A FRAMEWORK FOR EVALUATING "DON'T KNOW" RESPONSES IN SURVEYS

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Survey researchers have debated strategies for handling "don't know" (DK) responses for several decades (Converse, 1964; Schuman and Presser, 1981; Hippler and Schwarz, 1989). The critical issue has been whether or not to "accept" DK responses. Those who favor accepting DK as legitimate answers argue that not accepting DKs forces respondents to answer questions on the basis of insufficient knowledge or experience and diminishes the quality of data. Those who favor not accepting DKs argue that probing or encouragement from interviewers can often convert DKs to valid, substantive answers. Accepting DK responses too easily creates missing data and analytic difficulties.

The arguments for accepting or not accepting DKs both have merits. Some respondents may profess to know what they really do not; or, respondents may report DK when they could provide a substantive response (Converse and Schuman, 1974). Survey designers may be quite perplexed regarding the optimal use and interpretation of DKs.

The purpose of this paper is to propose a framework for evaluating DK responses to survey questions. This framework may be used both to help understand the basis of DK responses, as well as to guide decisions regarding what to do with DKs. We begin by reviewing the literature on DKs. We then develop the framework based upon this review, and conclude by considering applications of the framework to survey practice.

Past theory and practice
The Central Debate: Should DKs be Accepted?

Much of the literature that argues for accepting DK responses is based on the work of Converse (1964). His research indicated that respondents sometimes answered attitude questions even when unfamiliar with the issue. DK responses should be accepted to avoid the reporting of such "nonattitudes."

Similarly, Schuman and Presser (1981) reported that up to 30% of respondents reported attitudes about obscure laws when they were not given an explicit chance to say that they had no opinion. One explanation for this finding is that respondents feel pressure to answer survey questions if not given an explicit opportunity to respond DK. They will therefore provide an answer, even if it is meaningless (Bishop, Tuchfarber, and Oldendick, 1986). Indeed, the training manual for survey interviews at the Survey Research Center, University of Michigan (Guenzel, Berckmans, and Cannell, 1983) instructs interviewers to "always probe a 'don't know' response at least once" (p. 181). If such probes pressure respondents to provide meaningless answers, then prohibiting DKs could damage the quality of survey data.

Some researchers counter that DK responses may be given prematurely by respondents, who either lack motivation to think of an answer, or have initial difficulty doing so. Respondents may be able to provide adequate answers with additional effort. In a factual survey, Cannell, Oksenberg, and Converse (1979) directed respondents who gave DK answers to try harder, instructing "Maybe if you think about it a little longer, you will be able to remember." This direction did increase substantive responses.

Martin (1986) further explored whether additional probes helped respondents remember answers. Respondents were asked to remember the dates of autobiographical events. Those who responded DK were probed to associate the event with other dated events, seasons of the year, or holidays. If such probing yields acceptable substantive responses, then DKs should be discouraged.

Question Type: When Should DK's be Accepted?

Some researchers have investigated the consequences of accepting or not accepting DKs for particular question types. For example, Poe, Seeman, McLaughlin, Mehl, and Dietz (1988) argued against providing explicit DK boxes for factual questions on self-administered questionnaires. Traditionally, attempts to minimize DK responses have focused on factual questions, while DK responses to attitude questions have been regarded as more acceptable (Groves, 1989, pp. 468-471). Factual knowledge may be considered a matter of degree, in that approximations and estimations may be close enough to a "true" value to be worth obtaining; in contrast, people either "have" attitudes or they do not. Weak attitudes are often viewed as inadequate-- and may be formed as a direct result of being questioned on an issue that the respondent has never before considered.

Recent research on DKs has challenged the dichotomy that attitudinal DKs are desirable and factual DKs are not. Several studies suggest that DK responses to attitudinal questions should not be encouraged broadly. Smith (1984) argued that DK responses represented not only nonattitudes but also ambivalence. In the latter case, probing may yield a valid substantive response. Fazio and Williams (1986) argued that some attitudes are less accessible than others; therefore DK responses may not be randomly distributed in the population. Accepting DK answers too early may bias the sample towards people whose attitudes are accessible and can respond more easily.

In addition, Gilljam and Granberg (1993) showed that some attitudes obtained following initial DKs were successful predictors of behavior. Thus, while attitudes are sometimes expressed without underlying knowledge (a "false positive"), some attitudinal DK responses may also be "false negatives." Feick (1989) argued that DK responses may represent not only nonattitudes, but also inability to

choose among the responses offered, and misunderstanding. Thus, DK responses do not necessarily indicate ignorance of issues and facts, and DKs should be treated differently based upon their meaning.

DK responses to attitudinal questions are given for uncertainty, ambivalence, inaccessibility of information, and low motivation-- the same reasons that DK responses are provided to factual questions. Thus the attitudinal/factual dichotomy should not dictate whether or not to accept DKs.

Filtering: How Should DKs be Encouraged or Discouraged?

The more explicitly the option of DK is offered, the more frequently people give DK responses. An explicitly offered DK option is referred to as "filter" because it filters people from substantive responses. While a "standard form" does not offer a DK option explicitly, a "quasi-filter" asks the question while explicitly allowing a DK response. A "full filter" allows a respondent to say that he/she has no opinion on an issue before the question is asked. (Schuman and Presser, 1981, pp. 122-125).

Schuman and Presser (1981, p. 127) report that "filtering can on occasion significantly alter the division of substantive opinion, but that it typically does not." It is not clear which form of filtering produces the most useful information, but their use does enable researchers to allow or discourage DKs at various levels.

Recommendations regarding DKs in the literature are sometimes contradictory, and without a unifying theory, it remains difficult to formulate recommendations for DK strategies for particular topics or questionnaires. However, the literature can be applied to a framework that suggests DK strategies based on data needs, respondent knowledge, and respondent motivation.

A Two-State Mapping of Cognitive States to Responses

The mapping in Figure 1 shows a simple relationship between what a respondent knows (cognitive states), and how a respondent answers (response outcomes). The first cognitive state is that respondents have the knowledge or attitude of interest. The second cognitive state is that respondents do not have the knowledge or attitude that researchers are interested in. Arrows connect the response states to two response outcomes: either the respondent provides a substantive answer or provides a DK. Thus, the mapping contains four possible response paths that lead from a cognitive state to a response outcome.

Figure 1 Here
State-response mapping for two cognitive states

Ideal respondent behavior is a truthful response. That is, respondents in the upper cognitive state provide a substantive response that reflects their actual knowledge or attitudes (Path 1). Alternately, respondents in the lower cognitive state provide a DK, which would reflect their lack of knowledge or attitudes (Path 4). This response behavior is labeled "T" in Figure 1.

If all respondents answered in this ideal manner, responses to survey questions would always represent what respondents actually know. Path 1 responses, however, may be errors of commission, labeled "C," if respondents provide an untruthful substantive response. Respondents may also provide an answer without any basis for doing so (Path 3), another error of commission. Path 3 may be taken due to unwillingness to admit ignorance, or a belief that some substantive answer is required even in the absence of knowledge. Another possibility is that respondents may not provide information that they actually know (Path 2). This an error of omission, labeled "O." Path 2 may be taken due to desire to shorten the interview (Krosnick 1991), or unwillingness to discuss knowledge or attitudes with an interviewer. Paths 2 and 3 are always errors, and Path 4 is never an error. Path 1 may or may not be an error.

When survey designers decide the extent to which they will allow or discourage DKs, they are choosing error control strategies. These strategies are designed to minimize responses that do not reflect the cognitive state of the respondent. For example, the strategy of probing initial DKs may be used restrict Path 2 and reduce errors of omission. Alternately, the strategy of filtering may be used to restrict Path 3 and reduce errors of commission.

Error control strategies, however, involve trade-offs. For example, strong attempts to restrict Path 2 (i.e., discourage DKs by not offering them explicitly, and probe all initial DKs) might inadvertently restrict Path 4, a truthful response. Thus, the strategy could dispose respondents to provide a fabricated response. As discussed above, respondents sometimes provide answers when they have no basis to do so, and DKs are less common when the option is less explicit. Alternately, strong attempts to restrict Path 3 (i.e., encourage DKs through full filters) might inadvertently discourage Path 1 responses. The strategy could dispose respondents to answer DK when they have information of value. They may take the encouragement of DK answers as a signal of a potential "easy out," or be convinced that their attitudes or knowledge are insufficient to justify responding. Attempts to eliminate errors of omission could create errors of commission; the reverse is also true.

Of course, there are intermediate error control strategies. Quasi-filters alert respondents to the acceptability of DKs without directly querying whether a respondent wants to use a DK. This strategy reduces some errors of commission and omission. Stronger DK policies might be used depending which errors are expected.

The Two-State mapping in Figure 1 is useful for understanding DK answers as a subset of potential responses. It distinguishes between responses that meet researchers' objectives (Paths 1 and 4) and those that do not (Paths 2 and 3). The mapping also shows a tradeoff-- reducing errors from one path could increase them on another. But on the whole, this model is too simple, because it assumes that respondents are in one of two cognitive states. Many respondents fall in the middle: they may recall information with effort, recall partial information, or provide

estimates of factual knowledge through heuristics. Similarly, an attitudinal question may ask for an opinion that respondents have never considered, though they may have attitudes on related issues (Groves, 1991). Thus an attitude could be "generated" from related attitudes or knowledge.

A Four-State Mapping of Cognitive States to Responses

Instead of a two-state mapping, we suggest a four-state mapping of respondent knowledge or attitudes. We believe that the states are logically sound and sufficient to account for major psychological differences in the possession of attitudes or knowledge (Herrmann, 1995). The states are:

1) Available: The requested information is known and it is available with no apparent effort.

2) Accessible: The requested information is known but is not instantly available. Special effort from the respondent or prompting from the interviewer is necessary in order to recall the information.

3) Generatable: The requested information is not exactly known, and is therefore not instantly available. However, memory contains enough of a basis to make a reasonable approximation or generate an attitude.

4) Ignorant: The requested information is not known, and there is no basis to approximate or generate an answer.

As in the Two-State mapping, each knowledge or attitude state leads to either a substantive response, or a DK response. The Four-State mapping appears in Figure 2.

Figure 2 here:
State-response mapping for four cognitive states

Each response path is labeled according to its origin (cognitive state) and endpoint (response outcome). Thus, the path from state 1 to a substantive response is "1R"; the path from state 1 to a DK is "1D", and so on.

The mapping shows that ostensibly substantive responses can arise from each of the four cognitive states. Responses that seem equally complete could include precise answers, close estimates, wild guesses, or falsifications. Similarly, DKs could indicate a true lack of knowledge, difficulty coming up with an answer, or a desire to conceal information or attitudes. The mapping shows that respondents can always choose between two response paths. In order to plan appropriate DK strategies, it is necessary to understand what factors guide that choice of response path.

Determinants of Response Paths

Response path is determined by willingness to report the results of an attempt to find (or generate) the requested knowledge or attitudes. A respondent decides what to report in two stages. First, the respondent performs an adequacy judgment on the potential response. Afterwards, the respondent evaluates the desirability of responding accurately, which we refer to as formulating communicative intent (cf. Bradburn, Sudman, and Associates, 1979). In other words, the path from cognitive state to response is determined by two judgements: an assessment of what qualifies as "truthful," and a decision of whether answering truthfully is in the best interest of the respondent.

Determinants from "Extreme" Cognitive States (1 and 4)

In the first cognitive state, the requested information or attitude is "available" by definition. Because the knowledge or attitude can be instantly provided, no adequacy judgement from the respondent is necessary-- the response is obviously adequate. Thus, response path from State 1 is determined only by the respondent's communicative intent. Three response options are available to him/her:

• Report the "truthful answer" (Path 1R)
• Report a fabricated answer (error of commission, Path 1R)
• Report DK (error of omission, Path 1D)

The latter responses are errors, based on a decision to report inaccurately, perhaps due to socially desirability.

In State 4 the respondent cannot provide the requested information or attitude, regardless of effort -- the respondent is "ignorant" by definition. Because the request cannot be fulfilled, no judgement of adequacy is necessary. The only determinant of response path is the respondent's communicative intent -- a choice between admitting ignorance (Path 4D) or fabricating an answer (Path 4R).

Determinants from "Middle" Cognitive States (2 and 3)

In States 2 and 3, knowledge and attitudes are neither instantly available nor completely unavailable-- some effort must be expended to answer. When a potential response contains uncertainty, estimation, or guessing, or when the respondent does not know the level of precision expected by the researcher, an adequacy judgment is necessary. For example, many respondents could not report exactly how many apples they had eaten in the past 30 days, but they could generate an estimate. Respondents must decide whether that approximation qualifies as a legitimate answer. They might also decide that DK would be literally correct.

Respondents may evaluate a potential response as inadequate because they are unable to choose between several response categories, or the respondent may believe that a potential substantive answer does not "count" because it is not known precisely. The respondent may also believe that DK responses are unacceptable. The respondent may also lack motivation to respond (Cannell and Henson, 1974).

Although respondents must assess whether a substantive response or a DK is most appropriate for each question, communicative intent dictates what they actually report. Errors result when a respondent decides not to report the most appropriate answer based upon an adequacy judgment. Errors of omission occur when a respondent has an "adequate response" but chooses to report DK; errors of

commission occur when a respondent does not have an adequate response but chooses to provide one.

A Combined Model of Response Path Determinants

Figure 3, below, consolidates cognitive states, adequacy judgements, and communicative intent into one model that explains the respondent's reporting decision.

Figure 3 here:
Decision model for potential response

The response process begins with the formulation of a potential response. Respondents in States 2 and 3 must evaluate its adequacy. Respondents in State 1 know theirs are adequate; those in State 4 know theirs are inadequate.

All respondents in State 1, and respondents in States 2 and 3 with adequate responses, base their final responses upon the communicative intent decision shown in the lower left of Figure 3. Those with truthful intent provide a substantive answer that meets their understanding of the question requirements. Those with untruthful communicative intent may plead ignorance with a DK (error of omission), or provide a fabricated substantive answer (error of commission). All respondents in State 4, and respondents in States 2 and 3 without adequate responses, base their final responses upon communicative intent decision shown in the lower right of Figure 3. In this case, admitting that they do not know the answer to the question is the truthful response. If their communicative intent is untruthful, they may fabricate a response (for example, to avoid social undesirability of admitting ignorance).

Discussion
Purpose of the framework

The framework, consisting of the four-state mapping and the decision model, is designed to explain reporting decisions in response to survey questions. Respondents can choose between DKs and substantive responses regardless of their cognitive state. Furthermore, they can choose between accurate responses (based on their understanding of question requirements) and inaccurate responses (errors of omission or commission). Respondents first decide whether they can report adequately to meet the question requirements. Next, they decide whether they will report accurately based on communicative intent. The framework should help survey researchers understand the factors involved in these choices.

The framework should also help researchers design appropriate DK strategies. Successful DK strategies should help the respondent understand the researcher's intention of what qualifies as an adequate response-- through instructions, probes, or filters. These strategies should also encourage truthful reporting.

It is important to note that a respondent's adequacy judgment may not correspond to the researcher's objectives. In the absence of instructions to the contrary, a respondent may believe that vague estimates are acceptable when exact figures are required, or that exact figures are required when

estimates are acceptable. Thus, researchers must take responsibility for defining question requirements and designing strategies that support those requirements.

Implications for formulating DK strategies

We conclude with DK policy implications suggested by the framework. Researchers can decide what type of "filter" to use, what level of precision should be required for responding, and how extensive probing should be. They can also design surveys that pose realistic tasks for respondents, both in terms of cognitive abilities and motivation to participate. Which strategies should researchers employ?

First, the four-state mapping of cognitive states (Figure 2) may be used to conceptualize what respondents are likely to know and how they are likely to respond. Survey designers should estimate respondents' cognitive states regarding the attitudes or knowledge in question. For example, some survey questions are designed to measure visits to the doctor in the past year. Researchers should assess whether respondents tend to know this information exactly, know it but require assistance remembering, estimate it in general terms, and so on. Such assessment, (e.g. through cognitive interviewing) will help researchers set goals for data that respondents can actually provide, as well as understand what errors respondents are likely to commit.

Sometimes knowledge about respondents' cognitive states will suggest clear error control strategies. For example, if respondents tend to fall into State 2, increased probing may be necessary. As remembering becomes more difficult, more sophisticated probing techniques may be helpful. One such technique is to "prime" respondents with information to help their memory-- or allowing additional time so respondents can prime themselves. Alternately, if respondents tend to fall into State 3, increased filtering may be necessary; if respondents tend to fall into State 1, relatively simple questions may be most effective.

The decision model (Figure 3) indicates that survey researchers and designers should take account of adequacy judgments in determining response outcomes. Survey designers should therefore define the level of precision that qualifies as adequate for responding. Explicit instructions to respondents may be necessary, and interviewers should also understand what qualifies as "acceptable." For example, should rough estimates or "generated" attitudes be accepted, or is greater precision required? If the researcher does not define the "acceptable" level, respondents will have to do so themselves. As a result, respondents with the same level of knowledge could choose different response paths, with both believing that they answered correctly. Filters should be employed according to desired precision levels, and instructions given to clarify question requirements (e.g., "if you can't remember exactly, give me the best answer you can"; or, "if you can't remember exactly, please say so.")

Third, the decision model (Figure 3) also shows that communicative intent is critical in determining response outcome. Survey designers should design surveys that encourage truthful intent. Low respondent motivation may

result from long interviews, particularly if the questions are burdensome (Cannell, Miller, and Oksenberg 1981). As motivation decreases, respondents may provide answers that they know are less than adequate. In extreme cases, respondents may give blatantly false answers just to end the interview quickly. While researchers sometimes craft long and complex questions to measure precisely defined attitudes or behaviors, tired or disinterested respondents may not pay close attention to these nuances. Researchers should realistically estimate the amount of effort respondents are willing to spend in answering, planning survey length and complexity accordingly.

Also, sensitivity of the survey topic may also impact communicative intent. Respondents may associate disclosing sensitive information with various assessments of risk and potential loss (Willis, Sirken, and Nathan, 1994) which could lead to a reluctance to report accurately. Surveys on sensitive topics require special consideration of these issues during design. Researchers may need to justify the need for the sensitive information, offer rewards or other incentives for participation, or provide proof of confidentiality.

Conclusion

Whatever error control strategies researchers employ, they should remember that extreme attempts to eliminate one type of error may create others. Blocking all inappropriate substantive responses could increase errors of omission-- respondents might be inadvertently discouraged from reporting some acceptable responses. Alternately, blocking all inappropriate DKs could increase errors of commission-- respondents who really do not know answers might feel pressured into providing meaningless ones. Given a particular question, researchers may decide that one type of error or another is more serious. However, they should remember that the errors are interrelated and attempts to reduce them should be balanced.

The framework presented here demonstrates that issues central to understanding DKs -- cognitive states, adequacy judgements, and motivational and social aspects of responding-- are also central to overall data quality. Survey designers would benefit from carefully considering how well questionnaire design and interviewing strategies address factors that impact data quality. We recommend considering:

• Will respondents be capable of providing the information?
• Will respondents be willing to do what we are asking?
• Are our strategies for minimizing error balanced?

If the answer to any of these questions is no, then fundamental data quality requirements are not being met. Researchers should address these problems through revising questions, dropping questions, or acknowledging potential inadequacies of resulting data.

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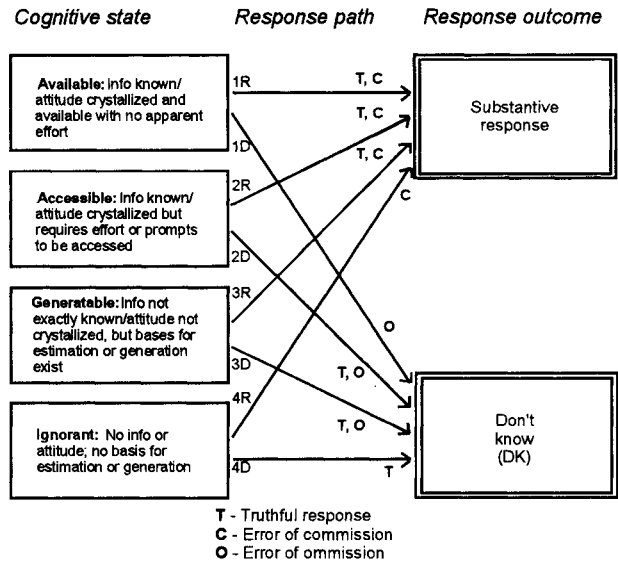## Figure 2: State-response mapping for four cognitive states

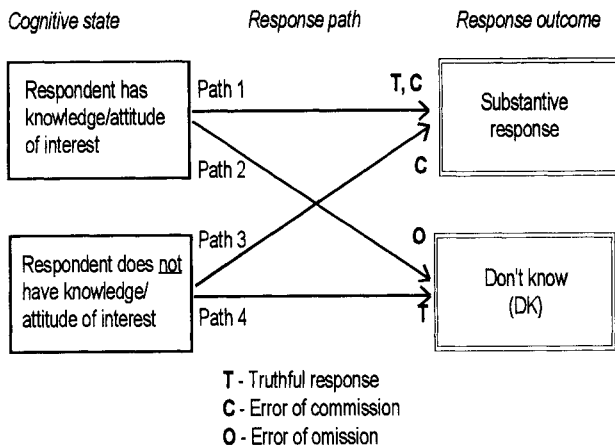## Figure 1: State-response mapping for two cognitive states

Figure 3: Decision model for expression of potential response