EFFECTS OF SUPPLEMENTAL QUESTIONS ON VICTIMIZATION ESTIMATES FROM THE NATIONAL CRIME SURVEY

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Introduction

From 1972 through 1975, the Bureau of the Census conducted a series of surveys, The National Crime Surveys (NCS), sponsored by the Law Enforcement Assistance Administration, in 26 U.S. cities. In each of the NCS cities surveys a sample of 12,000 housing units was selected. Within each household, self-response interviews were conducted with each household member 14 or older to determine the extent and nature of their personal crime victimization experience during the preceding 12-month period. Personal crimes covered by NCS include rape, assault, robbery, personal larceny with contact (pocket picking and purse snatching), and personal larceny without contact, as well as attempts at any of these. Proxy interviews were conducted for 12 and 13 year old household members and also for older members under limited circumstances. A household respondent was similarly asked about household crime victimization experience in the previous year. Household crimes covered by NCS include burglary, household larceny, motor vehicle theft, and attempts at any of these.

In addition to the victimization questions, a supplemental series of attitude questions was asked of respondents age 16 or older (strictly by self-response) in a random subsample of one-half of the interviewed units--i.e., about 5,000 interviewed households and 10,000 interviewed persons in each city. For each respondent, the survey procedure called for administering the attitude supplement prior to the basic victimization questionnaire in a deliberate attempt to avoid unduly influencing attitude responses. This was considered necessary because the supplement dealt with respondent attitudes, opinions, and behavior patterns in regard to crime and fear of crime--e.g., why a respondent moved to a particular neighborhood, whether the neighborhood was safe during the day or night, whether crime was increasing or decreasing there, what the respondent thought were the chances of personally being attacked or robbed, and whether, in the respondent's opinion, the local police were doing a good job. It also dealt with more general questions, such as whether crime throughout the United States was increasing or decreasing, and whether newspapers and TV accurately reported the seriousness of crime.

Study Design

Data were taken from NCS cities surveys conducted in 1974, primarily for the purpose of broadening the base of the overall investigation with the addition of 13 more cities--Boston, Buffalo, Cincinnati, Houston, Miami, Milwaukee, Minneapolis, New Orleans, Oakland, Pittsburgh, San Diego, San Francisco, and Washington, D.C. As in all other NCS cities surveys, the sample size was 12,000 housing units, half of which were slated to receive the attitude supplement, again administered before the crime victimization questions.

A set of special tabulations were produced for each half-sample: the subsample receiving the attitude questions and that receiving just the basic victimization interview. For all cities involved, identical processing, weighting, and tabulation procedures were used. Standard errors were obtained by interpolation from those calculated by the Bureau of the Census and published in Criminal Victimization Surveys in 13 American Cities by the Law Enforcement Assistance Administration (LEAA).

In this second study we went beyond looking just at differences in total personal crime victimization rates and total property crime victimization rates. We examined differences by detailed type of crime, crime event characteristics (such as amount of loss, victim-offender relationship, whether reported to police, amount of medical expense), and victim/household characteristics.

Comparison of Victimization Rates

For each of the tables in the Appendix, one can determine the effect of the supplement on victimization survey results. The first column lists the thirteen cities surveyed in 1974. The second and third columns respectively contain, by individual city and for all 13 cities combined, the weighted number of persons or households receiving the supplement and the number not receiving the supplement. The next two columns contain the victimization rate per thousand units receiving (column four) and not receiving (column five) the supplement for the particular category of victimization covered by that table. Columns six and seven show the standard errors for each rate and the last column contains the t-statistic for the difference between the rates.

The t-statistic is calculated as:

$$t = (r_2 - r_1)/(s_2^2 + s_1^2)^{\frac{1}{2}}$$

where t = the t statistic, with:

df $\doteq$ 10,000 per city for household crimes

df $\doteq$ 20,000 per city for personal crimes,

r_1 = the victimization rate for those not receiving the supplement,

r_2 = the victimization rate for those receiving the supplement,

s_1 = the standard error associated with the rate r_1, and

s_2 = the standard error associated with the rate r_2.

The t-statistic provides a test of the null hypothesis that no difference in the reported victimization rates exists between those receiving the supplement and those not receiving it, versus the alternative hypothesis that the

two rates differ. Because of the large sample size, the distribution of the t-statistic is approximately normal. A t-value greater than 1.96 in the absolute leads to rejection of the null hypothesis at the five percent level of significance, i.e., if samples of the same size were repeatedly drawn from the population under study, and if the t-value were computed for each sample, then the relative frequency of the t-values above 1.96 or below -1.96 would approach five percent. Similarly, a t-value greater than 2.576 in absolute value leads to rejection of the null hypothesis at the one percent level of significance. Critical values which are greater than 1.96 in absolute value are marked by a single asterisk(*) in the tables and those greater than 2.576 in absolute value are marked by a double asterisk(**).

One other test, the sign test, was used to examine the set of differences obtained from the 13 cities. The sign test is calculated by examining the number of positive differences obtained from the 13 cities (which are assumed to be independent), and determining the probability that that many cities would have a positive difference in the variable being examined, given that positive and negative differences are equally likely, being due only to sampling error. The table below presents the probabilities, obtained from the cumulative binomial distribution, of different numbers of positive or negative differences.

Probabilities of Positive Differences for the Sign Test

	p
All 13 differences positive	.0001
12 of 13 differences positive	.0016
11 of 13 differences positive	.0095
10 of 13 differences positive	.0349
9 of 13 differences positive	.0873
8 of 13 differences positive	.1571
7 of 13 differences positive	.2095

As an example, the probability of obtaining 11 positive differences from the 13 cities being examined is .0095, and the probability of obtaining 11 or more positive differences is (.001 + .0016 + .0095) = .0112. This test takes advantage of the fact that, although none or only some of the differences in a table are significant (by the t-test) because sample sizes are small, there may be a significant trend to the differences.1/

Personal Crimes of Violence

The analysis indicates that, for all but two cities, significantly more personal crimes of violence (rape, robbery, assault, and attempts at these), were reported by persons in the supplement sample than by persons not in the supplement sample. In the other two cities, a higher victimization rate was also reported, even though the difference was not significant. We can conclude that inclusion of the attitude supplement had an overall effect on survey results for personal crimes of violence.

Detailed type of Crime--

Looking at more detailed types of crime, rape and robbery show no detectable difference between the two rates using the t-test, while assault rates were significantly higher for persons receiving the supplement. However, 11 of the 13 differences for robbery are positive, so the sign test would indicate that perhaps robbery also was affected by administration of the supplement. Following this line of reasoning, the difference within assault is apparently due to simple assault rather than aggravated assault. A paired t-test does not allow rejection of the hypothesis that simple assault rate differences are equal to aggravated assault rate differences, but because 11 of 13 of the simple assault rate differences are larger than the aggravated assault rate differences, the sign test suggests that the supplement had a greater effect on simple assaults than aggravated assaults.

Similarly, looking at the differences for attempted assaults, differences in rates for attempted assaults without a weapon were larger than differences for attempted assaults with a weapon in 10 of 13 cities, although the paired t-test again does not prove to be significant. This same type of analysis is not as fruitful for robbery. Although a case can be made, using the sign test, that the supplement led to higher reporting of robberies, no claims can be made about detailed categories of robbery.

Crime Event Characteristics--

One reason to look at crime event characteristics is to try to attach some measure of saliency or relative importance to the crime, since such factors may well be related to differential recall and reporting. The first variable to investigate is the victim-offender relationship. Examining crimes committed by a stranger, respondents in the supplement reported 7.72 more crimes per thousand persons than persons not in the supplement, a significant difference. For crimes committed by an offender who was not a stranger, 11 of 13 city differences were positive, indicating by the sign test that the supplement may have led to increased reporting of crimes committed by nonstrangers. The t-test did not prove to be significant here, nor was it significant when the differences between rates for crimes committed by strangers were compared with rate differences of nonstranger crimes. However, for the latter comparison, 11 of 13 cities did have positive differences of the differences, again indicating (by means of the sign test) that the supplement may have been a greater stimulus to the reporting of crimes committed by strangers than by nonstrangers.

In comparing crimes which were not reported to police with those which were, victimization rates for crimes not reported to police were higher for supplement respondents in 12 of 13 cities. Conversely, victimization rates were lower for supplement respondents in 11 of 13 cities. The change in direction leads to a different test to determine if the change is

significant. A two-way classification can be established:

Crimes Not Reported to Police	Crimes Reported to Police # Differences		
#Differences	Positive	Negative	Total
Positive	1	11	12
Negative	1	0	1
Total	2	11	13

This cross classification can be tested using the McNemar Test for Significance of Changes. Using the table of binomial probabilities, one can reject the hypothesis that there is no change in the reporting behavior dependent on whether the crime was reported to police at the .0224 level of significance. As this reversal is significant, it is interesting to note that administration of the supplement had the reverse effect from that previously noted for crimes reported to police. It appears that the supplement actually depresses reporting of crimes that have previously been reported to police, whereas it stimulates reporting of crimes not previously reported to police. This result will be referred to later in the discussion of the saliency of some crimes.

Finally, the differences between the supplement and nonsupplement samples were examined by month of occurrence. Although some differences were significantly different for individual cities, none of the summary statistics for any month were significantly different using the t-test. Using the sign test, however, all months except May, August, and September showed significantly higher reporting for the supplement half sample.

Victim Characteristics--

Differences within selected victim characteristics were examined to determine whether any particular subgroups may have been disproportionately affected by the administration of the attitude supplement. Examining differences first by age, in the 13 cities combined, persons in the 16-17 year old age group who were in the supplement sample reported an average of 37.93 more personal crimes of violence per 1000 persons than the 16-19 year old persons not receiving the supplement. The sign test indicates the same thing, with positive differences in all 13 cities, and indicates similar results for the 20-24 year old age group and the 25-35 year old age category, with 12 and 13 cities respectively showing positive differences. The remaining age groups show mixed results, with no indication of half-sample differences for the 35-49 year old age group, 11 of 13 cities showing positive differences in the 50-64 year old group, and no indication of a difference in the 65 years or over age group. A regression run fitting the ratio of the in-supplement to out-of-supplement rates to the midpoints of the age categories shows a decline in the relative difference between the samples as age increases. The regression equation is:

$$\frac{\text{Violence Vict. Rate-In}}{\text{Violence Vict. Rate-Out}} = \underset{(.0757)}{1.4536} - \underset{(.0017)}{.0049}\ \text{Age}$$

n=78 (6 age categories x 13 cities) $R^2 = .0955$

The t-ratio, -.0049/.0017 = -2.8824, is significant for the negative slope, indicating a decline in the relative difference.

Personal Crimes of Theft

In eleven cities, the reported victimization rates for personal crimes of theft (pocket picking, purse snatching, personal larceny without contact, and attempts at these) are significantly higher for persons receiving the supplement than for persons not receiving the supplement. In the other two cities, a higher victimization rate was reported, but the difference was not significant. We can conclude that, just as for personal crimes of violence, the inclusion of the attitude supplement had an effect on survey results for personal crimes of theft.

Detailed Type of Crime--

Of the detailed types of crime, only personal larceny without contact, which averages over all cities a higher rate of 14.64 crimes for every 1000 persons showed significant differences. In contrast, crimes of personal larceny with contact (pocket picking and purse snatching combined) resulted in only slightly higher victimization rates across all cities, which also was not significant. Examination of the particular categories, purse snatching, attempted purse snatching, and pocket picking, show basically the same results as for total personal larceny with contact. Furthermore, the sign test gives no indication of any difference between the supplement and nonsupplement samples for any categories of crime other than personal larceny without contact, mentioned above.

Crime Event Characteristics--

The analysis of personal crimes of theft is analagous to that of crimes of violence in the preceding section. Crimes were first examined by whether they were reported to police. Personal crimes of theft which were not reported to the police were recalled in the interview at a slightly higher rate by persons who were given the supplement, while supplement respondents recalled fewer crimes of theft which were reported to police. In the former case, 10 of 13 cities had higher supplement rates for crimes not reported to police, significant at the .0922 confidence level (of marginal acceptance under Census Bureau norms). In the latter case, 9 of 13 cities had lower supplement rates for crimes reported to police. Again (as in the section on crimes of violence), a two way classification can be established.

Crimes Reported to Police	Crimes Not Reported to Police # Differences		
#Differences	Positive	Negative	Total
Positive	1	3	4
Negative	9	0	9
Total	10	3	13

In this case, however, the results are not significant according to McNemar's Test for Significance of Changes. The hypothesis being tested is that the increased reporting of crimes that were not reported to police by respondents in the supplement sample suffers a reversal for crimes that were reported to police. The nine cities where this is true are apparently counterbalanced by Milwaukee, Pittsburgh, and San Diego, where the opposite is true, namely that crimes of theft not reported to the police are underreported on the survey relative to those not in the supplement, whereas crimes of theft reported to the police are reported more frequently in the supplement sample.

Looking at total loss, for each category of dollar loss due to theft and/or damage loss, there was no detectable difference between respondents receiving the supplement and those not receiving the supplement. Finally, looking at month of occurrence, the sign test indicates that, except for October, each month the persons receiving the supplement reported higher victimization rates. The t-test for all cities combined, however, does not show any significant differences, as the differences, though mostly positive, are not of sufficient magnitude to satisfy the stricter assumptions of the t-test. It should be noted that although there is a pattern in reporting of crimes by month of occurrence, this pattern is consistent for both in and out of supplement samples, and so no trend is observed in the differences between the two samples. This was true of personal crimes of violence also.

Victim Characteristics--

For race, in all cities whites who were given the supplement reported a greater personal theft rate than whites who did not receive the supplement. The difference was significant in 9 of the 13 cities, as was the weighted average of all the cities (15.80 crimes per 1000 persons). Although blacks averaged differences of 9.44 more crimes per 1000 persons respectively, the differences were only significant in one or two cities, and in some cities persons not receiving the supplement reported slightly greater rates. Further, a t-test of the difference between the differences for whites and blacks was not significant, indicating that there is no reason to suspect that the supplement affected either group to a greater extent.

By age, persons under 65 years of age receiving the supplement reported a slightly higher personal theft rate than those not receiving the supplement using the sign test, while persons above 65 showed no detectable difference as only 6 of the 13 cities showed positive differences. Combining all cities, the difference between rates decreased with age. Unlike the previous section where the gap between samples was demonstrated to be decreasing, significance tests on the regression coefficients for this regression cannot reject the hypothesis that there is no interaction of age with the supplement.

Household Crimes

The t-statistic shows that the difference in victimization rates for total household crimes of burglary, larceny, motor vehicle theft, and attempts at any of these is statistically significant at the 99 percent confidence level for 12 of the 13 cities, and at the 90 percent level for the other city. In each of the cities a higher victimization rate was reported for households responding to the supplement than for those not responding. Therefore, we can conclude that inclusion of the supplement increased reporting of household crimes in addition to increases reported earlier for other types of crime.

Detailed Type of Crime--

Looking at the more detailed types of household crimes, however, one finds that only for larceny, completed and attempted, is the t-statistic above the critical value for all cities. Attempted larceny was reported at an average rate difference across all cities of 6.25, significantly lower than the average rate difference of 34.13 per 1000 households for completed larceny. Similarly, on the average, no detectable difference in victimization rates was found for burglaries where nothing was taken, as compared to an average of 4.32 more burglaries per 1000 households where something was taken. In the latter case, the reporting of burglaries does seem to have been increased by the administration of the supplement, as differences are positive for 12 of the 13 cities (although the 4.32 difference itself is not significant using the t-test). For forcible entry with nothing taken, only 6 of 13 cities hold a positive difference, which is not significant by the sign test, nor are the differences of the differences between something and nothing taken.

Crime Event Characteristics--

As in the previous two sections covering personal crimes, the sign test indicates that the victimization rate for household crimes not reported to the police was greater for households in the supplement sample than for households which were not. The sign test also shows for household crimes that were reported to police, households receiving the supplement had lower household crime victimization rates than those that did not receive the supplement. A two way classification will again be used to test for an interaction.

Crimes Reported to Police	Crimes Not Reported to Police		
	# Differences		
#Differences	Positive	Negative	Total
Positive	1	2	3
Negative	9	1	10
Total	10	3	13

Again McNemar's Test rejects the hypothesis that no interaction exists between the administration of the supplement and whether the crime was reported to the police.

Considering total loss due to theft and/or damages as another indicator of saliency, a somewhat unusual finding emerges. For household crimes with a total loss of less than $50, households receiving the attitude supplement reported slightly higher victimization rates (1.24 victimizations per 1000 households) than those not in the supplement sample. As 10 out of 13 cities had positive differences for less than $50 loss, this result is marginally significant by the sign test. For losses of $50 or more, the reverse is true with a net difference of -1.47 victimization per 1000 households, and 10 of 13 cities with negative differences, yielding lower victimization reporting for the supplement sample. A t-test of the difference of the differences between the two half-samples (1.24 -(-1.47) = 2.71) is not significant, but McNemar's Test for the Significance of Changes indicates a reversal took place, significant at the .0654 confidence level (see the table below).

Crimes with Loss $50

#Differences	Crimes with Loss $50 Positive	Negative	Total
Positive	1	2	3
Negative	9	1	10
Total	10	3	13

Again, there seems to be an interaction between administration of the supplement and amount of loss incurred.

Like the sections on personal theft and personal crimes of violence, the differences in rates of reporting household crime varied by month in which the crime was reported to have occurred. For the average of the 13 cities, the total household victimization rate was significantly higher for people receiving the supplement for the months of July and November. Other months all showed a higher household victimization rate for households in the supplement sample, and the average differences across all cities were positive, though not significantly different, but the sign test indicates that for all months a difference existed, with respondents to the supplement reporting higher victimization rates.

Household Characteristics--

Results for race of head for household crimes differ from results for personal crimes of violence. For the personal crimes, only whites showed a significant difference in reporting, and there was no detectable difference in the test between whites and blacks to see if they reacted differently to the supplement. For household crimes, both whites and blacks show significant differences in the response to the supplement. For both groups, higher numbers of victimizations were reported for the supplement half sample. The difference of the differences is not significant, however, so there is no reason to suspect that blacks and whites reacted differently to the supplement.

Conclusion

The original study cited above suggested three possible explanations for the observed differences between subsamples in victimization recall or reporting to survey interviewers:

1.) Improved respondent recall and reporting of events occurring within the reference period due to memory stimulation.

2.) Increased respondent desire to be accommodating, resulting in a greater amount of exaggeration or fabrication.

3.) Increased telescoping of events actually occurring prior to the beginning of the reference period because of memory stimulation and/or accommodation.

Several of the findings of this more detailed study tend to indicate that the effect of administering the attitude supplement is to increase respondent reporting of less serious victimizations--e.g., simple assault, those committed by strangers, those not reported to police, loss under $50. One view of this result is that one would expect, if the effect were due to exaggeration or fabrication (the second hypothesis), that respondents would have chosen more important events with which to be accommodating, thus refuting hypothesis number two. Another view is that respondents would only exaggerate less serious crimes, as more serious crimes may get the respondent too deeply involved in the interview, and the respondent would prefer to avoid getting into anything "heavy". This latter explanation would tend to support hypothesis number 2. Probably the only way to actually test this hypothesis is to conduct a reverse record check with a subsample of a broad spectrum of crimes. So no determination is made regarding hypothesis number two, though the predominant view is that victimization surveys suffer more from underreporting than overreporting by respondents.

Our findings do not support the third hypothesis. Higher victimization rates for the supplement sample would have been expected in the earlier part of the reference period, had telescoping from without been the explanation. But our findings (based mainly on the sign test) indicate higher rates throughout the year, with no discernible pattern. There are indications based on an analysis of the NCS--National Sample that unbounded data are subject to forward external telescoping, which causes disproportionately higher victimization reports in the early months of the reference period. A regression of the relative difference between total victimizations from the returning and incoming rotations in the NCS--National Sample by month of report in the reference period shows that the relative difference goes from negative to positive, increasing linearly as the reported month of occurrence gets closer in time to the month of interview.2/ The regression equation is:

$$100.\frac{\text{Returning rotations}}{\text{Incoming rotations}} = \underset{(.04)}{-.39} + \underset{(.009)}{.09}\ (\text{Month})$$

$n=8\ R^2=.965$

Because of this relationship in the NCS--National Sample, and because no such relationship exists in the analysis of the cities sample data, we conclude that telescoping is not a predominant factor.

Assuming, though, that we are correct in our conclusion of better reporting of crimes occurring within the reference period, we feel it may be an oversimplification to attribute the effect to just "memory stimulation." A good deal of the evidence from this examination indicates that the increased incident reporting is for those kinds of events that are more common--e.g. simple assault, attempted assault without a weapon, personal larceny without contact, household larceny (particularly completed household larceny and those with loss under $50), burglary involving actual theft--and by those population subgroups that generally have higher victimization rates--younger persons, white persons, and males. These results could be due to simple memory stimulation--i.e. those with a larger pool of events from which to recall report more when their memories are stimulated by a device such as the attitude interview. However, it may also be the case that some types of respondents may be more productive when stimulated than others. A multivariate look at the data would develop a model which could simultaneously examine differences in rates by crime characteristics and by demographic characteristics. Such a model may allow us to disentangle productivity from simple recall.

Footnotes

[1] A complete description of these tests can be found in any analysis text, such as Conover, W.J. Practical Nonparametric Statistics John Wiley & Sons, Inc. New York, 1971

[2] It should be noted that in the NCS--National Sample, returning rotations are bounded by earlier interviews and incoming rotations are unbounded, being first time interviews, and so are used only for bounding purposes.

SUMMARY OF RATES FOR IN AND OUT OF SUPPLEMENT SAMPLES
(Rates averaged across 13 cities. Rates per 1000 Persons)

Type of Crime	Victimization Rate		Standard Errors		Z of Difference	Number of Positive Differences 1/
	In	Out	In	Out		
Crimes of Violence	59.01	48.27	2.49	2.26	3.194**	13
Rape and Attempted Rape	2.33	2.04	.57	.50	.382	8
Robbery	19.90	16.23	1.47	1.32	1.858	11
Robbery/Attempted Robbery with Injury	5.97	5.01	.83	.75	.858	10
Serious Assault	3.26	2.68	.64	.57	.677	12
Minor Assault	2.71	2.77	.58	.59	-.073	7
Robbery without Injury	7.67	7.36	.92	.90	.241	7
Attempted Robbery without Injury	6.26	4.89	.84	.75	1.217	10
Assault	36.77	28.87	1.98	1.76	2.982**	13
Aggravated Assault	16.13	13.16	1.31	1.18	1.685	13
With Injury	4.90	4.62	.74	.73	.269	8
Attempted Assault with Weapon	11.23	8.53	1.10	.98	1.833	13
Simple Assault	20.65	15.71	1.50	1.31	2.481*	13
With Injury	4.71	4.53	.74	.73	.173	7
Attempted Assault without Weapon	15.94	11.18	1.32	1.11	2.760**	13
Crimes of Theft	112.70	97.56	3.30	3.10	3.344**	13
Personal Larceny with Contact	10.86	10.36	1.11	1.08	.323	8
Purse Snatching	3.02	2.89	.63	.62	.147	6
Attempted Purse Snatching	1.58	1.57	.42	.43	.017	7
Pocket Picking	6.26	5.91	.85	.85	.291	8
Personal Larceny without Contact	101.84	87.19	3.16	2.96	3.384**	13
Household Crimes	504.49	447.68	7.83	7.77	5.150**	13
Burglary	136.46	124.85	5.51	5.33	1.514	13
Forcible Entry	53.00	48.67	3.68	3.53	.849	12
Nothing Taken	9.05	9.05	1.57	1.57	.000	6
Property Damage	6.82	7.19	1.37	1.40	-.189	7
No Property Damage	2.23	1.86	.78	.70	.353	8
Something Taken	43.94	39.62	3.38	3.22	.925	12
Unlawful Entry without Force	46.11	44.55	3.48	3.43	.319	9
Attempted Forcible Entry	37.36	31.63	3.13	2.90	1.343	12
Larceny	332.05	289.98	7.47	7.23	4.047**	13
Under $50	194.22	167.46	6.33	5.98	3.073**	13
$50 or More	99.18	91.13	4.81	4.69	1.198	10
NA Amount	9.32	8.32	1.62	1.49	.455	9
Attempted Larceny	29.33	23.08	2.80	2.54	1.653	11
Auto Theft	35.98	32.84	3.06	2.93	.741	10
Theft of Car	21.46	20.96	2.39	2.34	.149	7
Theft of Other Vehicle	2.33	1.77	.82	.69	.523	7
Attempted Theft of Car	11.71	9.66	1.84	1.73	.812	12
Attempted Theft of Other Vehicle	.48	.46	.36	.35	.040	10