RISK AND LOSS PERCEPTIONS ASSOCIATED WITH SURVEY REPORTING OF SENSITIVE BEHAVIORS

Kenneth A. Rasinski, Alison K. Baldwin
National Opinion Research Center
Gordon B. Willis, Jared B. Jobe
National Center for Health Statistics
Kenneth Rasinski, NORC, 1155 East 60th Street, Chicago, Illinois 60637

One avenue for research to improve the accuracy of answers to sensitive survey questions involves understanding the threats that respondents feel, and developing techniques that reduce these perceived threats or increase the perceived gains from answering truthfully. In this paper we present preliminary laboratory research that studies respondent perceptions, and that assesses the application of two behavioral models to the topic of sensitive questions: utility theory and prospect theory.

Utility Theory

Nathan, Sirken, Willis, and Esposito (1990) have introduced the application of classical utility theory (Von Neumann and Morgenstern, 1947) to survey responding, by modeling risk-taking behavior through examining perceived losses and gains to the respondent's decision of whether to respond truthfully or not. Classical utility theory emerged from developments in game theory and attempts to explain how individuals weigh losses and gains in making decisions in a wide range of settings. Generally, utility theory assumes that decision-making under risk depends on two factors:

1. perceived risks: the decision-maker's perceptions of the conditional probabilities ("risks") of alternative outcomes given each decision option.

2. perceived losses: the decision-maker's perceptions of the losses (or benefits) that are associated with each possible outcome.

According to this framework, a respondent deciding whether to give a truthful answer to a survey question might consider such risks and losses as embarrassment during the interview, or consequences arising from the disclosure of answers beyond the interview setting; he or she might also consider such gains as approval from the interviewer, consistency with personal values (e.g., norms regarding lying), or the promotion of general welfare (e.g., furthering

knowledge about some topic). Recent critiques of utility theory have focused on psychological processes involved in translating objective gains and losses into subjective utilities and in converting objective probabilities into decision weights (Kahneman & Tversky, 1979). Other work has examined alternative procedures that people may use to combine losses and gains into an overall judgment (Anderson & Shanteau, 1970). However, these alternative models have retained utility theory's emphasis on the assessment of risks and losses as the cornerstone of the decision-making process.

Prospect Theory and Framing

Kahneman and Tversky (1979) have developed an alternative model of decision under risk, called *prospect theory*. Prospect theory was developed to account for empirically demonstrated violations of the axioms of utility theory, such as the finding that people place too much weight on certain outcomes in decisions involving risk. For example, in evaluating gambles, people tend to avoid risk when one of two alternatives will result in a certain gain but tend to seek risk when one of the alternatives will result in a certain loss. In addition, whereas classical utility theory measures outcomes in absolute terms, prospect theory focuses on changes in outcomes, that is, on gains or losses relative to some psychological reference point. Prospect theory also proposes that the functions relating outcomes to perceived value are convex for losses and concave for gains (implying that decision-makers are more sensitive to differences among small losses and small gains than to differences among larger ones) and that the value function is steeper for losses than for gains (implying than a certain loss of a given amount has more impact on decisions that a certain gain of the same amount).

A key hypothesis from prospect theory is that the evaluation of a prospect depends on how the prospect is *framed*, that is, whether it is stated as a gain or as a loss. The framing hypothesis has been supported in research on hypothetical decision-making problems

(Kahneman & Tversky, 1979; Tversky & Kahneman, 1981) including health-related decisions (Eraker & Sox, 1981; McNeil, Pauker, Sox, & Tversky, 1982). Predictions from prospect theory have been useful in understanding consumer decisions (Levin, Johnson, Russo, & Deldin, 1985) and health-related persuasive appeals (Meyerowitz & Chaiken, 1987). Meyerowitz and Chaiken (1987) found evidence that the framing of outcomes also affects behaviors, reporting that college-aged females who were exposed to a loss-framed pamphlet about breast cancer were more likely than those who received a gain-framed pamphlet to perform a breast self-examination during the four-week period following the exposure.

The axioms of prospect theory, especially those associated with the framing hypothesis, have potentially important implications for understanding responses to sensitive questions. Most discussions of the problem of obtaining honest answers to sensitive questions focus on the potential losses to the respondent. The framing hypothesis forces us to consider gains as well as losses, and to examine how potential losses and gains are presented. In practice, survey materials such as advance letters often stress the benefits to society as a whole or to the respondent's community in an attempt to persuade respondents to give truthful responses. However, by calling attention to the procedures used to safeguard respondents' identities, these materials may inadvertently arouse concern over potential consequences of disclosure. Little research has been conducted to evaluate how the juxtaposition of statements invoking losses and gains affects the likelihood of obtaining an honest response.

Experiment 1: Utility Theory

The experiment reported here extends the pilot work conducted by Sirken, Nathan, and Willis (1991), and Willis, Sirken, and Nathan (1994). The current experiment assesses the usefulness of utility theory by measuring subjects' perceptions of risk and loss, and relating these to their reported likelihood of providing truthful answers to sensitive survey questions.

Method
Materials. In order to influence subjects' perceptions of risks and losses, hypothetical scenarios were constructed describing a survey respondent and an interview situation. Each scenario depicted an interview situation in which the respondent is asked about two topics, one considered by the researchers to be very sensitive (abortion in the women's versions, and number of sexual partners prior to marriage in the

men's versions) and the other less sensitive (ever having been arrested for drunk driving, for both men and women). In the female versions, the respondent, a 28 year-old married woman with two children, was described as having had an abortion before she met her husband. She was also described as having been arrested for drunk driving when she was a teenager. The description indicated that her husband knew nothing about either of these. In the male versions, the respondent, a 28 year-old married man with two children, was described as having had more than twenty sexual partners before he met his wife. He too was described as having been arrested for drunk driving when he was a teenager. Again, the description indicated that his wife knew nothing about either of these incidents.

In all versions, an interviewer was depicted as coming to the respondent's house to administer a government-sponsored health survey. Eight versions of each sex's basic scenario were constructed; variations concerned whether: a) the questions were asked in a personal interview or using a self-administered questionnaire; b) the respondent was home alone or family members were present; and c) the interviewer was younger (in his/her mid-20's) or older (in his/her mid-50's). The interviewer was presented as a woman in the female versions and a man in the male version.

Subjects were 96 males and 96 females between 18 and 45, recruited through newspaper advertisements. Subjects were reimbursed $20 each for participating in this and another, unrelated study. Twelve subjects were assigned at random to each of the eight scenarios. After reading the scenario, subjects were asked to put themselves in the situation of the survey respondent, and were asked a series of questions about what they would be likely to think and do in that situation.

Table 1 lists the judgements that subjects were asked to make. Subjects were first asked, on a ten-point scale, to indicate how likely they thought it was that the respondent would give a truthful answer when asked about the sensitive topic, and then to make risk/loss judgments about being embarrassed, receiving sympathy and understanding, and disclosure of the sensitive information to the respondent's spouse and to an unauthorized person or group. Questions about the more sensitive topic (abortion or number of sex partners) came before questions about being arrested for drunk driving. It was predicted that: a) the perceived probability of a respondent telling the truth to the sensitive questions would vary according to the independent factors manipulated; and b) as a basic test of the utility model, risk and loss perceptions would be related to the perceived probability of a truthful response.

Table 1. Judgments about probability of telling the truth and about risk/loss

1) Truthful decision: Likelihood of respondent telling the truth.

2) Perceived Risks:
   a) Likelihood the interviewer would show disapproval if respondent told the truth.

   b) Likelihood the interviewer would be an understanding listener if respondent told the truth.

   c) Likelihood spouse would learn respondent's response.

   d) Likelihood that unauthorized person or group would learn respondent's response.

3) Perceived Losses:
   a) Degree of embarrassment felt if interviewer showed disapproval.

   b) Degree of feeling better if interviewer showed that he/she was an understanding listener.

   c) Degree of negative consequences if spouse learned respondent's response.

   d) Degree of negative consequences if unauthorized person or group learned respondent's response.

Results

Likelihood of telling the truth. The likelihood of telling the truth to the very sensitive topic was analyzed first. An analysis of variance was performed that included, as independent factors, Gender (male/female), Interviewer Age (50's/20's), Method (self administered/interviewer administered), and Privacy (family at home/not at home). This analysis yielded a significant main effect of Privacy $F(1,175)=5.33$, $p<.022$, and a significant Privacy by Interviewer Age interaction, $F(1,175)=9.05$, $p<.003$). Table 2 shows the means for these effects. The result suggests that for the very sensitive topics, having an older interviewer suppresses the tendency for disclosure in a family setting.

Table 2. Highly sensitive question: Effects of interviewer age and privacy on likelihood of truthful response.

	Interviewer Age		
	20's	50's	Overall
Privacy			
Family not home	6.19	7.81	7.00
Family home	6.50	5.40	5.96

Note: 1 = "not likely at all"
      9 = "extremely likely"

For the less sensitive topic of drunk driving, both female and male subjects were least likely to disclose information when the interviewer was older and other family members were home. Two significant interaction effects, each involving Gender, were found: Gender by Interviewer Age by Privacy, $F(1,173) = 2.80$, $p<.028$, and Version by Mode by Privacy, $F(1,173) = 9.53$, $p<.002$). Means for the Gender by Interviewer Age by Privacy interaction are shown in Table 3, indicating a complex pattern of results that is difficult to explain.

Table 3. Less sensitive question: Effects of interviewer age and privacy on likelihood of truthful response.

	Female Version		Male Version	
	Interviewer Age:		Interviewer Age:	
	20's	50's	20's	50's
Privacy				
Family not home	7.23	7.35	6.79	7.92
Family home	6.88	5.96	7.63	6.29

Note: 1 = "not likely at all"
      9 = "extremely likely"

Table 4 shows means for the Gender by Mode by Privacy interaction. Female subjects were least likely to be willing to disclose the truth about a drunk driving conviction when their family was home and the question was asked by the interviewer (rather than as a self-administered question). Surprisingly, male subjects

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were most likely to admit to their drunk driving conviction under these circumstances, and least willing to admit in the self-administered condition when other family members were home.

Table 4. Effects of Gender, Mode, and Privacy on likelihood of truthful response.

| | Female Version | | Male Version | |
| | Mode: | | Mode: | |
	Int. Adm.	SAQ	Int. Adm.	SAQ
Privacy				
Family not home	7.30	7.17	6.96	7.75
Family home	5.46	6.43	8.13	5.79

Notes: Int. Adm. = Interviewer-administered questionnaire.
SAQ = Self-administered questionnaire.
1 = "not likely at all"
9 = "extremely likely"

Risk/loss judgments. To test the key issue of the applicability of utility theory, the degree to which risk/loss judgments affected the reported likelihood of telling the truth was examined. Risk/loss composites were formed by multiplying each judgment of the likelihood that a negative or positive event would occur by the magnitude (positive or negative) of the corresponding consequence. This resulted in composites for each of the sensitive behaviors: interviewer disapproval X respondent embarrassment (EMBARRASS); interviewer understanding X respondent feels better (RELIEF); and spouse finds out X negative consequences for the relationship (SPOUSE).

The three risk/loss judgments were entered as independent variables in a regression analysis, with the probability of telling the truth as the dependent variable. The results, shown in Table 5, indicate that for the very sensitive topic the risk of disclosure to one's spouse was an important consideration in deciding whether to tell the truth, and for the less sensitive topic, the risk of embarrassment was an important consideration in deciding whether to respond truthfully.

These models are only marginally reliable; however, they do provide some limited evidence that the utility theory components of risk and loss were related to the probability of providing a truthful response to the sensitive survey questions.

Table 5. Regression of reported likelihood of giving true response on risk/loss judgments for more and less sensitive survey topics.

More Sensitive Topic			
	Beta	t	p
SPOUSE	-1.480	-3.433	.0007
RELIEF	.418	1.383	ns
EMBARRASS	.204	.493	ns
R Squared	.074		
F	4.804		
p	.003		

Less Sensitive Topic			
	Beta	t	p
SPOUSE	-.102	-.226	ns
RELIEF	.300	1.072	ns
EMBARRASS	-.710	-2.519	.013
R Squared	.051		
F	3.195		
p	.025		

Experiment 2: Prospect Theory
Method

In Experiment 2 we examined the impact of alternative framing of a risk on the probability of truthful responding to questions about sensitive topics. Each subject received a scenario in which they read the following:

> Assume that you received treatment for a serious drug problem in the past but that neither your current friends nor members of you family knew about it. An interviewer comes to your door one evening and asks you to participate in a health survey sponsored by a local university. The interviewer goes on to say that some of the questions ask about sensitive topics such as past drug problems.

Subjects in the positive frame condition received the following additional information:

The interviewer says the university research center sponsoring the survey has a strong commitment to ensuring the confidentiality of the survey information and has estimated that there is **more than a ninety-nine percent chance that no one you know would ever see your answers to the questions**. [Emphasis added.]

Subjects in the negative frame condition received this version of the additional information:

The interviewer says the university research center sponsoring the survey has a strong commitment to ensuring the confidentiality of the survey information and has estimated that there is **less than a one percent chance that someone you know would ever see your answers to the questions**. [Emphasis added.]

The subjects were those used in the first experiment. After completing Experiment 1, subjects were asked to read and respond to either a positive or negative frame scenario. Assignment to the conditions in Experiment 2 was made independent of assignment to the first experiment by fully crossing the Experiment 2 conditions with those of Experiment 1.

After reading the scenario, subjects were asked to respond to the following two questions: 1) How likely is it that you would agree to participate in this survey?, and 2) If you did agree to participate in this survey, how likely is it that you would give a truthful answer to a question that asked whether you ever received treatment for a drug problem? The response scale for each of the questions ranged from 1 to 10, with 1 anchored at "not likely at all" and 10 anchored at "extremely likely".

Results

Responses to the two questions were analyzed by Frame (positive frame/negative frame), Gender, and Race (Black/Other). For the question on participation, the only significant effect was for Race. Black subjects were more likely to say they would participate in the survey than were other subjects (Blacks, mean=7.41, others, mean=6.20, $F(1,181)=6.96, p<.009$). Neither Version nor Gender, nor any interactions, significantly affected willingness to participate.

For the question on reporting truthfully about drug treatment, the only significant effect was a three-way interaction between Frame, Gender, and Race, $F(1,181) = 4.86, p<.029$). Means for the three-way interaction are shown in Table 6.

Table 6. Framing experiment: Effects of Frame, Gender, and Race on perceived likelihood of truthful responding to drug use question.

	Negative Frame		Positive Frame	
	Gender:		Gender:	
	Female	Male	Female	Male
Race				
Black	7.96	8.28	8.24	7.95
Other	8.13	6.89	7.27	9.10

The largest effect appears to be for white males, who indicated more willingness to tell the truth in the positive frame condition than under the negative frame. The second biggest difference appears to be for white females, where the pattern is in the direction opposite of that expected: They appeared more willing to tell the truth when the risk of disclosure is framed negatively than when framed positively.

General Discussion

Assessment of utility theory

Experiment 1 suggests that there may be some value in assessing perceptions of risk and loss, and relating these perceptions to the probability of a truthful survey response. In particular, it may be possible to determine which survey procedures involve the lowest degree of perceived threat. From the current study, it appears that: a) embarrassment with respect to the survey interviewer may be an important factor, suggesting the value of self-administration, and that b) fear of disclosure to other household members inhibits respondents from telling the truth, which also suggests that a self-administered, rather than interviewer administered procedure, be used when sensitive questions are asked. Although there is some disagreement on this issue in the survey research literature, this conclusion agrees with those of several researchers who have conducted field studies of these variables (Gfroerer & Hughes, 1992; Schober et al., 1992; Turner et al., 1992).

Assessment of prospect theory

Little that was of practical or theoretical value was obtained from Experiment 2. In particular, the finding of triple interactions alone is not useful for survey planning and design purposes, and provides little insight into basic trends in respondent behavior when sensitive

questions are asked. In particular, there was no indication that prospect framing could be used to modify the introduction in a way that might increase the degree of truthfulness of responses.

Limitations of study and future research

There are several design limitations of these experiments which might be rectified in future studies. Most important, the hypothetical situations presented to laboratory subjects were fairly abstract, and may not have represented the true effects of these variables in a survey environment. For example, the description of an interviewer as being in her 20's or 50's may not have served as a salient cue in the same way that it might in the usual household survey. It would be advisable to address this limitation in particular by using more realistic demonstrations, such as those involving video-tape presentation of the hypothetical scenario. The authors are at this time conducting such research; it is hoped that this will produce clearer results which will allow us to model the response process for sensitive questions under realistic conditions.

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