RESULTS FROM THE NATIONAL CRIME VICTIMIZATION SURVEY (NCVS) CATI EXPERIMENT

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I. INTRODUCTION

Since 1987, the U.S. Census Bureau has studied the effect of centralized Computer Assisted Telephone Interviewing (CATI) on the National Crime Victimization Survey (NCVS). The CATI part of the experiment was conducted at the Census Bureau's centralized-CATI facility in Hagerstown, MD. Initially, we expected the advantage of CATI to be primarily monetary. While the use of CATI on households designated for interview by telephone has had only minor effects on the overall cost of conducting the NCVS (McCarthy, Montagliani, and McGinn, 1988); it has had a significant effect on the NCVS estimated crime rates (Hubble and Wilder, 1988). The crime rates from the group of households that use CATI whenever possible are 15 percent to 65 percent higher than the group that does not use CATI.

We believe that the increased crime rates from CATI reduce the amount of underreporting of crimes in the NCVS (Alexander and Taylor, 1989). Therefore, starting in 1988, we included the households in the CATI-eligible group in the published NCVS estimates. We will use CATI whenever possible as NCVS phases in its new questionnaire (Hubble, 1990).

In this paper, we conjecture that the standardized interviewer-respondent interaction explains the higher CATI crime rates. The mechanism for eliciting higher crime rates is important to pinpoint with the planned introduction of Computer Assisted Personal Interviewing (CAPI) to NCVS. We want to incorporate the effective CATI procedures and computer training modules in the CAPI system.

We present the 1987-1991 results, which are consistent with our 1987-based findings. Section II of this paper outlines the scope and general design features of the NCVS. Section III describes the NCVS CATI experiment design features. Section IV presents the results, and section V contains our conclusions and recommendations.

II. NCVS BACKGROUND

A. NCVS Scope of Crimes and Their Attributes

The NCVS is a household based sample survey that collects data on the amount and types of crime occurring in the United States.

Currently, NCVS measures the incidence of personal crimes of violence (rape, robbery, assault), personal crimes of theft (personal larceny with and without contact), and household crimes (burglary, household larceny, motor vehicle theft). Other types of crimes--such as murder, kidnapping, commercial robbery, drug abuse, prostitution, fraud, commercial burglary, and arson--are not in scope for the NCVS.

In the NCVS, each criminal incident is classified according to the most serious criminal act that took place. The order of seriousness for crimes against persons is rape, robbery, assault, and larceny. If a person is both robbed and assaulted, the incident is classified as a robbery; if the victim suffers physical harm, the crime is categorized as robbery with injury. Personal crimes of contact take precedence over household offenses. Burglary is the most serious household offense and larceny the least.

Specific information is collected on each incident. These incident attributes include the following:
° the date, time, and place of occurrence
° whether the crime was completed or only attempted
° whether there was a weapon present
° whether the crime was reported to police
° any injury or property loss suffered by the victim, including hospitalization, time lost from work, insurance payments, and property value
° the number of offenders and their characteristics, including their relationship to the victim
° substance abuse by offenders
° any actions taken by victims to protect themselves or property at the time of the incident

The information is used both in the crime classification process and for analytical purposes.

Also for analytical purposes, basic geographic and demographic information on each household is collected. This includes region (Northeast, Midwest, South, West), locality of residence (central city, suburban, nonmetropolitan), income, household composition, number of household members, and frequency of residential moves.

Personal demographic information on each respondent is collected for the same reason. This includes sex, age, race, ethnicity, education, marital

status, relationship to other household members, and membership in the armed forces.

B. NCVS Sample Design and Size

A stratified area probability sample is used to select the housing units in the NCVS.

The sample consists of all persons, aged 12 and older, in approximately 60,000 housing units. The reference period is 6 months long, and the sample is interviewed at 6-month intervals. For purposes of providing even interviewer workloads, the sample is divided into six rotating panels. The six panels each consist of one-sixth of the total sample (10,000 housing units). One panel is designated for sample each month.

Furthermore, each panel has six rotations. The six rotations correspond to the six tabulated interviews per household. The first interview is not tabulated. It places a "bound" on the subsequent interviews used for estimation. (A bound prevents the reporting of the same incidents in consecutive reference periods by eliminating incidents which were reported in the previous interview.) Since the initial interview has no such bound, it is not used in the crime rate estimate. A new rotation group enters the sample every 6 months, replacing a group retired from sample after being in sample for 3 years.

The first time a household appears in sample, a Census interviewer makes a personal visit to establish a household roster and to collect demographic information. This information is updated on subsequent interviews. Each person, aged 12 and older, living in the household is asked screen questions about personal crimes, while only the first respondent is asked screen questions about household crimes. The reference period for these questions is the 6 months before the interview month. If the respondent answers "yes" to any of the screen questions, the interviewer completes a crime incident report for each incident at the end of the screening process.

Most of the subsequent interviews are conducted by telephone. The exception is the fifth interview, which is conducted in person to reestablish personal contact with the household. Some special interviewing situations also require a personal interview. These situations are discussed in Hubble and Wilder, 1988.

It should be noted that prior to 1980 nearly all interviews were conducted in person. Since then the proportion of telephone interviews has increased to its present level, 73 percent of all interviews. While some effects were noted, the increase in the use of telephone interviews by field interviewers did not appear to significantly affect the major NCVS estimates (Roman and Sliwa, 1982).

III. NCVS CATI EXPERIMENT SAMPLE DESIGN

A. Sample Area Selection

The NCVS CATI experiment began in 1987. Originally, only hard-to-enumerate multiple-interviewer areas were to be included in the experiment. Hard-to-enumerate areas are places where it is difficult to hire and retain qualified interviewers. Most often they are large metropolitan areas. A planned expansion into additional hard-to-enumerate multiple-interviewer areas occurred in 1988. Strictly speaking, interpretation of the multiple-interviewer area results are limited to hard-to-enumerate multiple-interviewer areas.

In 1990, due to the large impact of CATI on crime rates in the multiple-interviewer areas, single-interviewer areas were added to the experiment to determine if CATI had a similar impact on these areas. Not all single-interviewer areas were eligible for inclusion into the NCVS CATI experiment. In more than half the single-interviewer areas, implementing the CATI experiment would have created intolerably small workloads for the field interviewer. So, the single-interviewer area CATI experiment is restricted to those areas with larger than average workloads. Larger workloads may be related to the size of the stratum from which the area was selected or the rate of population growth in the area. But, either way, these single-interviewer areas are likely to be different from single-interviewer areas as a whole. In addition, the selection of single-interviewer areas was restricted to only those field regional offices where the CATI experiment was already being conducted for multiple-interviewer areas. Consequently, like the multiple-interviewer area CATI experiment limitations, the single-interviewer area CATI results cannot easily be generalized to all single-interviewer areas.

B. Definition of Test Group and Control Group

The CATI experiment is divided into a test group (TG) and a control group (CG). Each household is interviewed 7 times. Both TG and CG conduct the first and fifth interviews in person, and both conduct the other five interviews by telephone. The TG conducts telephone interviews with CATI. The CG conducts telephone interviews from the field interviewer's home. Instances such as no telephone in the house or a language barrier force telephone interviews to take place in person. In addition, telephone interviews that start in Hagerstown can be moved to the field (recycles). Cases are recycled because the household could not be contacted or an interview was incomplete. Cases remain in the TG or CG even if the interview mode changes.

C. Sample Size

From 1987-1991, approximately 110,000 households in the multiple-interviewer areas were included in the experiment. Half of these households were assigned to the TG and half to the CG. From 1990-1991, the single-interviewer areas included approximately 13,000 households evenly divided between TG and CG.

IV. RESULTS

The results for multiple-interviewer areas and single-interviewer areas are in sections A and B, respectively. Further analyses of multiple-interviewer areas are in sections C through F.

A. Multiple-Interviewer Areas

Consistent with the NCVS CATI results reported in Hubble and Wilder, 1988, both personal and household crimes show significant differences between the TG and the CG (Tables 1 and 2). Of the major crime categories (crimes of violence, crimes of theft, burglary, household larceny, and motor vehicle theft), only motor vehicle theft does not show significant differences between the TG and CG. The more controlled respondent-interviewer interaction could explain these significant differences. The higher TG crime rates may be a result of a higher quality interview. CATI forces strict adherence to the questionnaire and ensures that all questions are asked of all respondents. Centralization and computerization play a role in the improved quality of the interview. We do not have a measurement of each of these components.

B. Single-Interviewer Areas

The results from the single-interviewer areas are not as definitive as for the multiple-interviewer areas (Tables 3, 4, and 5), perhaps because of smaller sample size. For personal crimes (rape, robbery, assault, theft), assault is the only category with significant differences between TG and CG (35 percent difference, significant at the $\alpha = .05$ level). In the multiple-interviewer areas assault, robbery, and theft are significantly different (25 percent difference, $\alpha = .01$; 45 percent difference, $\alpha = .01$; 25 percent difference, $\alpha = .01$, respectively). One theory is that the single-interviewer areas do a better job at collecting crimes, so their rate is closer than the multiple-interviewer areas to the actual crime levels. Hence, the addition of CATI would not have as big an effect. Single-interviewer areas typically have more experienced interviewers with lower interviewer turnover rates.

C. Multiple-Interviewer Areas--Personal vs. Telephone Interviews

The telephone interviews show significant differences between TG and CG, and those differences are significantly greater than the personal interview differences (Table 6). These results are as expected. We would only expect similar rates between the two groups for personal interviews and not for telephone interviews, since the distinguishing characteristics of the two groups exists for the telephone portion of the survey, i.e., CATI and centralized interviewing vs. non-CATI and decentralized interviewing. For personal interviews, we would expect similar rates for the TG and CG. Assaults, however, have a significant difference between the two groups (20 percent difference, significant at the $\alpha = .10$ level).

D. Multiple-Interviewer Areas--Personal Interviews - Measuring the Effect of CATI on Personal Interviews

We restrict the analysis to fifth-interview personal interviews. For both the TG and CG, we subset fifth-interview households with a telephone that are not replacement households. The remaining fifth-interview households in both TG and CG have had all previous interviews conducted in person (Table 7). The intention is to determine if the significant difference observed for assaults in personal interviews is differential by whether or not respondents have been previously contacted by telephone/CATI. We conjectured that previous CATI exposure would have a positive impact on the interview. Respondents with previous CATI exposure would be more willing to answer all of the questions because of a stricter regiment applied in their previous interviews conducted with CATI. The assault category is not significantly different based on the previous interviews conducted by telephone/CATI vs. all previous interviews conducted in person, but there is some indication of an overall CATI exposure effect for all personal crimes (26 percent difference, significant at the $\alpha = .10$ level).

E. Multiple-Interviewer Areas--Size of Household for Personal Crimes

The greatest effect of CATI can be seen in the 3+ person households where almost all crime categories are significant at the $\alpha = .01$ level (Table 8). There is also a significant difference between the percent differences for the 1 and 3+ person households for all personal crimes, crimes of violence, assault, and simple assault. In the CG, the quality of the interview appears to deteriorate as the size of household increases. CATI, meanwhile, does better in the larger households because it forces the interviewer to ask all of the respondents all of the questions. Using CATI, the computer directs the order of questions; and the interviewer can be monitored, which discourages inadequate probing or inappropriate proxying.

F. Multiple-Interviewer Areas--Primary Sampling Unit (PSU)

Partitioning the sample by PSU indicates that percent differences between TG and CG for personal

crimes and for household crimes can vary widely among PSU's (0-105%, for personal crimes;-10-70% for household crimes). Assuming, CATI standardizes interviews, the observed variability in the percent differences appears to be driven by respondent-interviewer interaction differences between PSU's in the CG.

V. CONCLUSION AND RECOMMENDATIONS

There are four possible causes for the higher crime rates in the TG. It could be a result of interviewer behavior, respondent behavior, minor changes in the questionnaire, or automation of the questionnaire. While each element probably contributes to the differences, interviewer behavior plays a major role. The observed differences between multiple-interviewer vs. single-interviewer areas; the positive correlation between CATI and household size for personal crimes; and the multiple-interviewer area differential results by PSU, support the hypothesis that the advantage of CATI for the NCVS is that it standardizes the interviewing process.

The significant percent differences between multiple-interviewer vs. single-interviewer areas may be explained by interviewer behavior. If CG single-interviewer areas are providing a better interview than CG hard-to-enumerate multiple-interviewer areas, then CATI gains are mostly seen in TG multiple-interviewer areas. For instance, in hard-to-enumerate multiple-interviewer areas maybe it's harder to reach all respondents. CATI reduces the burden on interviewers. If household members can't be reached, another interviewer calls the household. Possibly CATI makes more attempts to contact respondents.

The recontacting advantage of CATI could help explain the household size effect as well. Furthermore, CATI procedures probably discourage abbreviated interviews and inappropriate proxying. Interviewers in the field perhaps try to reduce the respondents' burden to avoid refusals now or when they recontact the household in 6 months. (The refusal rate is directly tied to an interviewer's job performance rating.) Abbreviated interviews probably occur most often in households with more than one respondent. CATI interviewers are monitored on a regular basis with centralized interviewing. This discourages interviewers confronted with reluctant respondents from conducting abbreviated interviews. In addition, CATI interviewers can use the fact that they are using a computer as a reason for the respondent to comply with the interview. ("The computer won't let me do anything but ask you these questions.")

Uniform changes to the questionnaire or automation of the questionnaire do not explain the differential results by PSU. The quality of the interview appears to vary by PSU. As a result, the benefit of CATI varies as well.

These results, though not direct proof of the cause, do suggest some actions to be taken in implementing other NCVS changes. Our recommendation for CAPI is to incorporate as many of the advantages of CATI as possible. In particular, include the capability to monitor the the collection of interview start and end times to avoid abbreviated interviews. As for the new questionnaire, the CATI results have already had an impact. Because of this study, the training materials used for the new questionnaire now emphasize the importance of asking all questions to all respondents.

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MULTIPLE-INTERVIEWER AREAS		Table 1	
PERSONAL CRIME RATES (Rate per 1000 pop 12+)			
TYPE OF CRIME	TG	CG	%diff
All Personal Crimes	128.0	101.6	26%***
Crimes of Violence	39.9	30.9	29%***
Completed	16.4	12.5	32%***
Attempted	23.5	18.5	27%***
Rape	0.9	0.8	10%
Robbery	10.8	7.5	45%***
Completed	7.2	5.3	37%***
Attempted	3.6	2.2	65%***
Assault	28.2	22.7	25%***
Aggravated	10.3	8.1	28%***
Completed w/ Injury	3.8	2.8	33%
Attempted w/ Weapon	6.5	5.2	25%*
Simple	17.9	14.6	23%***
Completed w/ Injury	5.1	4.0	28%*
Attempted w/o Weapon	12.8	10.6	21%**
Crimes of Theft	88.1	70.7	25%***
Value less than $50	29.6	22.1	34%***
Value $50 or more	42.2	36.4	16%***

MULTIPLE-INTERVIEWER AREAS		Table 2	
HOUSEHOLD CRIME RATES (Rate per 1000 hhlds)			
Type of Crime	TG	CG	%diff
All Household Crimes	221.5	188.5	18%***
Burglary	71.9	62.2	16%***
Completed	54.6	48.8	12%*
Forcible Entry	26.7	24.2	10%
Unlawful Entry w/o Force	27.9	24.5	14%
Attempted	17.3	13.4	29%**
Household Larceny	116.1	93.5	24%***
Value less than $50	43.1	31.8	36%***
Value $50 or more	57.0	50.5	13%**
Motor Vehicle Theft	33.6	32.8	3%
Completed	21.2	19.4	9%
Attempted	12.4	13.3	-7%

SINGLE-INTERVIEWER AREAS		Table 3	
PERSONAL CRIME RATES (Rate per 1000 pop 12+)			
Type of Crime	TG	CG	%diff
All Personal Crimes	111.1	98.8	13%
Crimes of Violence	38.5	31.7	22%
Completed	13.6	12.5	9%
Attempted	25.0	19.2	30%
Rape	0.8	0.9	-5%
Robbery	3.7	5.7	-35%
Completed	2.7	4.6	-41%
Attempted	1.0	1.1	-10%
Assault	34.0	25.1	35%**
Aggravated	10.6	7.8	36%
Completed w/ Injury	4.2	2.3	79%
Attempted w/ Weapon	6.4	5.5	17%
Simple	23.4	17.3	35%*
Completed w/ Injury	6.0	5.2	16%
Attempted w/o Weapon	17.4	12.2	43%*
Crimes of Theft	72.6	67.1	8%
Value less than $50	27.2	25.2	8%
Value $50 or more	33.6	32.7	3%

SINGLE-INTERVIEWER AREAS		Table 4	
HOUSEHOLD CRIME RATES (Rate per 1000 hhlds)			
Type of Crime	TG	CG	%diff
All Household Crimes	151.8	147.3	3%
Burglary	48.6	53.9	-10%
Completed	38.8	42.7	-9%
Forcible Entry	17.4	15.3	14%
Unlawful Entry w/o Force	21.4	27.4	-22%
Attempted	9.8	11.1	-12%
Household Larceny	88.5	80.3	10%
Value less than $50	35.3	32.2	10%
Value $50 or more	42.3	40.8	4%
Motor Vehicle Theft	14.7	13.2	11%
Completed	10.5	9.4	12%
Attempted	4.2	3.8	10%

PERSONAL & HHLD CRIME RATES BY MULTI- & SINGLE-INTERVIEWER AREAS			Table 5	
(Rate per 1000 pop 12+ and 1000 hhlds)				
MULTI-INTERVIEWER AREAS	TG	CG	%diff	
All Personal Crimes	128.0	101.6	26%***	
Crimes of Violence	39.9	30.9	29%***	
Rape	0.9	0.8	10%	
Robbery	10.8	7.5	45%***	@
Assault	28.2	22.7	25%***	
Aggravated	10.3	8.1	28%***	
Simple	17.9	14.6	23%***	
Crimes of Theft	88.1	70.7	25%***	
Value less than $50	29.6	22.1	34%***	
Value $50 or more	42.2	36.4	16%***	
All Household Crimes	221.5	188.5	18%***	
Burglary	71.9	62.2	16%***	
Household Larceny	116.1	93.5	24%***	
Motor Vehicle Theft	33.6	32.8	3%	
S-INT AREA:All Personal Crimes	111.1	98.8	13%	
Crimes of Violence	38.5	31.7	22%	
Rape	0.8	0.9	-5%	
Robbery	3.7	5.7	-35%	@
Assault	34.0	25.1	35%**	
Aggravated	10.6	7.8	36%	
Simple	23.4	17.3	35%*	
Crimes of Theft	72.6	67.1	8%	
Value less than $50	27.2	25.2	8%	
Value $50 or more	33.6	32.7	3%	
All Household Crimes	151.8	147.3	3%	
Burglary	48.6	53.9	-10%	
Household Larceny	88.5	80.3	10%	
Motor Vehicle Theft	14.7	13.2	11%	
@ Sig diff between MULT & SING INT AREAS %diff				

* significant at alpha = .10

** significant at alpha = .05

*** significant at alpha = .01

PERSONAL & HHLD CRIME RATES BY MODE OF INT
(Rate per 1000 pop 12+ and 1000 hhlds)

PERSONAL INTERVIEWS	TG	CG	%diff	
All Personal Crimes	139.6	136.2	3%	#
Crimes of Violence	53.1	45.6	16%*	#
Rape	1.3	1.4	-1%	
Robbery	14.4	13.0	11%	#
Assault	37.4	31.2	20%*	
Aggravated	13.6	11.6	17%	
Simple	23.7	19.6	21%	
Crimes of Theft	86.6	90.6	-4%	#
Value less than $50	22.8	25.1	-9%	#
Value $50 or more	47.9	48.4	-1%	#
All Household Crimes	219.7	224.9	-2%	#
Burglary	80.3	79.5	1%	#
Household Larceny	104.2	108.3	-4%	#
Motor Vehicle Theft	35.2	37.1	-5%	
TEL INT: All Personal Crimes	124.0	88.3	40%***	#
Crimes of Violence	35.3	25.3	40%***	#
Rape	0.7	0.6	23%	
Robbery	9.6	5.3	79%***	#
Assault	25.0	19.4	29%***	
Aggravated	9.1	6.7	37%***	
Simple	15.9	12.7	25%**	
Crimes of Theft	88.7	63.0	41%***	#
Value less than $50	32.0	21.0	52%***	#
Value $50 or more	40.3	31.8	27%***	#
All Household Crimes	222.4	169.4	31%***	#
Burglary	67.9	53.1	28%***	#
Household Larceny	121.6	85.8	42%***	#
Motor Vehicle Theft	32.8	30.5	8%	

Sig diff between PERSONAL and TELEPHONE %diff

Fifth-interview--personal interview

PERSONAL CRIME RATES BY WHETHER ALL PREV. INT CONDUCTED IN PERSON (Rate per 1000 pop 12+)

PREV. INTERVIEWS TEL/CATI	TG	CG	%diff	
All Personal Crimes	99.9	79.5	26%	*
Crimes of Violence	28.6	21.0	36%	
Rape	0.8	0.3	209%	
Robbery	4.9	5.6	-12%	
Assault	22.8	15.1	51%	
Aggravated	7.2	4.5	60%	
Simple	15.6	10.6	47%	
Crimes of Theft	71.3	58.5	22%	
Value less than $50	20.8	17.5	19%	
Value $50 or more	38.6	31.7	22%	
PREV INT PER: All Personal Cr	152.7	153.2	0%	
Crimes of Violence	61.1	53.0	15%	
Rape	1.5	1.7	-11%	
Robbery	17.5	15.2	15%	
Assault	42.1	36.1	17%	
Aggravated	15.7	13.8	14%	
Simple	26.4	22.3	18%	
Crimes of Theft	91.6	100.2	-9%	
Value less than $50	23.4	27.4	-15%	
Value $50 or more	51.0	53.4	-5%	

HHLD SIZE:1,2,3+ PERSON HHLDS (Rate per 1000 pop12+)

1 PERSON HOUSEHOLDS	TG	CG	%diff	
All Personal Crimes	145.2	131.2	11%	~
Crimes of Violence	40.8	40.0	2%	!~
Rape	1.7	2.0	-16%	
Robbery	12.8	11.0	17%	
Assault	26.3	27.0	-3%	~
Aggravated	8.4	5.5	53%	
Simple	17.9	21.5	-17%	!~
Crimes of Theft	104.4	91.2	14%	*
Value less than $50	31.8	24.9	28%	
Value $50 or more	51.5	47.3	9%	
2P HHLDS:All Personal Crimes	115.2	92.6	24%***	
Crimes of Violence	32.5	24.3	34%***	!
Rape	0.7	0.7	5%	
Robbery	9.2	6.4	45%**	
Assault	22.5	17.2	31%***	
Aggravated	8.5	6.3	34%	
Simple	14.0	10.9	29%*	!
Crimes of Theft	82.7	68.3	21%***	
Value less than $50	25.7	20.3	27%***	
Value $50 or more	42.0	37.1	13%	
3+ HHLDS:All Personal Crimes	134.8	100.8	34%***	~
Crimes of Violence	47.0	34.6	36%***	~
Rape	0.8	0.6	42%	
Robbery	11.7	7.4	58%***	
Assault	34.6	26.7	30%***	~
Aggravated	12.8	10.6	21%	
Simple	21.8	16.0	36%***	~
Crimes of Theft	87.8	66.2	32%***	
Value less than $50	32.7	23.1	42%***	
Value $50 or more	39.2	32.1	22%***	

! Sig diff between 1 and 2 PERSON HHLD %diff

~ Sig diff between 1 AND 3+ PERSON HHLD %diff

* significant at alpha = .10
** significant at alpha = .05
*** significant at alpha = .01