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Response Strategies for Coping with the Cognitive Demands of Attitude Measures in Surveys

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SUMMARY

This paper proposes that when optimally answering a survey question would require substantial cognitive effort, some respondents simply provide a satisfactory answer instead. This behaviour, called *satisficing*, can take the form of either (1) incomplete or biased information retrieval and/or information integration, or (2) no information retrieval or integration at all. Satisficing may lead respondents to employ a variety of response strategies, including choosing the first response alternative that seems to constitute a reasonable answer, agreeing with an assertion made by a question, endorsing the *status quo* instead of endorsing social change, failing to differentiate among a set of diverse objects in ratings, saying 'don't know' instead of reporting an opinion, and randomly choosing among the response alternatives offered. This paper specifies a wide range of factors that are likely to encourage satisficing, and reviews relevant evidence evaluating these speculations. Many useful directions for future research are suggested.

INTRODUCTION

It is now well known that even slight variations in the way an attitude question is asked can significantly change answers. Altering the order of questions, the order of response alternatives, the words used in question stems and response options, the number of points offered by a rating scale, and many other aspects of questions can change both the distributions of responses to a question and the reliability of those responses (see, e.g., Schuman and Kalton, 1985; Schuman and Presser, 1981; Tourangeau and Rasinski, 1988). Thus, survey findings depend to a great extent on formal aspects of questions.

Although it is widely documented that question alterations can produce changes in responses, little is known about precisely what effects can be expected from many kinds of question variations. This is so largely because we currently have relatively little understanding of the psychological mechanisms responsible for the many response effects in attitude measurement demonstrated to date. It has become clear in recent years that significant advances in our understanding and mastery of these response effects can be achieved through the application of theories and findings from cognitive and social psychology (Jabine, Straf, Tanur, and Tourangeau, 1984; Jobe and Mingay, this issue, pp. 175–192; Tourangeau and Rasinski, 1988).

This paper proposes a broad theoretical interpretation of a variety of respondent behaviours involving attitude measurement. Specifically, respondents sometimes per-

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form these behaviours because they *satisfice* when formulating their responses. I begin by defining satisficing and specifying some response strategies that it is likely to encourage. I then describe the conditions under which satisficing is most likely to occur, review the relatively limited existing evidence testing these assertions, and suggest some fruitful directions for future research.

DEFINING SATISFICING

Survey respondents are often asked to expend a great deal of cognitive effort for little or no apparent reward. They are asked, for example, to report when they visited doctors during the last year (Means and Loftus, in press), when they were a victim of a crime (Loftus and Marburger, 1983), or how often they watched network television news programmes (Price and Zaller, 1990). They are asked to consider numerous controversial political issues, one after another, and to offer thoughtful opinions on each (Schuman and Presser, 1981). And they are asked to summarize the natural emotional ups and downs of life by choosing just one point on a scale measuring life satisfaction in general, or satisfaction with particular aspects of their lives (Bradburn, 1969).

In responding to these many sorts of questions, survey researchers hope that respondents will produce high-quality data. And as Tourangeau (1984) has described, doing so requires that respondents proceed through four stages of cognitive processing. They must carefully interpret the meaning of each question, search their memories extensively for all relevant information, integrate that information carefully into summary judgements, and report those summary judgements in ways that convey their meaning as clearly and precisely as possible (see also Cannell, Miller, and Oksenberg, 1981; Tourangeau, 1986, 1987; Tourangeau and Rasinski, 1988; Willis, Royston, and Bercini, this issue, pp. 251–267). Performing these four steps carefully and comprehensively constitutes what might be called *optimizing*.

Some respondents are undoubtedly motivated to expend the substantial amount of mental effort required to optimize, because a wide variety of different sorts of motives encourage such behaviour (see Warwick and Lininger, 1975, pp. 185–187). These motives include desires for self-expression, for interpersonal response, for intellectual challenge, for self-understanding, for feelings of altruism, or for emotional catharsis. Expenditure of great effort in answering survey questions can also be motivated by desires for gratification from successful performance, to help manufacturers produce better-quality products that suit consumers' needs better, or to help governments make better-informed policy decisions.

Despite the number and variety of these motives, however, they probably lose their potency relatively quickly during a survey interview. Respondents are likely to satisfy whatever desires motivate them to participate just a short way into an interview, and they are likely to become increasingly fatigued, disinterested, impatient, and distracted as the interview progresses. This situation presents respondents with a dilemma. Their motivation to work hard has evaporated, and the cognitive costs of hard work have become increasingly burdensome. Nonetheless, the interviewer continues to ask a seemingly unending stream of questions and to carefully record responses, which suggests that the interviewer expects the respondent to devote the effort necessary to generate high-quality responses.

Many survey respondents probably deal with this situation by shifting their response strategy. Rather than continuing to expend the mental effort necessary to generate optimal answers to question after question, respondents are likely to compromise their standards and expend less energy instead. At first, respondents probably do so simply by being less thorough in comprehension, retrieval, judgement, and response selection. They may be less thoughtful about a question's meaning, they may search their memories less thoroughly, they may integrate retrieved information more carelessly, and they may select a response choice more haphazardly (see, e.g., Jabine *et al.*, 1984, p. 19). All four steps are executed, but each one less diligently and comprehensively than when optimizing occurs. And instead of attempting to generate an optimal answer, respondents settle for generating merely satisfactory answers. The first answer a respondent condiders that seems acceptable is the one he or she offers. This response behaviour might be termed a relatively weak form of *satisficing*.[1]

After a respondent answers questions using this strategy for a while, fatigue continues to increase, and executing all four steps of the response process becomes more and more taxing. At this point, respondents may simplify their endeavour even further by omitting the retrieval and judgement steps from the response process altogether. That is, respondents may interpret each question only superficially and select what they believe will *appear* to be a reasonable answer to each question without referring to any internal psychological cues specifically relevant to the attitude, belief, or event of interest. This process might be termed strong satisficing.

It is useful to think of optimizing and strong satisficing as anchoring the two ends of a continuum indicating the degrees of thoroughness and bias in retrieval and integration. The optimizing end of the continuum involves complete and unbiased retrieval and integration, whereas the strong satisficing end involves no retrieval or integration at all. In between are degrees of weak satisficing, which increase in bias and incompleteness toward the strong satisficing end of the continuum.

FORMS OF SATISFICING

There are many different response strategies that might constitute weak and strong satisficing. In this section I describe two possible forms of weak satisficing (selecting the first response alternative that seems to constitute a reasonable answer, and agreeing with any assertion the interviewer makes) and four possible forms of strong satisficing (endorsing the *status quo* instead of endorsing social change, failing to differentiate among a set of diverse objects in ratings, saying 'don't know' instead

[1] I borrow the terms 'optimizing' and 'satisficing' from Herbert Simon (1957; Simon and Stedry, 1969), who coined them in his discussion of economic decision-making and choice behaviour. He offered the satisficing notion as an alternative to the common economic assumption that people expend whatever decision-making effort is required in order to maximize the profits they reap from their decisions. When faced with a demanding information-processing or decision-making task, Simon suggested, people expend only the effort necessary to make a satisfactory or acceptable decision. Thus, people presumably attempt only to ensure that their profits are above a minimal threshold of acceptability (see also Janis and Mann, 1977). Consistent with this notion, a great deal of recent empirical research has demonstrated that people rely on heuristics and judgemental short cuts rather than expending substantial effort in most everyday decision-making tasks (see e.g. Nisbett and Ross, 1980; Sherman and Corty, 1984; Wyer and Srull, 1980). In discussing the process by which respondents choose response alternatives in closed-ended survey questions, Tourangeau (1984, p. 90) mentioned the potential applicability of the satisficing concept.

of reporting an opinion, and randomly choosing among the response alternatives offered).

Selecting the first response alternative that seems reasonable

Survey questions sometimes ask respondents to rank a list of objects in terms of the degree to which they each possess a particular quality. For example, respondents have been asked to rank personal qualities such as 'obedience' and 'cleanliness' in terms of their importance for a child to have (Kohn, 1969; Lenski, 1963). More common are questions that ask respondents to select the object that ranks highest on a given dimension. For instance, respondents are sometimes asked to indicate which of a set of national problems is most significant for the United States as a whole (Schuman, Ludwig, and Krosnick, 1986).

A large number of studies have found that answers to such questions can be influenced by the order in which the response choices are presented to respondents (Becker, 1954; Belson, 1966; Brook and Upton, 1974; Carp, 1974; Mueller, 1970; S. Payne, 1951; J. Payne, 1971; Quinn and Belson, 1969; Rugg and Cantril, 1944; Schuman and Presser, 1981). Some of these studies identified primacy effects, where response choices presented early were most likely to be selected. Other studies found recency effects, where response choices presented later were more likely to be selected.

These response effects may be the result of weak satisficing. When confronted with these sorts of questions, optimizing would clearly entail thinking carefully about the merits and appropriateness of each of the response alternatives before selecting one. In contrast, a weak satisficer could simply choose the first response alternative that he or she considers to constitute a reasonable answer. Exactly which alternative is most likely to be chosen depends upon whether the response choices are presented visually or orally to respondents.

When response alternatives are presented to respondents visually, either on a showcard or in a self-administered questionnaire, weak satisficing is likely to bias respondents toward selecting response alternatives presented early in a list. When asked to indicate which of a list of national problems is most important for the country, for example, respondents are likely to begin at the top of the list and consider each response alternative individually. And when they think about each response alternative, their thoughts are likely to be biased in a confirmatory direction (Hoch, 1984; Klayman and Ha, 1984; Koriat, Lichtenstein, and Fischhoff, 1980; Tschirgi, 1980; Wason and Johnson-Laird, 1972). In the present example, respondents are likely to try to think of reasons why each alternative is in fact an important problem rather than systematically comparing it with other problems. Given that survey researchers typically include in questions only response choices that are reasonable answers, this confirmatory biased thinking is likely to generate at least a reason or two in favour of selecting almost any alternative a respondent thinks about.

After considering one or two response alternatives to a closed-ended question, the potential for fatigue becomes significant. Therefore, weak satisficers could cope by thinking only superficially about later response alternatives; the confirmatory bias would thereby give the earlier items an advantage. Alternatively, weak satisficers could simply terminate their evaluation process altogether once they come upon a response alternative that seems to be a reasonable answer to the question. Again, because most answers are likely to seem reasonable, these respondents are likely to end up choosing response alternatives near the beginning of a list. Thus, weak satisficing seems likely to produce primacy effects under conditions of visual presentation.

When response alternatives are presented orally, as in a face-to-face or telephone interview, the effects of weak satisficing are more difficult to anticipate. This is so because response order effects reflect not only the criteria for evaluating each option, but also the limits of memory. When response alternatives are read aloud, respondents are not given the opportunity to process the first alternative extensively. Presentation of the second alternative terminates processing of the first one, usually relatively quickly. Therefore, respondents are able to devote the most processing time to the final items read; these items remain in short-term memory after interviewers pause to let respondents answer. Thus, the last options are likely to receive deeper processing dominated by generation of reasons supporting selection.

However, it is conceivable that some respondents listen to a list of response alternatives without evaluating any of them. Once the list is read, these individuals may begin their thinking by recalling the first alternative and thinking about that one. Then, they may progress through the list, one by one, from beginning to end. Given that fatigue should instigate weak satisficing relatively quickly, a primacy effect would be expected. Therefore, considering only the allocation of processing, it is reasonable to anticipate both primacy and recency effects.

The effects of deeper processing are likely to be reinforced by the effects of memory. Items presented early in a list are most likely to enter long-term memory (e.g. Atkinson and Shiffrin, 1968; Bruce and Papay, 1970; Crowder, 1969; Dreben, Fiske, and Hastie, 1979; Rundus, 1971), and items presented at the end of a list are most likely to be in short-term memory immediately after the list is heard (e.g. Anderson and Hubert, 1963; Atkinson and Shiffrin, 1968; Glanzer, 1972; Waugh and Norman, 1965). So items presented at the beginning and end of a list are more likely to be recalled after the question is read, particularly if the list is long. Therefore, given that a response alternative must be remembered in order for a respondent to select it, both early and late items should be more likely to be available for selection by weak satisficers.

Thus, weak satisficing should produce both primacy and recency effects in response to orally presented questions. As a result, response alternatives in the middle of a list should be less likely to be selected than alternatives at the beginning and end, particularly under the conditions that foster satisficing.

Agreeing with assertions

Attitude questions in surveys often offer a statement to respondents and ask them whether they agree or disagree with it, or whether the statement is true or false. Similarly, many survey questions ask respondents whether or not they favour a particular type of social policy. Researchers have long recognized that such agree/disagree, true/false, and yes/no questions are potentially subject to acquiescence response bias: the tendency to agree with or accept any assertion, regardless of its content. That is, some respondents may simply offer an affirmative response to whatever policy proposal is presented to them. Although acquiescence response bias is difficult to conclusively document (see Rorer, 1965; Schuman and Presser, 1981, pp. 206–207), numerous studies have found evidence of what at least appears to be acquiescence response bias (e.g. Bentler, Jackson, and Messick, 1971; Jackson,

1979; Lenski and Leggett, 1960; Martin, 1964; Moum, 1988; Peabody, 1966; Ray, 1983; Ray and Pratt, 1979; Schuman and Presser, 1981).

Two possible explanations have been proposed for acquiescence. One is that acquiescence represents a personality trait, a behavioural tendency of some individuals that manifests itself consistently across situations (Couch and Keniston, 1960). Contradicting this claim, however, many studies have found that acquiescence is not highly consistent across items within a scale, across scales within the same questionnaire, or across unrelated tasks (Hui and Triandis, 1985; Husek, 1961; Nunnally and Husek, 1958; Ray, 1983). For these and other reasons the plausibility of this explanation seems doubtful at present (see Bentler *et al.*, 1971; Nunnally, 1978, pp. 666–669; Rorer, 1965).

A second possible explanation for acquiescence is that it constitutes deferential behaviour among lower-status respondents (Carr, 1971; Lenski and Leggett, 1960). Survey interviewers and researchers are typically white, middle-class individuals, and many survey respondents are working-class individuals, some of whom are racial minorities. Lenski and Leggett (1960) postulated that this status difference might increase the likelihood that these respondents would agree with assertions that the interviewer or researcher apparently believes. Because agree/disagree questions typically require an interviewer to read the statement in a way that sounds as if he or she believes it to be true, this presumably facilitates deferential agreement bias. Such a response involves no retrieval or judgement and would therefore constitute strong satisficing.

A third possible explanation for acquiescence response bias is weak satisficing. When asked whether they agree with a particular statement, weak satisficers are probably inclined to think only of reasons why the statement might be true. If respondents fail to generate any such reasons they would presumably say 'disagree', and if respondents succeed in generating enough such statements they would presumably say 'agree'. Because most assertions offered in survey questions are probably reasonable, it seems extremely likely that many respondents using this decision rule will succeed in generating enough reasons to justify saying 'agree' most of the time. Respondents who devote the necessarily greater effort to generate reasons why a statement is *not* true are more likely to disagree with it, and are therefore less likely to evidence acquiescence. Regardless of whether acquiescence reflects strong or weak satisficing, it would be expected to be most common under the conditions that foster satisficing.

Endorsing the *status quo*

Survey questions often ask respondents about increasing or decreasing government effort or funding in certain areas. For example, surveys have asked whether defense spending should be increased or decreased, whether gun control laws should become stricter or less strict, and whether U.S. involvement in the internal affairs of Central American countries should be stepped up or cut back. Comparable questions on social issues have asked, for example, whether it should be easier or more difficult to get a divorce. In response to these sorts of questions, the easiest answer to give on the basis of little thought is 'keep things as they are'.

A relatively small proportion of respondents typically endorse the *status quo* when it is not offered explicitly by the question as a legitimate response option. However,

explicitly offering the *status quo* response alternative dramatically increases the proportion of respondents who give this answer, by between 10 and 40 per cent (Bishop, 1987; Kalton, Roberts, and Holt, 1980; Rugg and Cantril, 1944; Schuman and Presser, 1981, p. 164; Stember and Hyman, 1949–1950). Some of these individuals probably arrive at this response after executing an effortful cognitive process that constitutes optimizing. However, many of them may give this answer instead without any retrieval or judgement, simply because it appears to be a reasonable answer. Consequently, selection of the *status quo* response alternative may be more common under the conditions that foster satisficing.

Non-differentiation in using rating scales

Many survey practitioners believe that answering a series of questions with the same response alternatives is easier and more enjoyable for respondents and more efficient for interviewers than constantly changing response alternatives from question to question (e.g. Lavrakas, 1987, pp. 145–146). This belief frequently leads survey designers to group questions together that offer the same response alternatives. For example, respondents might be asked to consider a series of brands of candy bars and to indicate for each one whether they like it a great deal, like it somewhat, like it only a little, or don't like it at all.

In recent years, researchers have come to recognize that there is an inherent danger in asking respondents to rate a series of objects on a common scale. In most cases, researchers hope that respondents will differentiate among the objects in their ratings. In the candy bar example, researchers might want to use the rating data to make inferences about which brands are preferred. Unfortunately, this is sometimes difficult to do, because some respondents fail to differentiate between the objects in their ratings, instead giving all or almost all of the objects the same rating (see e.g. Krosnick and Alwin, 1989). Doing so may sometimes be the result of a careful consideration of the merits of the objects, but this response strategy could also be the result of strong satisficing. Satisficing respondents could, for example, simply select a point on the response scale that appears to be reasonable for the first object, and then rate all of the remaining objects at that point. We would therefore expect this response pattern to appear more often under the conditions that foster satisficing.

Saying 'don't know'

Regardless of the format of a question, respondents can always provide an answer that appears reasonable by telling the interviewer that they 'don't know' what their opinion is. Doing so requires no retrieval or judgement, so it would constitute a form of strong satisficing. Some survey questions actually encourage respondents to say 'don't know' by explicitly indicating that a 'don't know' response is acceptable. This sort of 'don't know' filtering is sometimes done with a prior question asking respondents whether they have thought enough about an issue in order to have

an opinion on it. Filtering can also be accomplished by attaching a phrase such as 'or haven't you thought much about this?' to the end of an attitude question. Filtering done in either of these ways presumably increases the apparent legitimacy of a 'don't know' response and thereby increases the likelihood that respondents will satisfice by giving it. Thus, 'don't know' responses should be more common under the conditions that foster satisficing.

Mental coin-flipping

Although saying 'don't know' is one possible strategy for strong satisficing, the norms of the interview situation discourage respondents from saying 'don't know' consistently throughout an interview. Furthermore, interviewers sometimes explicitly discourage 'don't know' responses by pressing respondents to choose a substantive answer to the question. These factors ought to encourage strong satisficers to adopt a method of last resort: mental coin-flipping. That is, these respondents may simply choose randomly from among the response alternatives offered by a closed-ended question (see Converse, 1964). This would clearly constitute strong satisficing, because no retrieval or judgement is necessary, and it should occur more often when satisficing is most likely.

Summary

In sum, a satisficing respondent may employ any of a series of response strategies: choosing the first response alternative that seems to constitute a reasonable answer, agreeing with an assertion made by a question, endorsing the *status quo* instead of endorsing social change, failing to differentiate among a set of diverse objects in ratings, saying 'don't know' instead of reporting an opinion, and randomly choosing among the response alternatives offered.

Of course, satisficing will not necessarily be responsible when one of these various response strategies is used, because each can sometimes result from optimizing instead. This is particularly obvious in the case of 'don't know' responses. Saying 'don't know' would clearly constitute optimizing by respondents who have never heard about an issue previously, and who have no information about it whatsoever. The other response strategies described above may also be employed as the result of optimizing. It is therefore important not to assume that these responses *always* constitute satisficing. Rather, they may *sometimes* constitute satisficing and are presumably more likely to occur under the conditions that foster satisficing.

CONDITIONS THAT FOSTER SATISFICING

Although the response strategies discussed above have all been documented in numerous studies or surveys, the existing literature in survey methods currently offers only scattered insights into precisely when each of them is most likely to be implemented by respondents. This is why the notion of satisficing is potentially useful. Because satisficing can be attributed to incomplete or biased retrieval and judgement, or to the elimination of these stages altogether, it is possible to specify a list of testable hypotheses regarding the conditions likely to provoke use of these strategies

(for related reviews in the decision-making literature see Beach and Mitchell, 1978; Payne, 1982).

Stated in general terms, the likelihood that a given respondent will satisfice when answering a particular question is a function of three factors: the first is the inherent *difficulty of the task* that the respondent confronts; the second is the respondent's *ability* to perform the required task; and the third is the respondent's *motivation* to perform the task (for a similar formulation in an analysis of naive psychology, see Heider, 1958, pp. 82–83). The greater the task difficulty, and the lower the respondent's ability and motivation to optimize, the more likely satisficing is to occur. These three general determinants of satisficing suggest a series of specific predictions about when satisficing is most likely.

Task difficulty

It is useful to think about the difficulty posed by a given question as a function of the difficulty of each of the four cognitive stages (Tourangeau, 1984). Some question stems pose a challenge because they are difficult to interpret. For example, question stems containing many words require respondents to hold more information in memory in order to generate a precise answer during a face-to-face or telephone interview. Moreover, question stems written with rarely used words, or words with various different meanings, are presumably more difficult for respondents to interpret. Of course, sometimes a longer question stem can help to clarify the meanings of the terms used, so formal aspects of questions can interact in determining difficulty of comprehension. In general, question stems that are difficult to interpret are especially likely to provoke satisficing.

The difficulty of the retrieval process required by a question can affect the extent of satisficing as well. For example, survey questions sometimes ask respondents to report their current attitudes towards an object, whereas others ask respondents what their attitudes were at some prior time-point. Reports of current states are presumably easier than retrospective recall questions because of the relative remoteness of the relevant information in memory, and questions that require recall of an attitude only a short time ago are presumably easier than questions that require long-term recall. Another aspect of retrieval difficulty is the number of objects addressed by a question. A question that asks respondents how much they like spinach requires only that cognitions about spinach be retrieved. But a question that asks whether an individual prefers spinach or turnips requires that information about both vegetables be recalled. The more difficult the required retrieval task is, the more likely satisficing is to occur.

A third locus of task difficulty is the judgement stage. Some questions require relatively simple judgements, such as ratings of how much respondents like spinach. By comparison, a much more demanding judgement task would be one that asks respondents to rank-order 15 different vegetables in terms of how much they like each. In this latter case, not only must much more information be retrieved from memory, but the comparative judgement task is much more demanding cognitively. It is useful to think of the difficulty of the judgement phase as a function of the *decomposability* of the decision to be made; the more constituent decisions that must be made and integrated into a single summary judgement, the more difficult this phase will be (see Armstrong, Denniston, and Gordon, 1975). Also, judgement is

more difficult for respondents who retrieve many conflicting pieces of information from memory, as compared to respondents who recall information that all supports a single judgement. In general, questions entailing more complex or challenging judgements are more susceptible to satisficing.

Finally, a question can be difficult to answer at the point of response selection. As with question stems, response alternatives that include rarely used words, or words with various different meanings, pose more of a challenge than response alternatives that contain common, unambiguous words. Also, response alternatives that are all verbally expressed (e.g. increase defence spending a lot, increase it a little, keep it the same, decrease it a little, and decrease it a lot) are less challenging than a multiple-point scale with only some verbal labels (as when a seven-point scale has only the end-points labelled 'increase defence spending a lot' or 'decrease defence spending a lot'). In the latter case the meanings of the mid-scale points are more ambiguous. Double-barrelled questions are another case in which it can be especially difficult for a respondent to choose one response alternative that appropriately expresses his or her attitude. These and other aspects of response selection difficulty all enhance the likelihood of satisficing.

In addition to these various sources of difficulty inherent in survey questions, task difficulty can be affected by the pace at which the interviewer reads the questions and records answers. If an interviewer establishes a very quick pace, respondents will feel pressure to answer quickly and will perceive that they have less time to perform all four steps of the response process. Thus, they will be more likely to satisfice. If an interviewer instead reads questions and records responses slowly, respondents will find it easier to optimize and will be more likely to do so (Lessler, Tourangeau, and Salter, 1989).

A final aspect of task difficulty is distraction. It is now widely recognized that in-home interviews do not occur in a vacuum where the interviewer and respondant can have complete privacy (see e.g. Converse and Schuman, 1974, p. 3). Instead, family members frequently interrupt the interview process and are sometimes even present for an entire interview. Particularly if children are present, and demand attention and monitoring, respondents will find it more difficult to optimize. Consequently, the likelihood of satisficing is increased.

Respondent ability

At least three aspects of respondent ability may be related to satisficing. First, retrieving information and making judgements should be easier for respondents adept at performing complex mental operations. For lack of a better term, this general ability has been referred to in the survey methodology literature as cognitive sophistication (e.g. Krosnick and Alwin, 1987; Schuman and Presser, 1981). An individual's level of cognitive sophistication is presumably determined both by innate factors and by the learning and training experiences he or she has had. Cognitive sophistication is almost certainly not equivalent to general intelligence, given the growing literature documenting that there are many, only weakly correlated, domain-specific cognitive abilities, rather than one general intelligence (Gardner, 1983; Sternberg, 1977, 1985, 1988). Rather, cognitive sophistication is probably best viewed as the ensemble of abilities needed to retrieve information from memory and integrate that information into verbally expressed summary judgements. In Sternberg's (1985) language, these

abilities presumably include both metacomponents of intelligence (higher-order cognitive control processes used for executive planning, monitoring, and evaluating one's task performance) and performance components (lower-order strategy execution processes, such as relation inference or rule application). The better an individual is able to perform these operations, the less likely he or she is to satisfice in a survey.

A second aspect of respondent ability is the amount of practice an individual has had at thinking about the topic of a particular survey question. The more experienced a respondent is at thinking about a given topic, the better able he or she is to think anew about that topic and to answer relevant questions (see e.g. Fiske and Kinder, 1981). For instance, a person who is exposed to television news programmes or newspapers regularly presumably gains a great deal of practice at thinking about a wide range of political issues. And a man whose wife is a tireless baseball fan may find himself constantly exposed to a barrage of relevant historical and technical information and may eventually become quite practised at thinking about baseball. Individuals who are particularly experienced at domain-relevant thought have more relevant knowledge in memory and have more practice at executing the necessary cognitive procedures (e.g. Smith, 1984). For both reasons these individuals are able to optimize more easily, so they are particularly unlikely to satisfice.

A third aspect of respondent ability is the degree to which an individual has a preconsolidated attitude on the issue in question. Some people have unambiguous evaluations of objects stored in memory that are easily accessible and may therefore be called to mind with little effort (e.g. Fazio, 1986). For these individuals the retrieval step in the response process should occur quickly and automatically upon the mere mention of the attitude object. Other individuals may have either inaccessible or ambiguous attitudes stored in memory, or they may have no preconsolidated judgement at all. These individuals are less able to perform the retrieval and/or judgement stages quickly, and are therefore more likely to satisfice.

Respondent motivation

There are many sources of respondent motivation potentially relevant to satisficing. For example, respondents differ from one another in terms of their *need for cognition*, a personality trait identified by Cacioppo and Petty (1982, 1984). Respondents high in need for cognition enjoy thinking, get intrinsic rewards from effortful mental exercises, and prefer to confront demanding cognitive tasks instead of easy ones. In contrast, low need for cognition individuals dislike expending mental effort and try to avoid situations that demand it. Interestingly, need for cognition is essentially uncorrelated with general cognitive sophistication, so these are clearly different constructs (Cacioppo, Petty, and Morris, 1983; Morris, Bachman, Bromwell, and Sterling, 1982). Over and above any effects of cognitive sophistication, respondents low in need for cognition are presumably more likely than high need for cognition respondents to satisfice in surveys.

Respondent motivation is probably influenced by the degree to which the topic of a question is personally important to the respondent. Individuals who care deeply about the issue of legalized abortion, for example, are probably very concerned about communicating their views on abortion clearly and completely to a survey interviewer. These individuals are therefore probably motivated to devote greater

effort to question interpretation, retrieval, judgement, and response selection than are respondents for whom the topic is personally unimportant. As a result, the former individuals are less likely to satisfice.

Motivation to optimize is likely to be greater among respondents who think that the survey in which they are participating is important and/or useful to some segment of society. Respondents who believe that expending substantial effort to answer survey questions carefully will help to produce desirable social outcomes are likely to do so. On the other hand, respondents who are more skeptical about the potential payoffs of the survey are less motivated to optimize and, as a result, these latter individuals are more likely to satisfice.

Motivation may also be influenced by interviewer behaviour.[2] For example, motivation to optimize is probably higher among respondents who believe that the interviewer wants precise responses, as compared to respondents who believe the interviewer only needs approximations (see Cannell, Fowler, and Marquis, 1968). Motivation is also probably increased if a question is preceded by instructions encouraging respondents to spend extra time and effort in carefully formulating a response (see e.g. Oksenberg, Vinokur, and Cannell, 1979a,b); and motivation is likely to be increased if respondents have publicly committed themselves to be diligent in performing their tasks (Oksenberg *et al.*, 1979a,b; see also Cannell *et al.*, 1981). These various aspects of interviewer behaviour can all decrease the likelihood of satisficing.

Another possible determinant of respondent motivation is *accountability*. Accountability is defined as a state in which people believe that they may have to justify their decisions to others (Tetlock, 1983a; Tetlock and Kim, 1987). In the survey context, accountability can be induced by occasionally asking respondents to explain or justify an answer they gave to a prior question. When people believe that they may be held accountable, they process information more vigilantly, paying closer attention to all relevant information, analysing it more carefully, drawing conclusions more cautiously, and making less biased judgements (see McAllister, Mitchell, and Beach, 1979; Tetlock, 1983a, 1983b, 1985; Tetlock and Kim, 1987; Weldon and Gargano, 1988; see also Janis and Mann, 1977). Of most relevance to the survey context, accountability leads people to search their memories more thoroughly for information, and to integrate it into more coherent summary judgements (e.g. Ford and Weldon, 1981). These findings suggest that accountability may enhance a survey respondent's motivation to optimize and may thereby reduce the likelihood that he or she will satisfice.

Finally, a respondent's motivation to optimize in answering a particular question is determined partly by how long the interview has been going on (see Jabine *et al.*, 1984, p. 19). Motivation to optimize is probably greatest at the beginning of a questionnaire and decreases as more and more questions are asked and answered.

[2] In numerous studies, Cannell and colleagues (see Cannell, Miller, and Oksenberg, 1981) have shown that enhancing respondent motivation and reducing task difficulty increases the quality of factual reports in surveys. This work was an important inspiration for the present paper, as were the discussions of respondent burden by Bradburn (1978) and by Rothwell and Bridge (1978).

The longer an interview has been under way, the lower is the respondent's motivation to optimize, and the more likely satisficing is to flourish.[3]

Combining these effects

The various hypotheses outlined above constitute a series of main effects of task difficulty, respondent ability, and respondent motivation on satisficing. Although it might be that these main effects are simply additive, their relations are more likely to be multiplicative. Specifically, the likelihood that a particular respondent will satisfice in answering a particular question can probably best be expressed as follows:

$$p\,(\text{Satisficing}) = \frac{a_1(\text{Task difficulty})}{a_2(\text{Ability}) \times a_3(\text{Motivation})}$$

Measures of the various components of ability, motivation, and task difficulty could be entered into this equation, and the coefficients a_1, a_2, and a_3 can be estimated through regresssion procedures.[4]

This equation is useful because it specifies interactions among task difficulty, ability, and motivation in determining performance. If a task is especially easy, the impact of ability and motivation should be relatively minimal. But if a task is especially difficult, the combination of low ability and low motivation should powerfully enhance satisficing. Furthermore, low motivation may not necessarily instigate satisficing if an individual is high in ability. Similarly, low ability may not necessarily instigate satisficing if an individual is high in motivation.

Given the list of components of respondent ability and motivation described above, this reasoning suggests a large number of specific interactions. For example, low cognitive sophistication or low topic importance should only enhance satisficing if the demands of the task are substantial (e.g. due to a difficult question). Similarly, task difficulty and question placement would be expected to have bigger effects among individuals low in cognitive sophistication, need for cognition, or topic importance.

A REVIEW OF RELEVANT EVIDENCE

This list of the conditions under which satisficing is most likely to occur makes it possible to assess the validity of the claims that various response strategies sometimes represent satisficing. This can be done by exploring whether the prevalence of each response strategy (e.g. selection of a *status quo* response option) varies accord-

[3] One might imagine that another factor would also influence satisficing behaviour: verbal and non-verbal rewards from the interviewer. A number of studies have explored the frequency and impact of verbal reinforcement, such as when interviewers say 'good answer', 'thank you very much', or 'that's just the sort of information we need' (see e.g. Marquis and Cannell, 1969). It is not unreasonable to suspect that this sort of reinforcement builds rapport between respondent and interviewer, maintains positive feelings about the interview process, and therefore leads respondents to be more diligent in generating answers. However, respondents typically get such reinforcement from interviewers regardless of the quality of the answer they give (Marquis and Cannell, 1969), a fact that respondents probably quickly learn. Thus, verbal reinforcement seems unlikely to maintain optimizing behaviour for very long in the face of an arduous barrage of survey questions. However, if interviewers were to informally assess the amount of effort respondents expend in answering questions, and provide positive feedback contingent on substantial effort expenditure, it might be possible to reduce satisficing.

[4] I thank Roger Tourangeau for suggesting this formulation.

ing to the conditions that foster satisficing. That is, we can examine whether each response strategy is more common when task difficulty is higher, and when ability and motivation are lower. If the prevalence of the response strategy varies according to each of these factors, that would constitute evidence consistent with the satisficing explanation. If instead the prevalence of the response strategy is unrelated to task difficulty, ability, and motivation, the hypothesis that the response strategy represents satisficing should be rejected.

Unfortunately, relatively little relevant evidence exists thus far, so it is not possible to perform a comprehensive and conclusive evaluation of the above hypotheses. Furthermore, the vast majority of relevant studies have a notable operational shortcoming. Many studies have explored the cognitive sophistication hypothesis, but almost none of them used direct measures of cognitive sophistication. Rather, these studies generally treated formal educational attainment as a proxy measure of cognitive sophistication. Though not optimal, this is certainly a reasonable strategy, because educational attainment is strongly correlated with more direct measures of cognitive sophistication (see e.g. Krosnick and Alwin, 1987). Despite this shortcoming it is nonetheless useful to review the evidence accumulated to date, in order to gauge the current state of relevant knowledge and to identify productive directions for future research.

Selecting the first acceptable response alternative

The discussion above asserted that primacy and recency effects may sometimes be the result of satisficing. If this is so, these effects should be more prevalent under the conditions that foster satisficing. Consistent with this claim, a number of studies have found that response order effects are stronger among less educated respondents (Cochrane and Rokeach, 1970, Table 2; Krosnick and Alwin, 1987; McClendon, 1986, 1990; Schuman and Presser, 1981, p. 71).[5] Krosnick and Alwin (1987), and Krosnick (1991), measured cognitive sophistication more directly, the former via a vocabulary test, and the latter via college students' grade point averages. As expected, people with higher vocabulary scores and students with higher GPAs revealed weaker response-order effects than people with lower vocabulary scores and students with lower GPAs. Also consistent with expectations, Payne (1951) and Schuman and Presser (1981) found that primacy and recency effects were generally more common in questions that included more words, more polysyllabic words, and more response alternatives.

Agreeing with assertions

If acquiescence is the result of strong or weak satisficing, it should be more common under the conditions that foster satisficing. Consistent with this prediction, many studies have found that acquiescence is more common among less educated respondents (Jackman, 1973; Jackson, 1979; Lenski and Leggett, 1960; McClendon, 1989, 1990; Moum, 1988; Schuman and Presser, 1981; Schuman and Scott, 1989; but see

[5] Schuman and Presser (1981, p. 71) indicated that their data revealed that less educated respondents tended to show stronger response-order effects, but that none of the interactions with education they examined approached statistical significance. However, no quantitative results were formally reported. Furthermore, an ongoing meta-analysis of this evidence suggests that education does moderate response order effect magnitude as expected (Krosnick and Schuman, 1990).

Ray, 1979). Acquiescence is also more common among respondents with low 'cognitive energy levels', low verbal ability, and low criticalness, a construct presumably related to need for cognition (Elliott, 1961; Forehand, 1962; Frederickson and Messick, 1959; Jackson, 1959; Jackson and Pacine, 1961; cf. Trott and Jackson, 1967). Also as expected, acquiescence is more common when items are presented at a faster pace and in response to items containing more words (McGee, 1967; Trott and Jackson, 1967). Finally, acquiescence is more common in response to more difficult items (Gage, Leavitt, and Stone, 1957).

However, a few pieces of evidence challenge the conclusion that acquiescence results partly from satisficing. For example, Schuman and Presser (1981) and Elliott (1961) found that acquiescence was no stronger among respondents for whom the topic of the question was personally unimportant, as compared to respondents for whom the issue was highly important (see also Krosnick and Schuman, 1989). Also, Clancy and Wachsler (1971), and Hui and Triandis (1985), found that acquiescence did not become more common when a question appeared later in a questionnaire.

Endorsing the *status quo*

The reasoning above suggests that respondents should be more likely to endorse the *status quo* under the conditions that foster satisficing. Consistent with this claim, Schuman and Presser (1981, p. 172) reported an experiment in which they assessed the increase in the proportion of respondents who endorsed the *status quo* when that response option was explicitly offered (as compared to when it was not offered). The effect of offering this response option was notably greater for respondents with a high school education or less (about 42.5 per cent) than for respondents with some post-high school education (33.8 per cent).[6] Furthermore, some experiments have shown that importance of the question topic to respondents is negatively related to the magnitude of the effect of offering a *status quo* response option (Krosnick and Schuman, 1988; Schuman and Presser, 1981, pp. 173–175; though see Stember and Hyman, 1949–1950).

Non-differentiation

A number of studies have found evidence consistent with the notion that non-differentiation in use of rating scales represents satisficing. Krosnick and Alwin (1989), and Rogers and Herzog (1984), found that non-differentiation is more common among respondents with less education. Moreover, many studies have found non-differentiation to be more common towards the end of a questionnaire than towards the beginning (Coker and Knowles, 1987; Herzog and Bachman, 1981; Knowles, 1988; Knowles, Cook, and Neville, 1989a, 1989b; Knowles, Lundeen, and Irwin, 1988; Kraut, Wolfson, and Rothenberg, 1975; Krosnick and Alwin, 1989; Neville

[6] Again, Schuman and Presser (1981, p. 172) were reluctant to accept the conclusion that education was related to the effect size in their middle alternative experiments. However, the one experiment for which they reported data completely clearly indicated such a relation. They said that other experiments failed to yield supportive evidence, but I am reluctant to accept that conclusion in the absence of the actual figures, partly because the statistical test Schuman and Presser reported did not test the education hypothesis precisely and therefore compromised statistical power. Furthermore, our on-going meta-analysis again suggests that education does moderate the magnitude of middle alternative effects (Krosnick and Schuman, 1990).

and Knowles, 1990; Rogers and Herzog, 1984), particularly among respondents low in verbal ability (Knowles, Cook, and Neville, 1989a, 1989b). Furthermore, placing rating questions later in a questionnaire makes correlations between ratings on the same scale more positive or less negative (Andrews, 1984; Herzog and Bachman, 1981; Krosnick and Alwin, 1989; Rogers and Herzog, 1984), which are the expected results of non-differentiation (see Krosnick and Alwin, 1989). The one piece of contrary evidence on this point was reported by Krosnick and Alwin (1989), who found that non-differentiation was not reduced among respondents for whom the question's topic was more personally important.

Saying 'don't know'

The theoretical reasoning offered above regarding 'don't know' responses is consistent with the findings of a number of studies. First, in response to both filtered and unfiltered questions, saying 'don't know' is quite a bit more common among respondents who have relatively little formal education (Almond, 1950, p. 127; Bishop, Oldendick, and Tuchfarber, 1980; Converse, 1976–1977; Faulkenberry and Mason, 1978; Francis and Busch, 1975; Gergen and Back, 1965; Glenn, 1966; Judd, Krosnick, and Milburn, 1981; Krosnick and Milburn, 1990; Neuman, 1986, p. 60; Reese and Miller, 1981; Schuman and Presser, 1981; Sigelman, 1981; Smith, 1981; Sudman and Bradburn, 1974; see also Campbell, Converse, Miller, and Stokes, 1960, p. 175). Second, explicitly offering respondents a 'don't know' response option increases the proportion of respondents who select it, particularly among respondents with little formal education (Bishop, Oldendick, and Tuchfarber, 1980; Schuman and Presser, 1981; Schuman and Scott, 1989).[7] Third, the effect of offering a 'don't know' filter is greater for people who consider an issue to be less personally important (Bishop *et al.*, 1980; Schuman and Presser, 1981, pp. 142–143).

Mental coin-flipping

The above reasoning suggests that the amount of random error in responses (which presumably results partly from mental coin-flipping) should be greater under conditions that foster satisficing. Consistent with this claim, a number of studies using a variety of methods have found random error to be greater among respondents with less formal education (Alwin and Krosnick, 1989; Andrews, 1984; Stember, 1951–1952). Andrews (1984) found evidence of increased random error among items presented later in a battery or later in a questionnaire. A number of studies have found less random error in answers to questions involving response alternatives that are fully verbally labelled, as compared to questions that offer some unlabelled, numeric response options (Alwin and Krosnick, 1989; Madden, 1960; Peters and McCormick, 1966; Zaller, 1988; cf. Andrews, 1984; Finn, 1972). Consistent with the decomposition notion, Krosnick and Berent (1990) found less random error in responses to questions that decomposed attitude questions into reports of direction and intensity, as compared to questions that measured both components simultaneously (cf. Aldrich, Niemi, Rabinowitz, and Rohde, 1982).

Three findings regarding random error contradict the satisficing hypothesis. First, Krosnick (1988) found that the amount of random measurement error in attitude reports was no greater among respondents who considered the topic of the question to be personally unimportant, as compared to respondents to whom the topic was very important. Second, Andrews (1984) found less random error in answers to questions requiring subjects to compare two or more objects, as compared to questions requiring absolute judgements about single objects. Third, Andrews (1984) found less random error in answers to longer questions, as compared to shorter ones. However, this latter finding may reflect the fact that the meanings of longer questions are clearer, so interpretation is less difficult.

[7] Schuman and Presser (1981) were cautious in suggesting that the effect of filtering might be greater for low-education respondents, because their statistical tests did not all reveal significant effects. However, the pattern of effect sizes they reported is strikingly consistent with expectations (0–11 years of education: 31.6 per cent; 12 years of education: 16.6 per cent; 13+ years of education: 10.8 per cent; see p. 139), and an overall statistical test was significant (see p. 140, footnote 18). Schuman and Scott (1989) were similarly cautious, but their results again revealed that the least-educated respondents showed the largest effect of filtering. Furthermore, Bishop *et al.* (1980) found similar results, as does our on-going meta-analysis (Krosnick and Schuman, 1990). This evidence is therefore generally supportive of the education hypothesis, despite the initial scepticism expressed by Schuman and colleagues.

CONCLUSION

Although it is widely recognized that the quality of survey data depends in part upon respondents' willingness to expend the effort needed to provide accurate answers to questions (e.g. Cannell *et al.*, 1981), there is currently little consensus about precisely how respondents manage the cognitive demands of the response tasks commonly found in contemporary surveys. This paper has offered some proposals about how respondents may do so.

Specifically, I have argued that respondents cope with substantial cognitive demands in one of two ways. Initially, they perform incomplete or biased searches of memory and integration of retrieved information. Later, they eliminate the steps of retrieval and judgement altogether and generate responses by interpreting questions and selecting response alternatives that seem reasonable, without ever making reference to relevant knowledge stored in memory. Having defined weak and strong satisficing in these fashions, it was possible to identify a number of response strategies that might be reflections of satisficing and to specify the conditions under which satisficing is most likely to occur. Although the small existing body of relevant evidence is generally consistent with these hypotheses, there are some notable contradictions. Clearly, then, a great deal of future research is necessary before any firm conclusions about the validity of these hypotheses can be drawn.

Fortunately, the most useful designs for experimental studies are quite straightforward. The dependent variables in these studies should be either the magnitudes of response effects or the extent of use of various response strategies. Response effect strength can be gauged by varying the order in which response alternatives are presented, whether a question involves agree/disagree response alternatives or a forced choice between opposing viewpoints, and whether a *status quo* or 'don't know' response option is offered. Other studies should assess whether the extent of non-differentiation in ratings, the frequency of 'don't know', *status quo*, and 'agree' responses, and the extent of random measurement error vary across respondents.

The independent variables in these studies should be the various components of task difficulty, respondent ability, and respondent motivation described above. Task difficulty is probably best studied through experimental manipulations. For example,

the linguistic difficulty of question stems can be varied, as can the nature of the decision task and the amount of situational distraction. Respondent ability is probably best studied by measuring respondent attributes. Cognitive sophistication, practice at thinking about a question's topic, and attitude accessibility can all be gauged and correlated with the dependent variables listed above. Respondent motivation can best be explored through a combination of manipulations and correlational analyses. Interviewer behaviour, accountability, and question placement in the questionnaire can easily be experimentally varied across respondents. In contrast, need for cognition, topic importance, and beliefs about survey importance are probably best measured and correlated with response effect size or response strategy frequency.

Studies of these sorts will require complex, multi-factorial designs and cumbersome statistical analyses. But their payoffs are likely to be enormous in terms of our understanding of respondents' strategies for coping with the cognitive demands of surveys.

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REFERENCES

Aldrich, J. H., Niemi, R. G., Rabinowitz, G. and Rohde, D. W. (1982). The measurement of public opinion about public policy: a report on some new issue question formats. *American Journal of Political Science*, **26**, 391–414.

Almond, G. A. (1950). *The American people and foreign policy*. New York: Praeger.

Alwin, D. F. and Krosnick, J. A. (1985). The measurement of values in surveys: a comparison of ratings and rankings. *Public Opinion Quarterly*, **49**, 535–552.

Alwin, D. F. and Krosnick, J. A. (1989). The reliability of attitudinal survey data: the effects of question and respondent characteristics. Paper presented at the International Conference on Social Science Methodology, Dubrovnik, Yugoslavia.

Anderson, N. H. and Hubert, S. (1963). Effects of concomitant verbal recall on order effects in personality impression formation. *Journal of Verbal Learning and Verbal Behavior*, **2**, 379–391.

Andrews, F. M. (1984). Construct validity and error components of survey measures: a structural modeling approach. *Public Opinion Quarterly*, **48**, 409–442.

Armstrong, J., Denniston, W. and Gordon, M. (1975). The use of the decomposition principle in making judgments. *Organizational Behavior and Human Performance*, **14**, 257–263.

Atkinson, R. C. and Shiffrin, R. M. (1968). Human memory: a proposed system and its control processes. In K. W. Spence and J. T. Spence (Eds), *The psychology of learning and motivation: advances in research and theory*, Vol. 2 (pp. 89–195). New York: Academic Press.

Becker, S. L. (1954). Why an order effect? *Public Opinion Quarterly*, **18**, 271–278.

Beach, L. R. and Mitchell, T. R. (1978). A contingency model for the selection of decision strategies. *Academy of Management Review*, **3**, 439–449.

Belson, W. A. (1966). The effects of reversing the presentation order of verbal rating scales. *Journal of Advertising Research*, **6**, 30–37.

Bentler, P. M., Jackson, D. N. and Messick, S. (1971). Identification of content and style: a two-dimensional interpretation of acquiescence. *Psychological Bulletin*, **76**, 186–204.

Bishop, G. F. (1987). Experiments with the middle response alternative in survey questions. *Public Opinion Quarterly*, **51**, 220–232.

Bishop, G. F., Oldendick, R. W. and Tuchfarber, A. J. (1980). Experiments in filtering political opinions. *Political Behavior*, **2**, 339–369.

Bishop, G. F., Oldendick, R. W. and Tuchfarber, A. J. (1983). Effects of filter questions in public opinion surveys. *Public Opinion Quarterly*, **47**, 528–546.

Bishop, G. F., Oldendick, R. W., Tuchfarber, A. J. and Bennett, S. E. (1979). Effects of opinion filtering and opinion floating: Evidence from a secondary analysis. *Political Methodology*, **6**, 293–309.

Bradburn, N. M. (1969). *The structure of psychological well-being*. Chicago, IL: Aldine.

Bradburn, N. M. (1978). Respondent burden. In L. G. Reeder (Ed.), *Health survey research methods* (DHEW Publication No. PHS 79-3207, pp. 49–54). Washington, DC: U.S. Government Printing Office.

Brook, D. and Upton, G. J. G. (1974). Biases in local government elections due to position on the ballot paper. *Applied Statistics*, **23**, 414–419.

Bruce, D. and Papay, J. P. (1970). Primacy effects in single trial free recall. *Journal of Verbal Learning and Verbal Behavior*, **9**, 473–486.

Cacioppo, J. T. and Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, **42**, 116–131.

Cacioppo, J. T. and Petty, R. E. (1984). The need for cognition: relationship to attitudinal processes. In R. McGlynn, J. Maddux, C. Stoltenberg, and J. Harvey (Eds), *Social perception in clinical and counseling psychology*. Lubbock, TX: Texas Tech Press.

Cacioppo, J. T., Petty, R. E. and Morris, K. J. (1983). Effects of need for cognition on message evaluation, recall, and persuasion. *Journal of Personality and Social Psychology*, **45**, 805–818.

Campbell, A., Converse, P. E., Miller, W. E. and Stokes, D. E. (1960). *The American Voter*. Chicago, IL: University of Chicago Press.

Cannell, C. F., Fowler, F. J. and Marquis, K. H. (1968). The influence of interviewer and respondent psychological and behavioral variables on the reporting in household interviews. *Vital and Health Statistics*, Series 2, No. 26, i–65.

Cannell, C. F., Miller, P. V. and Oksenberg, L. (1981). Research on interviewing techniques. In S. Leinhardt (ed.), *Sociological Methodology 1981* (pp. 389–437). San Francisco, CA: Jossey-Bass.

Carp, F. M. (1974). Position effects in single trial free recall. *Journal of Gerontology*, **29**, 581–587.

Carr, L. G. (1971). The Srole items and acquiescence. *American Sociological Review*, **36**, 287–293.

Clancy, K. J. and Wachsler, R. A. (1971). Positional effects in shared-cost surveys. *Public Opinion Quarterly*, **35**, 258–265.

Cochrane, R. and Rokeach, M. (1970). Rokeach's value survey: a methodological note. *Journal of Experimental Research in Personality*, 4, 159–161.

Coker, M. C. and Knowles, E. S. (1987). Testing alters the test scores: Test-retest improvements in anxiety also occur within a test. Paper presented at the Annual Meeting of the Midwestern Psychological Association, Chicago, IL.

Converse, J. M. (1976–1977). Predicting no opinion in the polls. *Public Opinion Quarterly*, **40**, 515–530.

Converse, J. M. and Schuman, H. (1974). *Conversations at random: survey research as interviewers see it*. New York: Wiley.

Converse, P. E. (1964). The nature of belief systems in mass publics. In D. Apter (Ed.), *Ideology and discontent* (pp. 206–261). New York: Free Press.

Couch, A. and Keniston, K. (1960). Yeasayers and naysayers: agreeing response set as a personality variable. *Journal of Abnormal and Social Psychology*, **60**, 151–174.

Crowder, R. G. (1969). Behavioral strategies in immediate memory. *Journal of Verbal Learning and Verbal Behavior*, **8**, 524–528.
Dreben, E. K., Fiske, S. T. and Hastie, R. (1979). The independence of evaluative and item information: impression and recall order effects in behavior-based impression formation. *Journal of Personality and Social Psychology*, **37**, 1758–1768.
Elliott, L. L. (1961). Effects of item construction and respondent aptitude on response acquiescence. *Educational and Psychological Measurement*, **21**, 405–415.
Faulkenberry, G. D. and Mason, R. (1978). Characteristics of nonopinion and no opinion response groups. *Public Opinion Quarterly*, **42**, 533–543.
Fazio, R. H. (1986). How do attitudes guide behavior? In R. M. Sorrentino and E. T. Higgins (Eds), *Handbook of motivation and cognition* (pp. 204–243). New York: Guilford.
Finn, R. H. (1972). Effects of some variations in rating scale characteristics on the means and reliabilities of ratings. *Educational and Psychological Measurement*, **32**, 255–265.
Fiske, S. T. and Kinder, D. R. (1981). Involvement, expertise, and schema use: evidence from political cognition. In N. Cantor and J. Kihlstrom (Eds), *Personality, cognition, and social interaction* (pp. 171–190). Hillsdale, NJ: Erlbaum.
Ford, J. K. and Weldon, E. (1981). Forewarning and accountability: effects on memory-based interpersonal judgments. *Personality and Social Psychology Bulletin*, **7**, 264–268.
Forehand, G. A. (1962). Relationships among response sets and cognitive behaviors. *Educational and Psychological Measurement*, **22**, 287–302.
Francis, J. D. and Busch, L. (1975). What we don't know about 'I don't knows'. *Public Opinion Quarterly*, **34**, 207–218.
Frederickson, N. and Messick, S. (1959). Response set as a measure of personality. *Educational and Psychological Measurement*, **19**, 137–159.
Gage, N. L., Leavitt, G. S. and Stone, S. C. (1957). The psychological meaning of acquiescence set for authoritarianism. *Journal of Abnormal and Social Psychology*, **55**, 98–103.
Gardner, H. (1983). *Frames of mind: the theory of multiple intelligences*. New York: Basic Books.
Gergen, K. J. and Back, K. W. (1965). Communication in the interview and the disengaged respondent. *Public Opinion Quarterly*, **30**, 385–398.
Glanzer, M. (1972). Storage mechanisms in recall. In G. H. Bower (Ed.), *The psychology of learning and motivation*, Vol. 5. New York: Academic Press.
Glenn, N. D. (1966). Aging, disengagement, and opinionation. *Public Opinion Quarterly*, **33**, 17–33.
Heider, F. (1958). *The psychology of interpersonal relations*. New York: Wiley.
Herzog, A. R. and Bachman, J. G. (1981). Effects of questionnaire length on response quality. *Public Opinion Quarterly*, **45**, 549–559.
Hoch, S. J. (1984). Availability and interference in predictive judgment. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, **10**, 649–662.
Hui, C. H. and Triandis, H. C. (1985). The instability of response sets. *Public Opinion Quarterly*, **49**, 253–260.
Husek, T. R. (1961). Acquiescence as a response set and as a personality characteristic. *Educational and Psychological Measurement*, **21**, 295–307.
Jabine, T., Straf, M., Tanur, J. and Tourangeau, R. (1984). *Cognitive aspects of survey methodology: building a bridge between disciplines*. Washington, DC: National Academy Press.
Jackman, M. R. (1973). Education and prejudice or education and response-set? *American Sociological Review*, **38**, 327–339.
Jackson, D. N. (1959). Cognitive energy level, acquiescence, and authoritarianism. *Journal of Social Psychology*, **49**, 65–69.
Jackson, D. N. and Pacine, L. (1961). Response styles and academic achievement. *Educational and Psychological Measurement*, **21**, 1015–1027.
Jackson, J. E. (1979). Bias in closed-ended issue questions. *Political Methodology*, **6**, 393–424.
Janis, I. L. and Mann, L. (1977). *Decision making*. New York: Free Press.
Judd, C. M., Krosnick, J. A. and Milburn, M. A. (1981). Political involvement and attitude structure in the general public. *American Sociological Review*, **46**, 660–669.
Kalton, G., Roberts, J. and Holt, D. (1980). The effects of offering a middle response option with opinion questions. *Statistician*, **29**, 65–78.

Klayman, J. and Ha, Y. (1984). Confirmation, disconfirmation, and information in hypothesis-testing. Unpublished manuscript, Graduate School of Business, Center for Decision Research, University of Chicago, IL.
Knowles, E. S. (1988). Item context effects on personality scales: measuring changes the measure. *Journal of Personality and Social Psychology*, **55**, 312–320.
Knowles, E. S., Cook, D. A. and Neville, J. W. (1989a). Assessing adjustment improves subsequent adjustment scores. Paper presented at the Annual Meeting of the American Psychological Association, New Orleans, LA.
Knowles, E. S., Cook, D. A. and Neville, J. W. (1989b). Modifers of context effects on personality tests: Verbal ability and need for cognition. Paper presented at the Annual Meeting of the American Psychological Society, Alexandria, VA.
Knowles, E. S., Lundeen, E. J. and Irwin, M. E. (1988). Experience with the personality test changes factor loadings on externality but not self-monitoring. Paper presented at the Annual Meeting of the Midwestern Psychological Association, Chicago, IL.
Kohn, M. L. (1969). *Class and conformity: A study in values*. Homewood, IL: Dorsey.
Koriat, A., Lichtenstein, S. and Fischhoff, B. (1980). Reasons for confidence. *Journal of Experimental Psychology: Human Learning and Memory*, **6**, 107–118.
Kraut, A. I., Wolfson, A. D. and Rothenberg, A. (1975). Some effects of position on opinion survey items. *Journal of Applied Psychology*, **60**, 774–776.
Krosnick, J. A. (1988). Attitude importance and attitude change. *Journal of Experimental Social Psychology*, **24**, 240–255.
Krosnick, J. A. (1991). The impact of cognitive sophistication and attitude importance on the magnitude of question order and response order effects. In N. Schwarz and S. Sudman (eds), *Order effects in social and psychological research*. New York: Springer-Verlag, in press.
Krosnick, J. A. and Alwin, D. F. (1987). An evaluation of a cognitive theory of response-order effects in survey measurement. *Public Opinion Quarterly*, **51**, 201–219.
Krosnick, J. A. and Alwin, D. F. (1989). A test of the form-resistant correlation hypothesis: Ratings, rankings, and the measurement of values. *Public Opinion Quarterly*, **52**, 526–538.
Krosnick, J. A. and Berent, M. K. (1990). The impact of verbal labeling of response alternatives and branching on attitude measurement reliability in surveys. Unpublished manuscript, Ohio State University, Columbus, OH.
Krosnick, J. A. and Milburn, M. A. (1990). Psychological determinants of political opinionation. *Social Cognition*, **8**, 49–72.
Krosnick, J. A. and Schuman, H. (1988). Attitude intensity, importance, and certainty and susceptibility to response effects. *Journal of Personality and Social Psychology*, **54**, 940–952.
Krosnick, J. A. and Schuman, H. (1990). The impact of educational attainment on susceptibility to response effects. Manuscript in preparation, Ohio State University, Columbus, OH.
Lavrakas, P. J. (1987). *Telephone survey methods: Sampling, selection, and supervision*. Newbury Park, CA: Sage.
Lenski, G. (1963). *The religious factor*. Garden City, NY: Doubleday.
Lenski, G. E. and Leggett, J. C. (1960). Caste, class, and deference in the research interview. *American Journal of Sociology*, **65**, 463–467.
Lessler, J., Tourangeau, R. and Salter, W. (1989). Questionnaire design in the cognitive research laboratory. *Vital and Health Statistics*, Series 6, No. 1 (HHS Publication No. PHS 89-1076). Washington, DC: U.S. Government Printing Office.
Loftus, E. F. and Marburger, W. (1983). Since the eruption of Mt. St. Helens, did anyone beat you up? Improving the accuracy of retrospective reports with landmark events. *Memory and Cognition*, **11**, 114–120.
Madden, J. M. (1960). A comparison of three methods of rating scale construction. USAF WADD Personnel Laboratory Technical Note No. 60-262.
Marquis, K. H. and Cannell, C. F. (1969). A study of interviewer-respondent interaction in the urban employment survey. Research report. Ann Arbor: Survey Research Center, University of Michigan.
Martin, J. (1964). Acquiescence: measurement and theory. *British Journal of Social and Clinical Psychology*, **3**, 216–225.
McAllister, D. W., Mitchell, T. R. and Beach, L. R. (1979). The contingency model for

selection of decision strategies: an empirical test of the effects of significance, accountability, and reversibility. *Organizational Behavior and Human Performance*, **24**, 228–244.
McClendon, M. J. (1986). Response-order effects for dichotomous questions. *Social Science Quarterly*, **67**, 205–211.
McClendon, M. J. (1989). Acquiescence: a test of the cognitive limitations and question ambiguity hypotheses. Paper presented at the 1989 Annual Meeting of the American Association for Public Opinion Research, St Petersburg, FL.
McClendon, M. J. (1990). Acquiescence and recency response-order effects in interview surveys. Unpublished manuscript, University of Akron, Akron, OH.
McGee, R. K. (1967). Response set in relation to personality: An orientation. In I. A. Berg (ed.), *Response set in personality assessment* (pp. 1–31). Chicago, IL: Aldine.
Morris, K., Bachman, E., Bromwell, G. and Sterling, S. (1982). The need for cognition: relationship to other personality factors. Unpublished manuscript, University of Iowa.
Moum, T. (1988). Yea-saying and mood-of-the-day effects in self-reported quality of life. *Social Indicators Research*, **20**, 117–139.
Mueller, J. E. (1970). Choosing among 133 candidates. *Public Opinion Quarterly*, **34**, 395–402.
Neuman, W. R. (1986). *The paradox of mass politics*. Cambridge, MA: Harvard University Press.
Neville, J. W. and Knowles, E. S. (1990). Serial position effects on extracted MMPI scales. Unpublished manuscript, University of Arkansas, Fayetteville, AR.
Nisbett, R. and Ross, L. (1980). *Human inference: Strategies and shortcomings of social judgment*. Englewood Cliffs, NJ: Prentice-Hall.
Nunnally, J. C. (1978). *Psychometric theory*. New York: McGraw-Hill.
Nunnally, J. C. and Husek, T. R. (1958). The phony language examination: an approach to the measurement of response bias. *Educational and Psychological Measurement*, **18**, 275–282.
Oksenberg, L., Vinokur, A. and Cannell, C. F. (1979a). Effects of commitment to being a good respondent on interview performance. In C. F. Cannell, L. Oksenberg, and J. M. Converse (eds), *Experiments in interviewing techniques* (pp. 75–108). Ann Arbor, MI: Survey Research Center, University of Michigan.
Oksenberg, L., Vinokur, A. and Cannell, C. F. (1979b). The effects of instructions, commitment, and feedback on reporting in personal interviews. In C. F. Cannell, L. Oksenberg, and J. M. Converse (eds), *Experiments in interviewing techniques* (pp. 133–199). Ann Arbor, MI: Survey Research Center, University of Michigan.
Payne, J. D. (1971). The effects of reversing the order of verbal rating scales in a postal survey. *Journal of the Marketing Research Society*, **14**, 30–44.
Payne, J. W. (1982). Contingent decision behavior. *Psychological Bulletin*, **92**, 382–402.
Payne, S. L. (1951). *The art of asking questions*. Princeton, NJ: Princeton University Press.
Peabody, D. (1966). Authoritarianism scales and response bias. *Psychological Bulletin*, **65**, 11–23.
Peters, D. L. and McCormick, E. J. (1966). Comparative reliability of numerically anchored versus job-task anchored rating scales. *Journal of Applied Psychology*, **50**, 92–96.
Petty, R. E. and Cacioppo, J. T. (1986). *Communication and persuasion*. New York: Springer-Verlag.
Price, V. and Zaller, J. (1990). Evaluation of media exposure items on the 1989 NES Pilot Study. Technical report to the National Election Study Board of Overseers, Ann Arbor, MI.
Quinn, S. B. and Belson, W. A. (1969). *The effects of reversing the order of presentation of verbal rating scales in survey interviews*. London: Survey Research Centre.
Ray, J. J. (1979). Is the acquiescence response style not so mythical after all? Some results from a successful balanced F scale. *Journal of Personality Assessment*, **43**, 638–643.
Ray, J. J. (1983). Reviving the problem of acquiescence response bias. *Journal of Social Psychology*, **121**, 81–96.
Ray, J. J. and Pratt, G. J. (1979). Is the influence of acquiescence on 'catchphrase' type attitudes scale items not so mythical after all? *Australian Journal of Psychology*, **31**, 73–78.
Reese, S. D. and Miller, M. M. (1981). Political attitude holding and structure: the effects of newspaper and television news. *Communication Research*, **8**, 167–188.

Rogers, W. L. and Herzog, A. R. (1984). Response style characteristics and their relationship to age and item covariances. Unpublished manuscript, Institute for Social Research, Ann Arbor, MI.
Rorer, L. G. (1965). The great response-style myth. *Psychological Bulletin*, **63**, 129–156.
Rothwell, N. and Bridge, G. (1978). Discussion of respondent burden. In L. G. Reeder (ed.), *Health survey research methods* (pp. 55–61). Washington, DC: U.S. Department of Health, Education, and Welfare.
Rugg, D. and Cantril, H. (1944). The wording of questions. In H. Cantril (ed.), *Gauging public opinion* (pp. 23–50). Princeton, NJ: Princeton University Press.
Rundus, D. (1971). Analysis of rehearsal processes in free recall. *Journal of Experimental Psychology*, **89**, 63–77.
Schuman, H. and Kalton, G. (1985). Survey methods. In G. Lindzey and E. Aronson (eds), *Handbook of Social Psychology*, Vol. 1 (pp. 635–698). New York: Random House.
Schuman, H., Ludwig, J. and Krosnick, J. A. (1986). The perceived threat of nuclear war, salience, and open questions. *Public Opinion Quarterly*, **50**, 519–536.
Schuman, H. and Presser, S. (1981). *Questions and answers in attitude surveys*. New York: Academic Press.
Schuman, H. and Scott, J. (1989). Response effects over time: two experiments. *Sociological Methods and Research*, **17**, 398–408.
Sherman, S. J. and Corty, E. (1984). Cognitive heuristics. In R. S. Wyer and T. K. Srull (eds), *Handbook of social cognition*, Vol. 1 (pp. 189–286). Hillsdale, NJ: Erlbaum.
Sigelman, L. (1981). Question-order effects on presidential popularity. *Public Opinion Quarterly*, **45**, 199–207.
Simon, H. A. (1957). *Models of man*. New York: Wiley.
Simon, H. A. and Stedry, A. C. (1968). Psychology and economics. In G. Lindzey and E. Aronson (Eds), *Handbook of Social Psychology*, 2nd edn, Vol. 5 (pp. 269–314). Reading, MA: Addison-Wesley.
Smith, T. W. (1981). Educated don't knows: an analysis of the relationship between education and item nonresponse. GSS Technical Report No. 28. Chicago, IL: National Opinion Research Center, University of Chicago.
Stember, H. (1951–1952). Which respondents are reliable? *International Journal of Opinion and Attitude Research*, **5**, 474–479.
Stember, H. and Hyman, H. (1949–1950). How interviewer effects operate through question form. *International Journal of Opinion and Attitude Research*, **3**, 493–512.
Sternberg, R. J. (1977). *Intelligence, information processing, and analogical reasoning: the componential analysis of human abilities*. Hillsdale, NJ: Erlbaum.
Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. New York: Cambridge University Press.
Sternberg, R. J. (1988). Intelligence. In R. J. Sternberg and E. E. Smith (Eds), *The psychology of human thought* (pp. 267–308). New York: Cambridge University Press.
Sudman, S. and Bradburn, N. M. (1974). *Response effects in surveys*. Chicago, IL: Aldine.
Tetlock, P. (1983a). Accountability and the perseverance of first impressions. *Social Psychology Quarterly*, **46**, 285–292.
Tetlock, P. (1983b). Accountability and complexity of thought. *Journal of Personality and Social Psychology*, **45**, 74–83.
Tetlock, P. (1985). Accountability: a social check on the fundamental attribution error. *Social Psychology Quarterly*, **48**, 227–236.
Tetlock, P. and Kim, J. (1987). Accountability and judgment processes in a personality prediction task. *Journal of Personality and Social Psychology*, **52**, 700–709.
Tourangeau, R. (1984). Cognitive sciences and survey methods. In T. Jabine, M. Straf, J. Tanur, and R. Tourangeau (eds), *Cognitive aspects of survey methodology: building a bridge between disciplines* (pp. 73–100). Washington, DC: National Academy Press.
Tourangeau, R. (1986). New perspectives from psychology. Paper presented at the Annual Meeting of the American Association for Public Opinion Research, St Petersburg, FL.
Tourangeau, R. (1987). Attitude measurement: a cognitive perspective. In H. Hippler, N. Schwarz, and S. Sudman (eds), *Social information processing and survey methodology* (pp. 149–162). New York: Springer-Verlag.

Tourangeau, R. and Rasinski, K. A. (1988). Cognitive processes underlying context effects in attitude measurement. *Psychological Bulletin*, **103**, 299–314.
Trott, D. M. and Jackson, D. N. (1967). An experimental analysis of acquiescence. *Journal of Experimental Research in Personality*, **2**, 278–288.
Tschirgi, J. E. (1980). Sensible reasoning: a hypothesis about children. *Child Development*, **51**, 1–10.
Warwick, D. P. and Lininger, C. A. (1975). *The sample survey: theory and practice*. New York: McGraw-Hill.
Wason, P. C. and Johnson-Laird, P. N. (1972). *Psychology of reasoning: structure and content*. Cambridge, MA: Harvard University Press.
Waugh, N. C. and Norman, D. A. (1965). Primary memory. *Psychological Review*, **72**, 89–104.
Weldon, E. and Gargano, G. M. (1988). Cognitive loafing: the effects of accountability and shared responsibility on cognitive effort. *Personality and Social Psychology Bulletin*, **14**, 159–171.
Wyer, R. S. and Srull, T. K. (1980). The processing of social stimulus information: a conceptual integration. In R. Hastie, T. M. Ostrom, E. B. Ebbeson, R. S. Wyer, D. L. Hamilton, and D. E. Carlston (eds), *Person memory* (pp. 227–300). Hillsdale, NJ: Erlbaum.
Zaller, J. (1988). Vague minds vs. vague questions: An experimental attempt to reduce measurement error. Paper presented at the annual meeting of the American Political Science Association, Washington, DC.