Personally addressed hand-signed letters increase questionnaire response: a meta analysis of randomised controlled trials

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Running title: Personalised letters and response

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Keywords: Data collection; Meta-analysis; Questionnaires; Randomised Controlled Trials.

(811 words)
ABSTRACT

Background
Postal questionnaires are commonly used to collect data for health studies, but non-response reduces study sample sizes and can introduce bias. Finding ways to increase the proportion of questionnaires returned would improve research quality. We sought to quantify the effect on response when researchers address participants personally by name on letters that accompany questionnaires.

Methods
All randomised controlled trials in a published systematic review that evaluated the effect on response of including participants’ names on letters that accompany questionnaire were included. Odds ratios for response were pooled in a random-effects meta-analysis and evidence for changes in effects over time was assessed using random-effects meta regression.

Results
The odds of response when including participants’ names on letters were increased by one-fifth (pooled OR 1.18, 95% CI 1.03–1.34; p=0.015). When participants’ names and hand-written signatures were in combination, the effect was a more substantial and statistically significant increase in response (OR 1.45, 95% CI 1.27–1.66; p<0.001). There was no evidence that the magnitude of these effects had declined over time.

Conclusions
This meta-analysis of the best available evidence indicates that researchers using postal questionnaires can increase response by addressing participants by name on cover letters. The effect appears to be enhanced by including hand-written signatures.

(206 words)
Keywords: Data collection; Meta-analysis; Motivation; Questionnaires; Randomised Controlled Trials
**BACKGROUND**

Mailed questionnaires are often used in health research to collect data. However, non-response reduces study sample sizes and can introduce bias.[1] Strategies that appear to increase response have been identified and include making questionnaires and accompanying letters more personal.[2] Recently, a randomised controlled trial and meta-analysis of previous trials found no advantage in hand-signed letters.[3] This study investigates whether there is any advantage to researchers using postal questionnaires who make an effort to personally address participants by name, and examine the effect when a hand-written signature is also included.

**METHODS**

All randomised controlled trials that evaluated the inclusion of participants’ names on the letters accompanying postal questionnaires were identified from a published systematic review.[2] There was no restriction by language, questionnaire topic, or study population. We extracted data from each study on the year of publication, numbers of participants randomised and numbers responding. We pooled the odds ratios for response estimated by each trial in a random effects meta-analysis [4] and tested for heterogeneity in effects using the chi-squared statistic. Evidence for publication bias was assessed using Egger’s test.[5] We hypothesised *a priori* that due to an increased use of these methods through electronic means, the size of the effects of personalisation on response would have decreased over time. We examined the evidence for this hypothesis by conducting a meta-regression of the estimated effects on year of publication.
RESULTS

Fourteen randomised controlled trials including 12,102 participants were identified from the published systematic review.[6][7][8][9][10][11][12][13][14][15][16][17][18][19] Further details about the numbers of records of potentially eligible studies retrieved by the search strategy are reported elsewhere.[2] Study participants were individuals from professional groups and members of the public, and included non-respondents to previous mailings of questionnaires. Thirteen trials were conducted in the US and one was conducted in New Zealand.

We found evidence for a small but statistically significant increase in response when participants were personally addressed by name and signatures were not written by hand on covering letters (pooled OR 1.18, 95% CI 1.03–1.34; p=0.015; figure 1). There was no evidence for changes in this effect over time (regression coefficient=-0.004, 95% CI -0.033–0.22; p=0.721). We found strong evidence for an increase in response when participants were personally addressed by name and signatures were hand-written, compared with when neither method of personalisation was used (pooled OR 1.45, 95% CI 1.27–1.66; p<0.001). There was some evidence for an increase in this effect on response over time (regression coefficient=0.011, 95% CI -0.001–0.223; p=0.068). Heterogeneity between trial results was not statistically significant in either analysis (p=0.753, $I^2=0.0\%$ and p=0.108, $I^2=35\%$ respectively) and there was no evidence for publication bias (p=0.845 and p=0.600 respectively).
DISCUSSION

Including participants’ names and handwritten signatures on letters sent with postal questionnaires appears to increase response, compared with using neither method. The use of participants’ names in the absence of a handwritten signature may also improve response, but the effect appears to be smaller. The magnitude of these effects was hypothesised to have declined over recent years but we found no evidence that this was the case.

Strengths and weaknesses of the study

Although the types of participants and questionnaire topics varied between the included studies, we found a consistent increase in response with these methods of personalisation over all trials. We found no evidence for publication bias. The majority of the included studies were conducted in the United States of America and none was conducted in a lower income country. This may therefore reduce the generalisability of these findings to other settings. One included trial found a marked reduction in response with personalisation. This trial had asked alumni members about their home and business addresses, and business positions held. This might suggest that a personal address on cover letters could be detrimental to response, should the participants perceive that their peers will have access to their personal information. We did not investigate any effects that personalisation may have had on the accuracy and validity of the data collected. We are therefore unable to say whether personalisation affects the quality of response, only that it appears to increase the quantity of response.

Implications for researchers and further research

Our results suggest that researchers who go to the trouble of hand-signing letters can increase response if they also personally address participants by name. An absolute
increase in the proportion of questionnaires returned of between 4% and 10% can be expected, depending on the baseline response proportion when using neither intervention. Currently there is insufficient evidence to say whether high quality scanned signatures have similar effects to handwritten signatures, when used on letters with participants’ names. Randomised controlled trials comparing electronic with handwritten signatures are needed.

**CONCLUSIONS**

This meta-analysis of the best available evidence indicates that researchers using postal questionnaires can increase response by addressing participants by name on cover letters. The effect appears to be enhanced by including hand-written signatures.

**ACKNOWLEDGEMENTS**

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**COMPETING INTERESTS**

The authors declare that they have no competing interests.

**AUTHORS’ CONTRIBUTIONS**

PS and PE designed the study, extracted and analysed the data, interpreted the results and wrote the paper.
REFERENCES


7 Wright SJ: Mail survey response rates: A test of four techniques designed to increase response rates and a discussion of the associated cost considerations. Student Research Report. Massey University, Department of Marketing; 1984.


FIGURE 1 Odds ratios for questionnaire response associated with the inclusion of participants’ names on covering letters.
FIGURE 1

<table>
<thead>
<tr>
<th>Participant’s name only</th>
<th>Intervention</th>
<th>Control</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roberts 1978</td>
<td>361/516</td>
<td>357/528</td>
<td>1.12 (0.86, 1.45)</td>
</tr>
<tr>
<td>Wright 1984</td>
<td>242/325</td>
<td>225/336</td>
<td>1.44 (1.03, 2.02)</td>
</tr>
<tr>
<td>Childers 1985</td>
<td>157/250</td>
<td>141/250</td>
<td>1.31 (0.91, 1.87)</td>
</tr>
<tr>
<td>Martin 1989</td>
<td>242/1000</td>
<td>221/1000</td>
<td>1.13 (0.91, 1.39)</td>
</tr>
<tr>
<td>White 1997a</td>
<td>29/70</td>
<td>29/70</td>
<td>1.00 (0.51, 1.96)</td>
</tr>
<tr>
<td>White 1997b</td>
<td>26/70</td>
<td>27/70</td>
<td>0.94 (0.48, 1.86)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>1057/2231</td>
<td>1000/2254</td>
<td>1.18 (1.03, 1.34)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participant’s name &amp; hand-written signature</th>
<th>Intervention</th>
<th>Control</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weilbacher 1952</td>
<td>87/235</td>
<td>98/237</td>
<td>0.83 (0.58, 1.21)</td>
</tr>
<tr>
<td>Dillman 1974</td>
<td>353/458</td>
<td>322/469</td>
<td>1.53 (1.15, 2.06)</td>
</tr>
<tr>
<td>Matteson 1974</td>
<td>325/1062</td>
<td>225/1061</td>
<td>1.64 (1.35, 1.99)</td>
</tr>
<tr>
<td>Kerin 1976</td>
<td>93/220</td>
<td>64/220</td>
<td>1.78 (1.20, 2.65)</td>
</tr>
<tr>
<td>King 1978</td>
<td>89/161</td>
<td>35/80</td>
<td>1.59 (0.93, 2.73)</td>
</tr>
<tr>
<td>Worthen 1985a</td>
<td>135/500</td>
<td>111/500</td>
<td>1.30 (0.97, 1.73)</td>
</tr>
<tr>
<td>Worthen 1985b</td>
<td>56/188</td>
<td>56/188</td>
<td>1.00 (0.64, 1.56)</td>
</tr>
<tr>
<td>Worthen 1985c</td>
<td>63/177</td>
<td>46/177</td>
<td>1.57 (1.00, 2.48)</td>
</tr>
<tr>
<td>Green 1989</td>
<td>224/298</td>
<td>188/286</td>
<td>1.58 (1.10, 2.26)</td>
</tr>
<tr>
<td>Gitelson 1992</td>
<td>26/150</td>
<td>20/150</td>
<td>1.36 (0.72, 2.57)</td>
</tr>
<tr>
<td>Shin 1992c</td>
<td>144/200</td>
<td>114/200</td>
<td>1.94 (1.28, 2.94)</td>
</tr>
<tr>
<td>Shin 1992d</td>
<td>166/200</td>
<td>151/200</td>
<td>1.58 (0.97, 2.59)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>1761/3849</td>
<td>1430/3768</td>
<td>1.45 (1.27, 1.66)</td>
</tr>
</tbody>
</table>