

ment: history and overview. *Appl Cognit Psychol*. In press.

15. Willis, G. B., Royston, P., and Bercini, D.: The use of verbal report methods in the development and testing of survey questionnaires. *Appl Cognit Psychol*. In press.
16. Lessler, J., Tourangeau, R., and Salter, W.: Questionnaire design in the cognitive research laboratory: results of an experimental prototype. *Vital Health Stat [6], No. 1, DHHS Publication No. (PHS) 89-1076*. U.S. Government Printing Office, Washington, DC, May 1989.
17. Royston, P., and Bercini, D.: Questionnaire design research in a laboratory setting: results of testing cancer risk factor questions. *Proceedings of the Section on Survey Methods Research, American Statistical Association, Alexandria, VA, 1987*, pp. 829-833.
18. Royston, P., Bercini, D., Sirken, M., and Mingay, D.: Questionnaire design research laboratory. *Proceedings of the Section on Survey Methods Research, American Statistical Association, Washington, DC, 1986*, pp. 703-707.

19. Ericsson, K. A., and Simon, H. A.: *Protocol analysis: verbal reports as data*. MIT Press, Cambridge, MA, 1984.
20. Poon, L. W.: Differences in human memory with aging: nature, causes, and clinical implications. *In Handbook of the psychology of aging*, edited by J. E. Birren and K. W. Schaie. Ed. 2. Van Nostrand Reinhold, New York, 1985, pp. 427-462.
21. Fitti, J. E., and Kovar, M. G.: The Supplement on Aging to the 1984 National Health Interview Survey. *Vital Health Stat [1], No. 21, DHHS Publication No. (PHS) 87-1323*. U.S. Government Printing Office, Washington, DC, June 1987.
22. Rubenstein, L. Z., Schairer, C., Wieland, G. D., and Kane, R.: Systematic biases in functional status assessment of elderly adults: effects of different data sources. *J Gerontol* 39: 686-691 (1984).
23. Guralnik, J. M., Branch, L. G., Cummings, S. R., and Curb, J. D.: Physical performance measures in aging research. *J Gerontol* 44: M141-146 (1989).

Comparison of Three Inducement Techniques to Improve Compliance in a Health Survey Conducted by Telephone

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Synopsis

The use of telephone interviews for epidemiologic and public health studies has increased in recent years.

Since telephone surveys are susceptible to lower response rates than personal interviews, several attempts have been reported to increase respondents' compliance using various precontact procedures. This investigation evaluates the comparative effectiveness of three techniques to enhance compliance with a relatively long telephone interview on epidemiologic topics.

The theoretical and practical applications in the domain of telephone surveys of two techniques, the foot-in-the-door and the low ball, commonly considered nonpressure techniques, are discussed. A newly suggested, combined compliance procedure is also introduced and tested.

Results show that compliance was greater for the new method when compared with each of the other two methods. Moreover, each of the three methods outperformed a control condition. The theoretical models developed to devise and explain the new techniques received empirical support in a public health survey employing 335 adult residents of Tel Aviv, Israel, in May 1988.

TELEPHONE INTERVIEWING is becoming a popular procedure for conducting health surveys. In fact, it is often the sole method of data collection in epidemiologic studies on subjects such as occupational exposure (1, 2), and it is also commonly used in population-based, case-control studies of cancer (3). The validity of telephone interview data depends on respondents' willingness to comply with the request to

be interviewed and to supply full and accurate data to the telephone interviewer (4). In other words, problems associated with refusal are important to survey researchers, primarily because of potential biases that may affect survey estimates.

Achieving a high cooperation rate depends on a number of factors, such as the telephone interviewers (5) and the content of the interview (6). However, the body

of evidence supporting the potency of prior notification and inducements as techniques for enhancing response rates is growing (7, 8).

The intent of this paper is to present and empirically evaluate three inducement techniques with no obvious source of pressure: the foot-in-the-door (FITD) technique, the low-ball procedure (LB), and a combined FITD and LB technique. The FITD technique has already been applied in mail surveys (9) to produce a higher rate of cooperation by respondents, but it has not been tested much in telephone surveys. Neither has it been tested in epidemiologic or health settings. The LB procedure has not been previously tested in survey research. Thus, in contrast to previous research, our study examines the relative effectiveness of the LB and the newly suggested combined system in a setting of considerable interest to survey researchers in general and epidemiologic researchers in particular, namely, a request to participate in a relatively long telephone interview.

Background Literature and Hypotheses

Foot-in-the-door. This paradigm's name was derived from the analogy of a salesman setting his foot in a prospect's door, and it illustrates that compliance with a small, initial request significantly enhances the likelihood of compliance with a large, subsequent target request. For example, Freedman and Frazer (10), generally credited as the technique's developers, found that home owners who first agreed to sign a petition were significantly more likely to agree to the placement in their yards of a large sign promoting auto safety than comparable home owners who were only asked to accept the large sign placement. Subsequent studies (11) have replicated the Freedman and Frazer findings. A comprehensive review of the FITD literature was published in 1983 (12).

As discussed more fully by Scott (13), the FITD effect has been explained in terms of self-perception and attribution theories (14, 15). Presumably, compliance with an initial, small request leads a person to self-attribute a favorable disposition toward such behavior, and perceiving himself as a consistent individual, thus increasing the probability of compliance with a second, critical request. In addition, Hansen and Robinson (16) have demonstrated that building a high level of subject involvement in the topic during the initial small request may further generate a significantly higher response to the target request (in their study this was the response rate to a mail survey). Therefore, a properly designed "foot" that generates above average involvement will lead to greater degree of compliance than normal with the subsequent target request.

Low-ball procedure. Another procedure for increasing compliance without pressure, the low-ball technique, was introduced and validated by Cialdini and coworkers (17). This procedure has been primarily demonstrated in prosocial request contexts, like eliciting donations, but not in the survey domain.

In the LB procedure, the subject is led to accept performing the target behavior immediately, without knowing the full cost of the behavior. It is only after the subject has agreed to carry out the task that the full cost is revealed. Like the FITD technique, this tactic is also commonly used by sales people, especially new car dealers (18), to produce compliance from customers. The sales person tries to induce the customer to make an active decision to buy a car by offering an extremely good deal. Once the customer has made the decision, the sales person partially removes the advantage of the deal in a variety of ways. However, it is expected that the customer's decision will persist even after the target behavior has become more costly.

The theoretical interpretation of the LB behavior is based on the psychological concept of commitment that was fully formulated by Kiesler (19). Accordingly, an active initial decision to behave positively toward some object will tend to make the decision persist, not necessarily because the decision will produce a more favorable attitude toward the object in question, as in the case of self-perception, but because the active decision creates commitment.

The difference between the FITD technique and the LB procedure is that in the first technique the behavior initially requested may be related to the large request by the requester, but it is not the target behavior itself. In the LB procedure, the behavior requested initially is, in fact, the target behavior. Only the cost of carrying out the specific behavior changes. This additional "cognitive commitment" to perform the target behavior was advanced by researchers such as Burger and Petty (20) to account for the relative superiority of the LB over the FITD technique.

The combined technique. While each of these techniques has been shown to enhance compliance, it might be possible to increase compliance further by combining the two procedures. In the current study, the two procedures are indeed combined. The new compliance technique consists of two initial requests in one precall that precedes the target request—a long telephone interview.

The theoretical formulation to explain the possible superiority of the combined model is that it uses the essential elements of two different but possibly complementary methods. The LB procedure allows subjects to establish a strong cognitive commitment to the perform-

Table 1. Response rates, termination rates, and item non-response rates with three experimental conditions in a telephone health survey, Tel Aviv, 1988

Condition	Number called	Response rate		Termination rate (percent)	Item nonresponse (mean)
		Number	Percent		
Foot in the door	78	46	59.0	0.04	1.63
Low ball . . .	84	62	73.8	0.05	1.71
Combined.	63	53	84.1	0.04	1.64
Total. . . .	225	161	71.6	0.04	1.65
Control. . . .	81	39	48.1	0.06	1.81

ance of the target behavior. The FITD augments the number of these subjects who will agree to the target request by further establishing a positive attitude based on the "self-observing" of their previous behavior while possibly also becoming involved in the subject or topic area under consideration.

Hypotheses. On the basis of the extant FITD and LB literature, the general hypothesis was that all three techniques would be more effective in eliciting compliance with a lengthy telephone interview than a regular (control) procedure. It was further suggested that the combined LB and FITD procedures would induce greater compliance than either procedure used alone and that the LB technique will result in higher compliance than the FITD technique.

Method

Overview. The subject of the survey, which was carried out by means of relatively long (34 questions), probing telephone interviews, concerned various public health and health care matters in Israel. At the time of the survey (mid-1988), health care issues were at the forefront of private and public issues in Israel. The public health system in the country had come under heavy public criticism; physicians and nurses had been on strike; there was a polio breakout; and motor vehicle accidents had reached epidemic proportions. All those issues had been receiving much attention in the television, radio, and the press and in parliamentary debates.

Subjects. Subjects were 335 adult (18 years or more) residents of the Tel Aviv metropolitan area. They were selected at random from the most recent Tel Aviv telephone directory (about the same numbers of men and women). They were interviewed on weekdays between 4 p.m. and 9 p.m. and were randomly assigned to three experimental and one control condition. The sample

size exceeded the minimum requirement under Feldt and Mahmond's specifications (21).

Interviewers. Interviews were administered by a large Israeli research company, "Teleseker." This organization is well known throughout the country for its large centralized telephone interviewing (CTI) facilities. Eight experienced, professional interviewers administered the experimental and control treatments using the CTI facility. This strategy permitted centralized supervision of the interviewers' performances by the researchers and company staff and allowed quick usable feedback so that problems could be immediately solved. The very fact that all interviewers called from the same location under close supervision facilitated maximum control, thus reducing interviewer variance in ways not possible in other interviewing procedures.

All interviewers were thoroughly instructed in training sessions and while pretesting survey procedures and instruments. Interviewers' debriefing sessions included caller role-playing. A pilot test was first conducted to refine the wording of the forms, instructions and questions, selection procedures, and so forth. Interviewers were assigned randomly to one of the experimental or control groups and were unaware of the experimental manipulations.

Each interviewer was given a list of names and telephone numbers and each completed an average of 40 interviews. The callers began each interaction by introducing themselves by name and as representing "Teleseker." The sponsoring organization, however, was identified as Tel Aviv University. The name of the subject in the initial telephone contact was recorded so that behavioral compliance could be identified and assessed. Also the number of attempts made to reach the subject was recorded by the interviewer on the form. Each subject was telephoned by the same interviewer in the second, target request, telephone contact.

Procedure. In the FITD-only condition, subjects were asked by the interviewer to comply with a small request to respond to three short questions involving health-related issues. The overall FITD design was inspired by the Hansen and Robinson 1980 study (16). In our study, however, the target request was the subjects' verbally agreeing to and behaviorally participating in a 20-minute telephone interview. (The actual interview took between 5 and 7 minutes.)

In the LB condition the interviewer solicited the respondent's agreement to participate, at a later date, in a telephone interview concerning health issues that would take approximately 10 minutes. The target behavior was the same—a 20-minute interview. Specifically, in the second call, the interviewer raised the

behavioral cost, explaining that "... the university had added more questions to the survey."

The first part of the combined condition consisted of an LB procedure in which the respondent was asked to participate in a forthcoming survey. An FITD procedure then followed in the form of the question "while we are on the phone could you please respond to three short questions concerning health matters?". Thus, the same FITD technique was employed in this condition, too. Moreover, the second call procedure was identical to the LB second call procedure.

The second call was made 3 days after the initial telephone contact. All subjects in the initial contact condition were called again regardless of whether they had agreed to participate or had responded to the initial short questions.

Dependent variables. This study tested the effect of each of the three experimental conditions on different types of response behavior: overall compliance (response rate), termination rate, item nonresponse rate, response bias, and volunteer bias. Response rate alone is an inadequate criterion for judging the effectiveness of inducement techniques. Methods that increase response rate may do more harm than good if they increase response bias or sample composition bias (22).

1. Response rate was defined as the percentage of total subjects approached who actually fulfilled the target request.
2. Termination rate was defined as the proportion of respondents who agreed to participate but did not complete the telephone interview.
3. Item nonresponse rate was measured by the number of questions for which no response was obtained.
4. Response bias was examined by comparing, for each question, response distribution across treatment.
5. Volunteer bias was measured by comparing demographic distribution of respondents across treatment groups.

Results

After three attempts at making the initial call to 254 subjects (not including the control group), the hit rate reached close to 88 percent. Therefore, of the 254 subjects contacted for the target request, 29 were dropped from the analysis because they could not be reached after three attempts. However, the attrition of subjects was quite evenly distributed and, therefore, not related to experimental treatments. Compliance with the initial request was very high and did not differ among subjects randomly assigned to the three multiple-request treatments. Analysis is based, therefore, on the total number

Table 2. Response rates and results of hypotheses¹ concerning three experimental conditions in a telephone health survey, Tel Aviv, 1988

Hypothesis	Z-test	Conclusion ²
Foot in the door greater than control.....	1.39	Correct, marginal
Low ball greater than control....	3.47	Correct, significant
Combined greater than control....	4.61	Correct, significant
Low ball greater than foot in the door.....	2.02	Correct, significant
Combined greater than foot in the door.....	3.13	Correct, significant
Combined greater than low ball...	1.41	Correct, marginal

¹One tailed test.
²Significant when $P < .10$, marginal when $.10 < P < .15$.

'Presumably, compliance with an initial, small request leads a person to self-attribute a favorable disposition toward such behaviors, and perceiving himself as a consistent individual, thus increasing the probability of compliance with a second, critical request.'

reached for the second target request.

A preliminary χ^2 analysis of the dependent variables within each condition showed no significant differences among the interviewers. Hence, the compliance data were quite free of caller effects, and the subsequent analysis could therefore be performed on collapsed data.

The experimental results are reported for each dependent variable. Appropriate means and percentages are listed in table 1. For the response rate, subjects who participated in the second interview were scored as compliers. Subjects who did not agree to take part in the interview were scored as noncompliers.

To test for differences in cooperation rates, a Z-test was employed (23). Given the nature of the data in the experiment, this provides pairs differences and directionality in accordance with research questions.

Response rate. Table 1 contains details of the number of subjects who complied within each condition. Overall compliance was 71.6 percent for the three experimental conditions and 48.1 percent for the control condition. The response rates show considerable variation among treatments, ranging from a low of 59 per-

It appears, therefore, that the psychological process in the low ball technique, of an unfulfilled commitment, is stronger in producing compliance than the self-attribute feeling expected in the foot-in-the-door technique.

cent for the FITD respondents to a high of 84.1 percent for the combined group respondents.

Following the hypotheses, two orthogonal contrasts were conducted. First, the compliance rate of subjects in the different request conditions (including those turning down the initial request) was compared with the compliance rate in the control condition. Regardless of whether subjects agreed to the initial request, they were included in the subsequent analysis to avoid a selection bias. However, the analysis was repeated after elimination of persons who did not comply with the first request. The results, nevertheless, remained unchanged.

As hypothesized, the overall response rate for the treatment groups is greater than for the control group ($\chi^2(3) = 25.38, P < 0.01$). Second, the rates of compliance within all four groups were compared. Of the six predictions (table 2) four were verified, and two only approached significance. The largest difference is between the combined procedure and the control group. The difference between the combined and the FITD groups is also significant, as is the difference between LB and FITD. Marginal differences were revealed between FITD and the control group and the combined and LB groups.

Termination rate. The number of respondents who agreed to answer the questions but did not complete the telephone interview was very small. Termination rates within experimental treatment and compared with the control condition were nonsignificant. Thus, compliance did not affect termination rate.

Response quality. As indicated in table 1, the request conditions did not produce a significant change in items reported, and therefore in rates of items omitted. The percentages are very small and very close to each other. Also, the values of the critical ratios were found to be nonsignificant. The overall mean of item nonresponse rate is 1.65, accounting only for 2.9 percent of questions.

Response bias. To investigate whether experimental treatments, although affecting response rate, might

cause differences in answers, comparisons were made across mean answers on each one of the fixed-response items for all treatment groups by means of χ^2 tests. As the comparisons involved a large number of significance tests, the probability of finding a particular number of significant test results was computed. For the latter procedure the binomial distribution is suitable (24). No significant mean differences within treatment groups were revealed. The overall nonsignificant results indicate that response bias was not affected. Because the results do not lead to differences in response distortion, the means and test scores are not reported.

Volunteer bias. To check whether the various manipulations influenced the composition of the respondent group, volunteer bias was measured. Chi-square tests and Kruskal-Wallis one-way analysis of variance were utilized to test for relationships between stimuli and the variables of age, sex, and health status. No relationships were found between the experimental conditions and any of the descriptive variables, meaning that the experimental manipulation did not induce certain consumer groups to respond more (or less) than others.

Conclusions

How to obtain compliance without pressure is of concern in a wide variety of contexts, including telephone surveys on epidemiologic topics. The basic hypothesis evaluated in this investigation was that the request technique during a telephone prenotification will significantly affect response rate for a target—a long telephone interview—without affecting response quality and the respondent's bias.

This study corroborates the findings in other studies that the FITD and LB techniques are effective in enhancing compliance with relatively high cost behaviors. Several studies that also tried to compare the two techniques (25) demonstrated the overall superiority of the LB over the FITD. This observation was also confirmed in our study in the telephone survey context. It appears, therefore, that the psychological process in the LB, of an unfulfilled commitment, is stronger in producing compliance than the self-attribute feeling expected in the FITD setting.

But, rather than simply investigating their relative efficiency, in this study we also attempted to explore whether the two techniques could be considered complementary to one another and produce in conjunction an even greater degree of compliance. The findings show that the LB-FITD combination outperformed each one of the two techniques on its own.

The results of this study are of theoretical and practical importance. First, the data provide support for the notion that cognitive commitment to an appeal aug-

ments the effect of the commonly used FITD technique. From a practical viewpoint, the results suggest that the telephone prenotification procedure is more effective in establishing a costly target behavior when researchers are able to manipulate a certain level of cognitive commitment, with minimal pressure, during the initial request. Also, of considerable practical interest is the relative ease with which the three techniques can be implemented in health surveys.

Because the low ball method involves a request that includes inaccurate information, its use is of ethical as well as practical concern. Although it is a common practice in experimental procedures to manipulate subjects and use misleading information to secure compliance, our feeling is that the ethics of the method is of paramount importance—particularly in terms of unethical applications based on the results. The issue is one of degree, and therefore only reasonable and ethical manipulation of subjects should be countenanced in using the low ball technique.

References

1. Baumgarten, M., Siemiatycki, J., and Gibbs, G. W.: Validity of work histories obtained by interview for epidemiologic purposes. *Am J Epidemiol* 118: 585-591 (1983).
2. Bond, G. G., et al.: Validation of work histories obtained from interviews. *Am J Epidemiol* 128: 343-351 (1988).
3. Hartge, P., et al.: Design and methods in a multi-center care-control interview study. *Am J Public Health* 74: 52-56 (1984).
4. Dillman, D. A.: *Mail and telephone surveys: the total design method*. John Wiley & Sons, New York, 1978.
5. Harlow, B. L., and Hartge, P.: Telephone households screening and interviewing. *Am J Epidemiol* 117: 632-633 (1983).
6. Struebbe, J. M., Kerman, J. B., and Grogan, T. J.: The refusal problem in telephone surveys. *J Advertising Res* 26: 29-37 (1986).
7. Hornik, J.: Impact of pre-call request form and gender interaction on response to a mail survey. *J Marketing Res* 14: 144-151 (1982).

8. Lavrakas, J. P.: *Telephone survey methods*. Sage Publications, Beverly Hills, CA, 1987.
9. Allen, C. T., Schewe, C. D., and Wijk, G.: More of self-perception theory's foot technique in the pre-call/mail survey setting. *J Marketing Res* 17: 489-502 (1980).
10. Freedman, J. L., and Frazer, S.: Compliance without pressure: the foot-in-the-door technique. *J Pers Soc Psychol* 4: 195-202 (1966).
11. Reingen, P. H., and Kerman, J. B.: More evidence on interpersonal yielding. *J Marketing Res* 16: 588-593 (1979).
12. Beaman, A. L., et al.: Fifteen years of foot-in-the-door research: a meta-analysis. *Pers Soc Psychol Bull* 9: 181-196 (1983).
13. Scott, A.: Modifying socially-conscious behavior: the foot-in-the-door technique. *J Consumer Res* 4: 156-164 (1977).
14. Bem, D. J.: Self-perception theory. *In* *Advances in experimental social psychology*, edited by L. Berkowitz. Academic Press, New York, 1972, vol. 6, pp. 1-62.
15. Kelley, H. H.: The process of causal attribution. *Am Psychologist* 2: 107-128 (1973).
16. Hansen, R. A., and Robinson, L. M.: Testing the effectiveness of alternative foot-in-the-door manipulations. *J Marketing Res* 17: 359-364 (1980).
17. Cialdini, R. B., et al.: Low-ball procedure for producing compliance: commitment then cost. *J Pers Soc Psychol* 36: 403-476 (1978).
18. Carlson, M. D.: *How to get your car repaired without getting gypped*. Harrow Books, New York, 1973.
19. Kiesler, C. A.: *The psychology of commitment: experiments linking behavior to belief*. Academic Press, New York, 1971.
20. Burger, J. M., and Petty, R. E.: The low-ball compliance technique: task or person commitment? *J Pers Soc Psychol* 40: 492-500 (1981).
21. Feldt, L. S., and Mahmond, M. W.: Power function charts for specification of sample size, *Psychometrika* 23: 201-210 (1958).
22. Houston, M. J., and Ford, N. M.: Broadening the scope of methodological research on mail surveys. *J Marketing Res* 13: 397-403 (1976).
23. Guilford, J. P., and Fruchter, B.: *Fundamental statistics in psychology*. Ed. 5, McGraw-Hill, New York, 1973.
24. Siegal, S.: *Nonparametric statistics*. McGraw-Hill, New York, 1956, pp. 36-42.
25. Pallak, M. S., et al.: Commitment and energy conservation. *App Soc Psychol Annual* 1: 235-253 (1980).