Ann Epidemiol* 1992;2:745-53.
- Martin JD, McConnell JP. Mail questionnaire response induction: the effect of four variables on the response of a random sample to a difficult questionnaire. *Soc Sci Q* 1970;51:409-14.
- Martin WS, Duncan WJ, Powers TL, Sawyer JC. Costs and benefits of selected response inducement techniques in mail survey research. *J Business Res* 1989;19:67-79.
- Martin CL. The impact of topic interest on mail survey response behaviour. *J Market Res Soc* 1994;36:327-38.

- Mason WS, Dressel RJ, Bain RK. An experimental study of factors affecting response to a mail survey of beginning teachers. *Public Opin Q* 1961;25:296-9.
- Matteson MT. Type of transmittal letter and questionnaire colour as two variables influencing response rates in a mail survey. *J Applied Psychol* 1974;59:535-6.
- McConochie RM, Rankin CA. Effects of monetary premium variations on response/non response bias: Representation of black and non black respondents in surveys of radio listening. *American Statistical Association—Proceedings of the Section on Survey Research Methods*, 1985:42-5.
- McKee D. The effect of using a questionnaire identification code and message about non-response follow-up plans on mail survey response characteristics. *J Market Res Soc* 1992;34:179-91.
- McKillip J, Lockhart DC. The effectiveness of cover-letter appeals. *J Soc Psychol* 1984;122:85-91.
- Miller MM. The effects of cover letter appeal and non monetary incentives on university professors' response to a mail survey. Paper presented at the annual meeting of the American Educational Research Association, 1994.
- Mortagy AK, Howell JB, Waters WE. A useless raffle. *J Epidemiol Community Health* 1985;39:183-4.
- Moss VD, Worthen BR. Do personalization and postage make a difference on response rates to surveys of professional populations. *Psychol Rep* 1991;68:692-4.
- Mullen P, Easing I, Nixon SA, Koester DR, Biddle AK. The cost-effectiveness of randomised incentive and follow-up contacts in a national mail survey of family physicians. *Eval Health Professions* 1987;10:232-45.
- Mullner RM, Levy PS, Byre CS, Matthews D. Effects of characteristics of the survey instrument on response rates to a mail survey of community hospitals. *Public Health Rep* 1982;97:465-9.
- Murawski MM, Carroll NV. Direct mail performance of selected health related quality of life scales. *J Pharmacoepidemiol* 1996;5:17-38.
- Murphy PM, Daley JM. Exploring the effects of postcard prenotification on industrial firms' response to mail surveys. *J Market Res Soc* 1991;33:335-41.
- Myers JH, Haug AF. How a preliminary letter affects mail survey returns and costs. *J Advertising Res* 1969;9:37-9.
- Nagata C, Hara S, Shimizu H. Factors affecting response to mail questionnaire: research topics, questionnaire length, and non-response bias. *J Epidemiol* 1995;5:81-5.
- Nakai S, Hashimoto S, Murakami Y, Hayashi M, Manabe K, Noda H. Response rates and non-response bias in a health-related mailed survey. *Nippon-Koshu-Eisei-Zasshi* 1997;44:184-91.
- Nevin JR, Ford NM. Effects of a deadline and veiled threat on mail survey responses. *J Appl Psychol* 1975;61:116-8.
- Newland, CA, Waters, WE, Standford, AP, Batchelor, BG. A study of mail survey method. *Int J Epidemiol* 1977;6:65-7.
- Nichols RC, Meyer MA. Timing postcard follow-ups in mail questionnaire surveys. *Public Opin Q* 1966;30:3006-7.
- Nichols S, Waters WE, Woolaway M, Hamilton-Smith MB. Evaluation of the effectiveness of a nutritional health education leaflet in changing public knowledge and attitudes about eating and health. *J Human Nutr Dietetics* 1988;1:233-8.
- Ogbourne AC, Rush B, Fondacaro R. Dealing with nonrespondents in a mail survey of professionals. *Eval Health Professions* 1986;9:121-8.
- Olivarius NdeF, Andreasen AH. Day-of-the-week effect on doctors' response to a postal questionnaire. *Scand J Primary Health Care* 1995;13:65-7.
- Osborne MO, Ward J, Boyle C. Effectiveness of telephone prompts when surveying general practitioners: a randomised trial. *Austr Family Physician* 1996;25:S41-3.
- Parasuraman A. Impact of cover letter detail on response patterns in a mail survey. *Am Inst Decision Sci* 1981;13th meeting:289-91.
- Parsons RJ, Medford TS. The effect of advance notice in mail surveys of homogenous groups. *Public Opin Q* 1972;36:258-9.
- Peck JK, Dresch SP. Financial incentives, survey response, and sample representativeness: does money matter. *Rev Publ Data Use* 1981;9:245-66.
- Perneger TV, Etter J-F, Rougemont A. Randomized trial of use of a monetary incentive and a reminder card to increase the response rate to a mailed questionnaire. *Am J Epidemiol* 1993;138:714-22.
- Perry N. Postage combinations in postal questionnaire surveys—another view. *J Market Res Soc* 1974;16:245-6.
- Peters TJ, Harvey IM, Bachmann MO, Eachus JJ. Does requesting sensitive information on postal questionnaires have an impact on response rates? A randomised controlled trial in the south west of England. *J Epidemiol Community Health* 1998;52:130.
- Peterson RA. An experimental investigation of mail survey responses. *J Business Res* 1975;3:199-210.
- Phillips WM. Weaknesses of the mail questionnaire: a methodological study. *Sociol Soc Res* 1951;35:260-7.
- Pirota M, Gunn J, Farish S, Karabatsos G. Primer postcard improves postal survey response rates. *Aust N Z J Public Health* 1999;23:196-7.
- Poe GS, Seeman I, McLaughlin J, Mehl E, Dietz M. 'Don't know' boxes in factual questions in a mail questionnaire. *Public Opin Q* 1988;52:212-22.
- Powers DE, Alderman DL. Feedback as an incentive for responding to a mail questionnaire. *Res Higher Educ* 1982;17:207-11.
- Pressley MM, Tullar WL. A factor interactive investigation of mail survey response rates from a commercial population. *J Marketing Res* 1977;14:108-11.
- Pressley MM. Care needed when selecting response inducements in mail surveys of commercial populations. *J Acad Marketing Sci* 1978;6:336-43.
- Pressley MM, Dunn MG. A factor-interactive experimental investigation of inducing response to questionnaires mailed to commercial populations. *AMA Educators Conference Proceedings*, 1985:356-61.
- Pucel DJ, Nelson HF, Wheeler DN. Questionnaire follow-up returns as a function of incentives and responder characteristics. *Vocational Guidance Q* 1971;March:188-93.
- Rimm EB, Stampfer MJ, Colditz GA, Giovannuci E, Willet W C. Effectiveness of various mailing strategies among nonrespondents in a prospective cohort study. *Am J Epidemiol* 1990;131:1068-71.
- Roberts RE, McCrory OF, Forthofer RN. Further evidence on using a deadline to stimulate responses to a mail survey. *Public Opin Q* 1978;42:407-10.
- Roberts H, Pearson JC, Dengler R. Impact of a postcard versus a questionnaire as a first reminder in a postal lifestyle survey. *J Epidemiol Community Health* 1993;47:334-5.
- Roberts I, Coggan C, Fanslow J. Epidemiological methods: the effect of envelope type on response rates in an epidemiological study of back pain. *Aust N Z J Occ Health Safety* 1994;10:55-7.
- Rolnick SJ, Gross CR, Garrard J, Gibson RW. A comparison of response rate, data quality, and cost in the collection of data on sexual history and personal behaviours. *Am J Epidemiol* 1989;129:1052-61.
- Romney VA. A comparison of responses to open-ended and closed ended items on a state-level community education needs assessment instrument. Doctoral dissertation, University of Virginia, 1993.
- Roszkowski MJ, Bean AG. Believe it or not! Longer questionnaires have lower response rates. *J Business Psychol* 1990;4:495-509.
- Rucker MH, Arbaugh JE. A comparison of matrix questionnaires with standard questionnaires. *Educ Psychol Measurement* 1979;39:637-43.
- Rucker M, Hughes R, Thompson R, Harrison A, Vanderlip N. Personalization of mail surveys: too much of a good thing? *Educ Psychol Measurement* 1984;44:893-905.
- Sallis JF, Fortmann SP, Solomon DS, Farquhar JW. Increasing returns of physical surveys. *Am J Public Health* 1984;74:1043.
- Salomone PR, Miller GC. Increasing the response rates of rehabilitation counselors to mailed questionnaires. *Rehab Counseling Bull* 1978;22:138-41.
- Salvesen K, Vatten L. Effect of a newspaper article on the response to a postal questionnaire. *J Epidemiol Community Health* 1992;46:86.
- Schweitzer M, Asch D. Timing payments to subjects of mail surveys: cost-effectiveness and bias. *J Clin Epidemiol* 1995;48:1325-9.
- See Tai S, Nazareth I, Haines A, Jowett C. A randomized trial of the impact of telephone and recorded delivery reminders on the response rate to research questionnaires. *J Public Health Med* 1997;19:219-21.
- Shahar E, Bisgard KM, Folsom AR. Response to mail surveys: effect of a request to explain refusal to participate. *Epidemiology* 1993;4:480-2.
- Shiono PH, Klebanoff MA. The effect of two mailing strategies on the response to a survey of physicians. *Am J Epidemiol* 1991;134:539-42.
- Simon R. Responses to personal and form letters in mail surveys. *J Advertising Res* 1967;7:28-30.
- Skinner SJ, Ferrell OC, Pride WM. Personal and nonpersonal incentives in mail surveys: immediate versus delayed inducements. *Acad Marketing Sci* 1984;12:106-14.
- Sletto R. Pretesting of questionnaires. *Am Sociol Rev* 1940;5:193-200.
- Sloan M, Kreiger N, James B. Improving response rates among doctors: randomised trial. *BMJ* 1997;315:1136.
- Smith K, Bers T. Improving alumni survey response rates: An experiment and cost-benefit analysis. *Res Higher Educ* 1987;27:218-25.
- Spry VM, Hovell MF, Sallis JG, Hofsteter CR, Elder JP, Molgaard CA. Recruiting survey respondents to mailed surveys: controlled trials of incentives and prompts. *Am J Epidemiol* 1989;130:166-72.
- Stafford JE. Influence of preliminary contact on mail returns. *J Marketing Res* 1966;3:410-1.
- Stevens RE. Does preceding mail questionnaires affect response rates. *Public Opin Q* 1975;38:621-2.
- Sutherland HJ, Beaton M, Mazer R, Kriukov V, Boyd NF. A randomized trial of the total design method for the postal follow-up of women in a cancer prevention trial. *Eur J Cancer Prevention* 1996;5:165-8.
- Sutton RJ, Zeitz LL. Multiple prior notifications, personalization, and reminder surveys. *Marketing Res* 1992;4:14-21.
- Svoboda P. A comparison of two questionnaires for assessing outcome after head injury in the Czech Republic 2001 (unpublished).
- Swan JE, Epley DE, Burns WL. Can follow-up response rates to a mail survey be increased by including another copy of the questionnaire? *Psychol Rep* 1980;47:103-6.
- Tambor ES, Chase GA, Faden RR, Geller G, Hofman KJ, Holtzman NA. Improving response rates through incentives and follow-up: the effect on a survey of physicians' knowledge of genetics. *Am J Public Health* 1993;83:1599-603.
- Temple-Smith M, Mulvey G, Doyle W. Maximising response rates in a survey of general practitioners. Lessons from a Victorian survey on sexually transmissible diseases. *Austr Fam Physician* 1998;27(suppl 1):S15-S18.
- Trice AD. Maximizing participation in surveys: hotel ratings VII. *J Soc Behav Pers* 1985;1:137-41.
- Tullar WL, Pressley MM, Gentry DL. Toward a theoretical framework for mail survey response. *Proceedings of the Third Annual Conference of the Academy of Marketing Science* 1979;2:243-7.
- Urban N, Anderson GL, Tseng A. Effects on response rates and costs of stamps vs business reply in a mail survey of physicians. *Clin Epidemiol* 1993;46:455-9.
- Vocino T. Three variables in stimulating responses to mailed questionnaires. *J Marketing* 1977;41:76-7.
- Vogel PA, Skjostad K, Eriksen L. Influencing return rate by mail of alcoholics' questionnaires at follow-up by varying lottery procedures and questionnaire lengths. Two experimental studies. *Eur J Psychiatry* 1992;6:213-22.
- VonRiesen RD. Postcard reminders versus replacement questionnaires and mail survey response rates from a professional population. *J Business Res* 1979;7:1-7.
- Waisanen FB. A note on the response to a mailed questionnaire. *Public Opin Q* 1954;18:210-2.
- Ward J, Wain G. Increasing response rates of gynaecologists to a survey: a randomised trial of telephone prompts. *Austr J Public Health* 1994;18:332-4.

- Ward J, Boyle C, Long D, Ovadia C. Patient surveys in general practice. *Austr Fam Physician* 1996;25:S19-S20.
- Ward J, Bruce T, Holt P, D'Este K, Sladden M. Labour-saving strategies to maintain survey response rates: a randomised trial. *Aust N Z J Public Health* 1998;22(3 suppl):394-6.
- Warriner K, Goyder J, Gjertsen H, Hohner P, Mcspurren K. Charities, no; lotteries, no; cash, yes. *Public Opin Q* 1996;60:542-62.
- Weilbacher WM, Walsh HR. Mail questionnaires and the personalized letter of transmittal. *Marketing Notes* 1952;16:331-6.
- Weir, N. Methods of following up stroke patients. Neurosciences Trials Unit, University of Edinburgh, 2001 (unpublished.)
- Wells DV. The representativeness of mail questionnaires as a function of sponsorship, return postage, and time of response. Doctoral dissertation, Hofstra University, 1984.
- Weltzien RT, McIntyre TJ, Ernst JA, Walsh JA, Parker JK. Crossvalidation of some psychometric properties of the CSQ and its differential return rate as a function of token financial incentives. *Community Mental Health J* 1986;22:49-55.
- Wensing M, Mainz J, Kramme O, Jung HP, Ribacke M. Effect of mailed reminders on the response rate in surveys among patients in general practice. *J Clin Epidemiol* 1999;52:585-7.
- Whitmore WJ. Mail survey premiums and response bias. *J Marketing Res* 1976;13:46-50.
- Willits FK, Ke B. Part-whole question order effects. *Public Opin Q* 1995;59:392-403.
- Windsor J. What can you ask about? The effect on response to a postal screen of asking about two potentially sensitive questions. *J Epidemiol Community Health* 1992;46:83-5.
- Woodward A, Douglas B, Miles H. Chance of a free dinner increases response to mail questionnaire. *Int J Epidemiol* 1985;14:641-2.
- Worthen BR, Valcarce RW. Relative effectiveness of personalized and form covering letters in initial and follow-up mail surveys. *Psychol Rep* 1985;57:735-44.
- Wynn GW, McDaniel SW. The effect of alternative foot-in-the-door manipulations on mailed questionnaire response rate and quality. *J Market Res Soc* 1985;27:15-26.
- Zagumny MJ, Ramsey R, Upchurch MP. Is anonymity important in AIDS survey research? *Psychol Rep* 1996;78:270.
- Zusman BJ, Duby P. An evaluation of the use of monetary incentives in postsecondary survey research. *J Res Dev Educ* 1987;20:73-8.

(Accepted 3 December 2001)