

## **Increasing response rates: You CAN tell a questionnaire by its colour**

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### **Abstract**

Providing respondents with pre-paid incentives or using multiple reminders have been shown to improve response rates to mail surveys. However, both add to the cost and effort of conducting surveys, prompting researchers to investigate lower cost, less labour intense alternatives. One such alternative is to use coloured questionnaires. This study examined the effect of four different questionnaire colours (bright red, green, blue and purple) on response rates to a mail survey of 1600 New Zealand residents randomly drawn from the New Zealand Electoral Roll. The coloured questionnaires generated significantly different response rates – from 60% – 71%. Purple proved to be the most effective colour overall for both male and female respondents, across all age groups, and with each response wave.

Keywords: response rate, questionnaire colour

### Literature Review

The ongoing decline in mail survey response rates (Bednall and Shaw, 2003) has prompted researchers to continually seek out and test ways to encourage participation by respondents. Whilst many procedures have been tested, it is generally accepted that pre-paid incentives, in particular small cash rewards, are the most effective way to achieve faster and higher response rates in mail surveys (Church, 1991; Edwards, Roberts, Clarke, DiGuseppi, Pratrip, Wentz and Kwan, 2002). Unfortunately, in countries such as New Zealand, sending cash via the mail is now contrary to postal regulations. Incentives add to the expense involved, so researchers, particularly those whose surveys have to be completed under severe budgetary constraints, need alternative options.

A range of techniques that could possibly improve mail survey response rates have been reported in the literature, with some adding nothing (or very little) to the cost of the survey. For example, aspects of the cover letter (tone, layout, letterhead, signature, status of researcher), questionnaire (length, question type, topic, layout, colour) and survey envelope (size, address form, address personalisation, logo, type of postage) have all been tested, with varying results (Linsky, 1975; Kanuk and Berenson, 1975; Heberlein and Baumgartner, 1978; Dillman 1978, 2000; Yu and Cooper, 1983; Harvey, 1987; Fox, Crask and Kim, 1988; Brennan, 1992; Edwards et al, 2002). This study focuses on just one of these elements – the colour of the questionnaire.

There are only a handful of published studies on the effect of questionnaire colour on response rates. Buttle and Thomas (1996), Etter, Cucherat and Perneger (2002) and Hartley and Rutherford (2003) reviewed these studies, with Hartley and Rutherford (2003) finding no difference in response rates from white versus coloured questionnaires in nine of the twelve studies reviewed (for details, see Dunlap, 1950; Gullahorn and Gullahorn, 1963; Pucel, Nelson and Wheeler, 1971; Pressley and Tullar, 1977; Jobber and Sanderson, 1983; Fullerton and Dodge, 1988; Greer and Lohtia, 1994; Hartley, 2000). Bender (1957) tested combinations of different coloured questionnaires and non-matching coloured envelopes, reporting no effect due to colour.

Of the three studies finding colour effects, one found yellow more effective under certain conditions (Blythe and Essex, 1981); one found a significantly higher response rates from pink compared to white under certain conditions (Matteson, 1974); and one found blue/yellow to be more effective than black/white (LaGarce and Washburn, 1995; LaGarce and Kuhn, 1995).

These published studies primarily involved executives, graduates, university staff or members of professional associations, with none reporting on the use of colour in surveys of the general public. Since a large number of mail surveys are conducted with members of the general public, it would be useful to know whether colour has an effect on response rate among this population. It would also seem sensible for any new study to examine colours judged suitable for the survey under consideration, rather than restrict the choices to colours used previously. It would also be of interest to know whether any effects due to questionnaire colour vary with age or gender, given the common observation that differences in colour preferences are associated with these variables.

There are various opinions about how and why using coloured questionnaires might affect response to surveys. It is widely acknowledged that different colours evoke different emotional reactions (Hempill, 1996; Hartley and Rutherford, 2003), and this has led to the suggestion that different colours may elicit different response behaviours, although this has not been systematically investigated. However, a more pragmatic explanation is that coloured questionnaires are simply more noticeable and stand out better in the clutter of everyday junk mail (Pressley and Tullar, 1977; Fullerton and Dodge, 1988; Greer and Lohtia, 1994; Hartley, 2000). A key question then, is whether one colour is more effective than another.

## Method

Sixteen hundred (1600) New Zealand residents were randomly selected from the 2005 electoral roll, and randomly assigned to one of four treatment groups for an experiment on incentives. Within each of these four experimental groups, respondents were randomly allocated one of the four versions of the questionnaire (bright red, lime green, turquoise blue, bright purple) – see Figure 1. As such, the questionnaire colour experiment was balanced across the incentive experiment. The questionnaires were identical except for colour and the format of a single question near the end of the survey. These colours were specifically chosen to make the questionnaire look less academic and more ‘fun’, and to set a tone in keeping with the topic (Reality TV). A white control was sacrificed due to budgetary constraints.

The survey was conducted between August 31 and October 21, 2005, with the first reminder sent 16 days after the first mailing, and the second reminder sent 13 days after that. The eight page questionnaire (topic Reality TV) was in the form of an A4 booklet (A3 folded). The cover letters were on white A4 University letterhead, signed by both researchers. In the mailings in which a questionnaire was sent (first and third for three groups; first and second for one group), the surveys were sent in a white A4 envelope with the University’s logo in the top left-hand corner. The other mailing was in a white A5 envelope, identical to the A4. A reply paid envelope was provided in all mail-outs. Undelivered mail (GNAs) and ineligible respondents (advised as offshore or deceased) were removed.

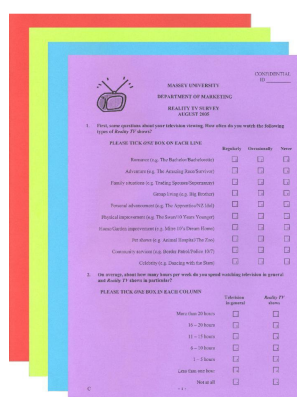


Figure 1. Questionnaires

## Results

### Response rates

Table 1 reports the response rates associated with each colour of questionnaire. The response rates for the four colours ranged from 60% to 71% with a mean of 64% after three waves (initial mail-out and two reminders). The differences between the colours were both statistically and managerially significant. The purple questionnaires generated a response rate 6% higher than blue and between 10% - 11% higher than the green and red questionnaires.

**Table 1. Response Rate by Questionnaire Colour**

	Questionnaire Colour				Total
	Red	Green	Blue	Purple	
	%	%	%	%	%
<b>Valid</b>	59.7	61.2	65.2	<u>71.0</u>	64.3
<b>Non-Response</b>	40.3	38.8	34.8	29.0	35.7
<b>N</b>	390	389	385	390	1554

Note:  $X^2 = 12.99$  df = 3 p = .005

### Effect by Age Group

Table 2 provides a break-down of response rate by age-group. Purple produced the highest response rate regardless of the age group of respondents. A prior test confirmed a non-significant interaction between age and gender with regard to the effect of colour. The highest response for all colours was from respondents in the 51-70 age bracket. Purple performed the best across all age groups, followed by blue. Red performed poorly for respondents under 30 or over 70 with green performing quite poorly with respondents under 30. While the results suggest age-related colour effects, the differences in response rates for the four questionnaire colours are non-significant at the .05 level for all age brackets. However, the 18-30 group, which appears to have an aversion to green and red, almost reach significance (p=.056) at the .05 level.

**Table 2. Effect of Questionnaire Colour on Response Rate by Age Group**

Age Group	N	Questionnaire Colour				Overall	$\chi^2$	p
		Red	Green	Blue	Purple			
		%	%	%	%	%		
<b>18-30</b>	303	<u>50.0</u>	<u>45.8</u>	62.8	<u>64.2</u>	55.4	7.51	.06
<b>31-50</b>	624	62.7	59.5	64.6	<u>69.0</u>	63.9	3.20	.36
<b>51-70</b>	450	66.3	73.0	68.2	<u>75.8</u>	<u>71.1</u>	3.12	.37
<b>70 +</b>	177	<u>53.3</u>	61.2	64.1	<u>75.0</u>	63.3	4.62	.20
<b>Overall</b>	1554	59.7	61.2	65.2	<u>71.0</u>	64.3		

Note: df = 3

### Effect by Gender

Table 3 reports response rates by gender. For both males and females, the colour of the questionnaire made a significant difference to the response rate. Males did not respond well to red, while females did not respond well to green. Purple however was the most effective colour for both males and females.

**Table 3. Effect of Questionnaire Colour on Response Rate by Gender**

Gender	N	Questionnaire Colour					$\chi^2$	P
		Red	Green	Blue	Purple	Overall		
		%	%	%	%	%		
Male	767	<u>52.3</u>	61.7	61.4	<u>67.6</u>	60.6	9.62	.02
Female	787	67.4	<u>60.7</u>	69.4	<u>74.1</u>	<u>67.9</u>	8.80	.03
Overall	1554	59.7	61.2	65.2	<u>71.0</u>	64.3		

Note: df = 3

It may be that colour makes questionnaires easier to find amongst other mail and clutter once put down. If so, this would suggest that the effect of colour would be greatest among non-respondents sent a reminder, who on receiving the reminder letter would look for the questionnaire sent in an earlier posting in order to respond. In this study, one would expect to see the greatest colour effect in Wave 2.

As can be seen in Table 4, the purple questionnaire generated the highest response rate during every phase of the survey, both when a questionnaire was supplied (Waves 1 and 3) and when only a reminder letter was sent (Wave 2). Although the differences between the colours are not statistically significant for any wave, it is interesting that green elicited a much lower response than both blue and purple in Wave 2, whereas purple elicited a much higher response than the other three colours in Wave 3. The reasons for these results are not apparent, although sampling error cannot be ruled out.

**Table 4. Effect of Questionnaire Colour on Response Rate by Wave**

Wave	N	Questionnaire Colour					$\chi^2$	P
		Red	Green	Blue	Purple	Overall		
		%	%	%	%	%		
1	1554	35.1	33.6	36.5	<u>38.0</u>	35.8	1.38	.71
2	744	19.0	16.6	22.5	<u>23.3</u>	20.3	3.42	.33
3	581	26.5	28.7	27.5	<u>36.3</u>	29.6	3.95	.27
Overall	1554	59.7	61.2	65.2	<u>71.0</u>	64.3		

Note: Wave 1 includes all four treatment groups. Waves 2 and 3 exclude Treatment Group 3 which received a replacement questionnaire with the first reminder but not with the second.

### Discussion

The results of this study indicate that questionnaire colour can affect mail survey response rates and that the most effective colour overall is bold purple - at least in this study, with this topic, population and shade of purple! Purple achieved the highest response rates by a significant margin among both males and females, in each age category, and in each wave.

The question as to why this particular colour should be more effective is pure speculation. One suggestion is that colours have “psychological effects”, although studies by Weller and Livingston (1988) and Godar (2000) did not find strong “psychological effects” due to paper or background colour.

A more common alternative view is that certain colours are simply easier to see, making the questionnaires easier to find when the respondent decides to complete the survey, or when a reminder letter arrives and prompts completion (Pressley and Tullar, 1977; Fullerton and Dodge, 1988; Greer and Lohtia, 1994; Hartley, 2000). However, this does not explain the effect in our study, as all four colours were visually intrusive. Furthermore, purple was the most effective colour both when a questionnaire was provided as well as when it was not. Perhaps a combination of perceptual and emotional factors was at play, given that purple has strong association with both royalty and a market leading brand of chocolate.

### Conclusion

While a response rate of 71% (purple questionnaire) or even 65% (blue questionnaire) is very respectable, we cannot tell from our study whether these colours performed any better than white would have done (*cf.* Pressley and Tullar, 1977). Our results however do indicate that colour can have an effect on response rates in mail surveys of the general public with both blue and purple achieving good response rates across all age groups and both genders. These results suggest opportunities for future research using white as a control and testing different colours with larger samples.

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