

Obtaining Purchase Probability Data via Telephone Surveys: A Preliminary Test of Two Techniques

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This paper examines two alternative methods of using the Juster Scale in telephone surveys, and the effects on response rate, respondent comprehension, and accuracy of prediction. A random sample of 80 people was selected from the Palmerston North telephone directory and randomly allocated to one of two treatment groups. Respondents in Group 1 (Juster Scale) were mailed a letter with the Juster Scale printed on the back. The letter informed them that they would be contacted by telephone within the next two days. There was no preliminary mail contact with Group 2 (Verbal Probability Scale). Two days after the mailout to Group 1, all respondents were surveyed by telephone. In the first telephone interview, respondents were asked to provide a probability of purchase for nine food items, using either the pre-mailed Juster Scale (Group 1) or a verbal eleven-point purchase probability scale (Group 2). A followup telephone call was made to each respondent one month after the first call, to determine actual purchases of the products involved in the study. Both the mailed Juster Scale and the Verbal Probability Scale produced acceptable estimates, although the Verbal Probability Scale consistently produced more accurate results. The results of this study suggest that the Verbal Probability Scale is a viable method for obtaining purchase probabilities in telephone surveys.

Keywords: Juster Scale, purchase probability, intention, telephone survey

Introduction

Telephone surveys have become the main method of data collection for large samples (Aaker & Day 1990), particularly among commercial research houses. The use of the CATI system, particularly when combined with random-digit dialling, means that considerable control over the quality of interviewing is possible, monitoring interviewer performance is easily accomplished, and the cost of establishing a sampling frame is eliminated. Geographical barriers are no obstacle, fieldwork, including callbacks, can be conducted quickly and efficiently, and the results can be produced more quickly than with other survey methods. In addition, the telephone is an "irresistible intruder" (Ball 1968) that facilitates contact with respondents; when the telephone rings, most people will answer it.

Unfortunately, a telephone survey is not always a viable option. It is generally accepted that telephone surveys are unsuitable for interviews that will last for more than about 20 minutes, and are not particularly suitable for examining complex or sensitive issues, or topics such as finance and politics. Furthermore, it is not possible to present visual concepts or physical objects, such as lists, illustrations or samples. This is a major drawback, since researchers often want respondents to rate a range of items on some sort of scale. In a face-to-face or mail survey, printed lists can be provided. But in a telephone survey, the list has to be read out. Because most people have a limited ability to remember information provided in this way, response categories are often limited to no more than four or five (Aaker & Day 1980; Bradburn & Sudman 1979; Dillman 1978).

This limitation is a major problem if one wishes to obtain an estimate of future purchases. The traditional approach is to use some sort of purchase intention scale, sometimes using only three scale points, but typically using five (definitely would buy...definitely would not

buy). These scales can be used over the telephone, and often are. The problem is that, regardless of the survey method, purchase intention scales are notoriously inaccurate. A much better alternative is to use the purchase probability scale developed by Juster (1966). However, this is an eleven point scale with both verbal and numerical scale point labels (see Figure 1), making it unsuitable for telephone surveys in its present form.

The purpose of this paper is to examine two alternative methods of using the principle of the Juster Scale in telephone surveys. In particular, the study examines the effect of the two methods on response rate, respondent comprehension, and accuracy of prediction.

Method

A random sample of 80 people was selected from the Palmerston North telephone directory and randomly allocated to one of two treatment groups. Respondents in Group 1 (Juster Scale) were mailed a letter addressed to "The Householder", which instructed the recipient to pass it on to the "main grocery shopper" in the household. The envelope contained a covering letter which informed them that they would be contacted by telephone within the next two days.

Figure 1. The Juster Scale

10	Certain, practically certain	(99 in 100)
9	Almost sure	(9 in 10)
8	Very probable	(8 in 10)
7	Probable	(7 in 10)
6	Good possibility	(6 in 10)
5	Fairly good possibility	(5 in 10)
4	Fair possibility	(4 in 10)
3	Some possibility	(3 in 10)
2	Slight possibility	(2 in 10)
1	Very slight possibility	(1 in 10)
0	No chance, almost no chance	(1 in 100)

The Juster Scale was printed on the back of the letter, which respondents were asked to keep by their telephone. There was no preliminary mail contact with Group 2 (Verbal Probability Scale). The study was conducted between the end of July and the end of August, 1993.

Procedure

Two days after the mailout to Group 1, all respondents were surveyed by telephone. In the first telephone interview, respondents were asked to provide a probability of purchase for nine food items, using either the pre-mailed Juster Scale (Group 1) or a verbal eleven-point purchase probability scale (Group 2). The instructions were as follows:

Group 1 (Juster Scale)

Having identified the "main grocery shopper" and ascertained that the respondent had the letter in front of them, the following statement was read out:

We would like to know what the prospects are of you buying certain products during the next four weeks. The answers you may give are on the Juster Scale that is printed on the back of the letter we sent you. The answers are arranged on a scale a bit like a thermometer. If you are certain, or practically certain that you will purchase a product then you would choose the answer "10". If you think there is no chance, or almost no chance of purchasing, the best answer would be "zero". If you are uncertain about the prospects, choose another answer as close to "0" or "10" as you think it should be.

Group 2 (Verbal Probability Scale)

The respondents in this group were not sent the Juster Scale. They were simply contacted by telephone and read the following statement:

We would like to know what the prospects are of you buying certain products during the next four weeks. I would like you to answer on a scale of "zero" to "10". If you are certain, or practically certain that you will purchase a product than you would choose the answer "10". If you think there is no chance, or almost no chance of purchasing, the best answer would be "zero". If you are uncertain about the prospects, choose another answer as close to "0" or "10" as you think it should be. You can think of the numbers as chances out of "10". For example, 3 would mean 3 chances in 10, or there was some possibility. An answer of 6 would mean 6 chances in 10, or there was a good possibility of you purchasing the product.

Respondents in both groups were then asked the following standard question:

Taking everything into account, what are the chances that you, or anybody else in your household, will buy the following products within the next four weeks, that is, between now and the end of August?...

*...at least one tube or pump of toothpaste
...at least one container of margarine
...at least one packet of butter
...at least one carton of eggs
...at least one tin or packet of spaghetti
...any pre-cooked chicken
...any ice-cream*

...at least one packet of cheese
...any organically grown, fresh vegetables or fruit

Each interview was preceded by a standard introduction that identified the interviewer and the survey organisation, guaranteed confidentiality, and notified respondents of their right to decline. The interview concluded with a set of demographic questions (age, occupation, personal and household income, size of household, and proportion of shopping done). A followup telephone call was made to each respondent one month after the first call, to determine actual purchases of the products involved in the study.

Results and Discussion

Response Rate

Table 1 shows the response rates for the two groups. In Group 1, which was mailed the Juster Scale, the response rate (47%) was lower than in Group 2 (74%), and the rate of refusal higher (26% compared to 16%). This result suggests that, provided the accuracy of predictions are satisfactory, it would be better to use the verbal probability scale over the telephone rather than a pre-mailed Juster Scale, since this not only gives a higher response rate, but is less time consuming and less expensive to conduct.

Table 1. Response rate details

	Group 1 (Juster Scale)		Group 2 (Verbal Probability Scale)	
	n	%	n	%
Successful	14	47	37	74
Unreachable*	4	13	4	8
Unavailable	4	13	1	2
Refused	8	26	8	16
Total Attempted	30	100	50	100

* Did not answer the phone by the 3rd call back, or there was no such number.

However, the result for Group 1 should be treated with some caution, since there is considerable evidence that it is possible to achieve response rates in excess of 60% in mail surveys (Brennan 1992), and achieve much lower rates of refusal. There is an absence of published information on the matter, but there is no reason to doubt that respectable response rates and refusal rates could also be achieved for mixed-mode surveys of the type used with Group 1. A first step may be to address the letter to a specific person in a household, rather than to "The Householder" (see Brennan 1992).

Respondent comprehension

None of the respondents in either group reported any difficulty with the scale they were asked to use. Thus, as far as ease of use is concerned, either method would be acceptable.

Accuracy of Predictions

The predicted and actual four week purchase rates for each item are shown in Table 2, along with the percentage error in prediction. The mean absolute deviations (MAD) of the errors are also shown.

Table 2. Accuracy of the mailed Juster Scale and the Verbal Probability Scale

	Juster Scale (n = 14)			Verbal Probability Scale (n = 37)		
	Predicted	Actual	Error of prediction	Predicted	Actual	Error of prediction
	%	%	%	%	%	%
Toothpaste	95.0	100.0	-5.0	89.5	75.0	14.5
Margarine	72.1	64.3	7.8	74.6	75.7	-1.1
Butter	95.7	100.0	-4.3	78.4	78.4	0.0
Eggs	97.9	100.0	-2.1	90.5	97.3	-6.8
Spaghetti	79.3	78.6	.7	69.7	67.6	2.1
Chicken	24.3	21.4	2.9	17.8	16.2	1.6
Ice cream	55.0	28.6	26.4	48.6	54.1	-5.5
Cheese	91.4	100.0	-8.6	32.7	100.0	-6.2
Organic Produce	51.4	42.9	8.5	32.7	25.0	7.7
Including Ice-cream	MAD		7.4	MAD		5.1
Excluding Ice-cream	MAD		5.0	MAD		5.0

The errors in the estimates were generally quite small for both methods; mostly less than 10%. The major exception is the Group 1 estimate for ice-cream, which has an error of over three times that for the other items, suggesting that this result is an anomaly.

An overall measure of accuracy is provided by the MAD values reported at the bottom of Table 2. When all nine items are considered, the Verbal Probability Scale produced marginally more accurate estimates than the Juster Scale. When the ice-cream results are excluded from the analysis, the accuracy of both methods increases, and the difference between the two methods disappears. The differences between the MAD scores are too small to make too much of them; both methods produced acceptable results.

Table 3 shows a comparison of the mean of the absolute individual errors for each of the tested products. While none of the differences are individually statistically significant, the Verbal Probability Scale produced lower mean errors in estimation for eight of the nine

products. This difference is significant ($p < 0.02$) suggesting that, on the whole, the Verbal Probability Scale is more accurate than the Juster Scale.

Table 3. Mean absolute individual errors

	Juster Scale (n = 14)	Verbal Probability Scale (n = 37)	Significance of Difference
Toothpaste	.85	.77	.33
Margarine	.81	.77	.59
Butter	.85	.77	.36
Eggs	.85	.79	.46
Spaghetti	.83	.76	.42
Chicken	.77	.71	.45
Ice Cream	.78	.75	.72
Cheese	.81	.84	.63
Organic Produce	.79	.72	.36

Conclusions

Both the mailed Juster Scale and the Verbal Probability Scale produced acceptable estimates, although the Verbal Probability Scale consistently produced more accurate results. This result is contrary to what one would expect, since previous studies have demonstrated the superiority of the Juster Scale, which has both verbal and numerical scale-point labels, over other forms of the scale with fewer or different scale-point labels (Gendall, Esslemont & Day, 1991). It is possible that the results obtained in this study are a consequence of sampling error, because of the small sample sizes involved. Even so it does seem reasonable to conclude that the Verbal Probability Scale is at least an acceptable alternative to the mailed Juster Scale.

Despite the small sample sizes involved, the results of this study suggest that the Verbal Probability Scale is a viable method for obtaining purchase probabilities in telephone surveys. While the mailed Juster Scale would also produce acceptable estimates, because of the mailout in addition to the telephone survey, it is likely to achieve a lower response rate, would require a longer time period for the fieldwork, and would be more expensive. In contrast, the Verbal Probability Method could be used in a regular telephone survey without foregoing any of the advantages the telephone provides.

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