# Perception of the Rate of Increase of Crime*

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A survey of 130 Christchurch residents required respondents to estimate the number of crimes in the categories murder, assault, burglary and crimes of all kinds reported to the New Zealand Police in 1984 and over the previous 20 years. Estimates of the numbers of crimes committed in 1984 were generally inaccurate. Estimation of the rate of increase in crime (i.e. numbers relative to 1984) were, on the other hand, reasonably accurate.

In recent years there has been increasing interest in how the general public perceives the amount of crime, particularly how individuals assess their personal risk of becoming a victim (e.g., McPherson, 1978; Perloff, 1983; Tyler, 1984; Tyler & Cook, 1984; Warr, 1980, 1982). Research generally has revealed that some aspects of the incidence of crime are rather accurately perceived and some not. For example, McPherson (1978) found citizens perceive rather accurately the crime rate and probability of victimisation in their neighbourhood. Warr (1982) found good agreement between the perceived rates of commission of different crimes by Tucson adults and self-reported data on crimes committed by Tucson juveniles. On the other hand, Warr (1980) revealed perceived incidence of various crimes to differ quite markedly from their actual incidence: incidence of rarer crimes was generally overestimated while that of some common crimes was underestimated.

One aspect of the rate of crime in the past few decades has been its steady increase in many countries. In New Zealand for example the number of crimes of all kinds reported to the police has increased exponentially over the last 30 years, approximately doubling every 11 or 12 years (New Zealand Department of Police, 1955–1985). The question of how accurately this increase over time is perceived by the public at large has both theoretical and practical significance. Theoretically the issue is interesting because other research has shown both that geometrically increasing sequences in the laboratory are misperceived in that the projected rate of increase is underestimated (Wagenaar & Sagaria, 1975; Wagenaar & Timmers, 1979), and that the difference between past and present prices is underestimated (Kemp, 1984). On the basis of these results one might predict that the actual rate of increase in crime should be underestimated.

Practically the issue is important since underestimation would suggest public complacency or ignorance in the face of a growing problem, while overestimation would suggest public hysteria. In either case, one would expect public support for inappropriate policy decisions about countering crime if public perception was greatly different to reality.

The present study was primarily concerned with how accurately an urban sample perceived the increase in the rate of different crimes over the previous 20 years.

## Method

### Respondents and Procedures

130 respondents were interviewed between September and November of 1985. Respondents were obtained by area sampling and were interviewed in their homes.

The personal information collected suggests the sample to be representative of the adult Christchurch population. The sample consisted of 53 men and 76 women, and contained 68 married and 72 unmarried respondents. Information on the respondents age, socioeconomic status, and political party supported showed no appreciable biases.

All respondents were interviewed by one of two trained, paid interviewers who worked from an interview schedule. Responses to the question were recorded at the time. Interviews typically lasted twenty minutes.

### The interview

The interviews followed a set format determined by the structure of the schedule. Most of the

questions required respondents to estimate the number of crimes of different types reported in New Zealand in past years. Estimates of four categories of crime were requested: murder, assault, burglary, and "crimes of all kinds." Several factors influenced the choice of these four categories. It was felt necessary to choose crimes whose meaning was clear to the respondents and whose legal definition had not been dramatically altered over the previous 20 years. In addition a continuous 20-year statistical record of actual numbers reported to the New Zealand Police was available for the categories chosen (New Zealand Department of Police, 1965–1985).

All questions relating to a particular category of crime were asked together. The first question relating to each category was of the form:

"How many (crimes of all kinds/burglaries/cases of assault/murders) do you think were reported to the N.Z. Police last year (1984)?"

Then followed five questions of a similar kind asking how many crimes of that category were committed in previous years. For burglary and crimes of all kind, numbers of crimes committed in 1983, 1979, 1974, 1969 and 1964 were requested; for assaults the previous years' questions were 1983, 1979, 1977, 1971, and 1965; and for murders 1983, 1980, 1973, 1969, 1964. The reason behind this irregular choice of dates for assault and murder is the year-to-year variability in rates of occurrence of these crimes. Particularly for murder this variability is very great; there were, for example, 32 murders in 1974, 20 in 1975, and 40 in 1976. Clearly variability of this kind creates difficulties in assessing the accuracy of the respondents' estimates. To combat this, exponential growth curves were fitted to the official statistics for murder and assault for the period 1964–1984 and years whose actual rate fell close to the curve were chosen for the questions. This procedure was not used for burglary or crimes of all kinds where the year-to-year variability was much less. The order of asking the five questions relating to previous years was varied: half the respondents were asked in order of recency (i.e. 1983 first)

and half in reverse order of recency (i.e. 1964 or 1965 first).

The seventh question relating to a particular category requested respondents to estimate the number of crimes in the category that they thought would be reported in 1986. Finally, as an adjunct to the assault, burglary and crimes of all kinds sections, respondents were asked if they had been a victim of that crime in the previous five years.

To avoid possible problems arising from a particular ordering of the categories within the schedule, all questions relating to each of the four categories were listed on one page.

The order of these four pages was randomly varied for each interview. The schedule was completed by requests for some personal information.

## Results

Table 1 shows the actual and estimated numbers of crimes in each category reported in 1984. Except for murder, where the median estimate was quite close to, and an overestimate of, the actual figure, the rates of occurrence were generally underestimated by the respondents. Application of the two-tailed sign test ($p < .05$) revealed that significantly more than half the respondents underestimated the 1984 assault, burglary, and all crime figures while significantly more than half overestimated the 1984 murder figures. In addition, as is clear from the quartile estimates, responses were very variable between respondents, indicating that the sample as a whole was uncertain about the number of assaults, burglaries, and crimes in general reported.

To obtain a clearer picture of respondents' perception of the rate of increase, it is necessary to take into account and remove the marked variability in 1984 estimates. Hence for each respondent and category of crime, estimates relative to those of 1984 were obtained by dividing the respondent's estimate for each year

Table 1: *Actual and Estimated Numbers of Crimes Reported in 1984 by Category of Crime*

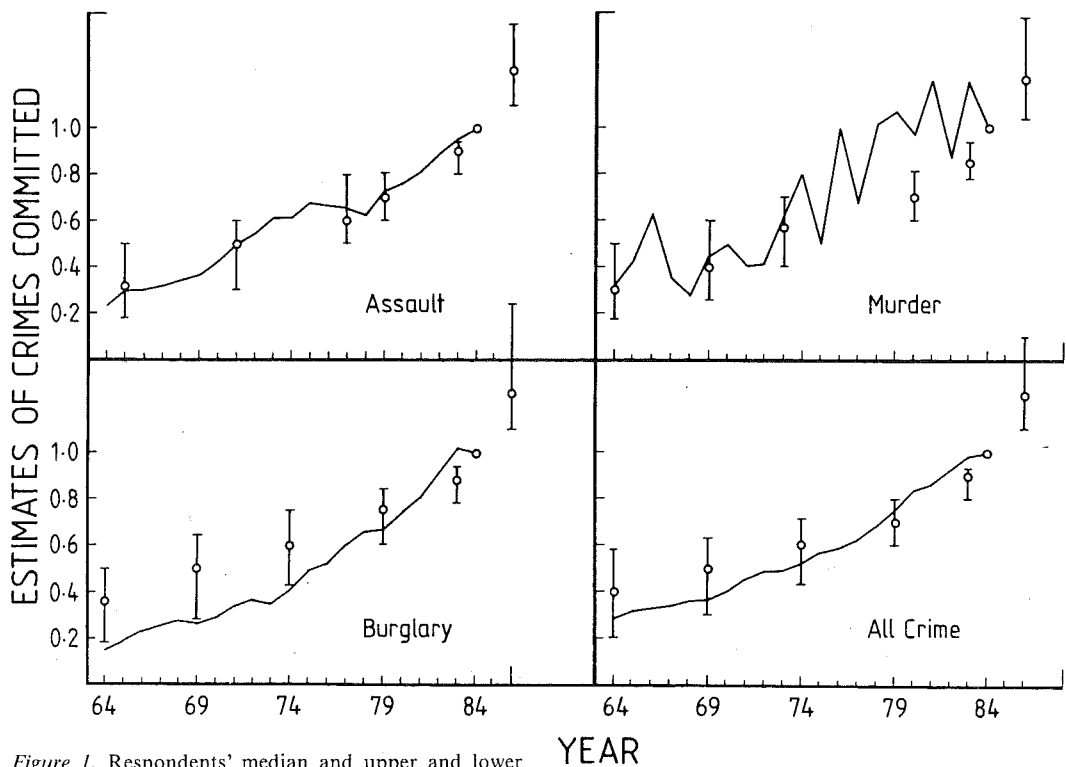|  | Assault | Burglary | Murder | All Crimes |
|---|---|---|---|---|
| Actual | 16,760 | 73,537 | 40 | 415,690 |
| Estimated: |  |  |  |  |
| Median | 2,000 | 15,000 | 54 | 50,000 |
| Lower Quartile | 550 | 5,000 | 30 | 5,000 |
| Upper Quartile | 10,000 | 60,000 | 150 | 250,000 |
| Harm. Mean | 3,095 | 15,339 | 72 | 41,476 |
| Percentage of sample underestimating the actual figure | 77 | 77 | 34 | 78 |

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*Figure 1*. Respondents' median and upper and lower quartile estimates of crimes in four categories reported to the Police (expected for 1986) as a function of year for the period 1964–1986. All estimates are relative to respondents' individual estimates of the number reported in 1984. Also shown (as a solid line) is the actual increase relative to 1984 for the period 1964–1984.

by the 1984 estimate. Figure 1 shows these median relative estimates as a function of time, as well as the actual growth of crime obtained by dividing the actual numbers reported for each year by the appropriate 1984 statistics.

Figure 1 suggests that in general respondents were rather accurate at estimating the increase in assaults and murders. For burglary, and to a lesser extent for crimes of all kinds, respondents perceived the increase in crime to be slower than it actually was. As is evident from Figure 1, however, the actual rate of increase in burglaries reported is faster than the rate of increase in the other crimes. Two further features of Figure 1 deserve comment. Firstly, the quartile estimates clearly show considerable variation amongst respondents in perception of the rate of increase of crime. On the other hand, this variation is less marked than the variation in estimates of the number of crimes in 1984 evident in Table 1. Secondly, the median estimates resemble the actual increase in the

rate of crime in displaying an exponentially increasing pattern of growth.

To enable further analysis of estimation of the rate of increase in crime, a single summary measure for each respondent and crime category was created. A power function of the form: Perceived number of crimes = A (Actual number of crimes)$^n$ was fitted for each respondent and crime category, and the exponent n calculated. This exponent, the summary measure, is readily interpretable: The greater the exponent the greater the perceived rate of increase. Exponents less than one indicate that the rate of increase in a particular crime is underestimated by a respondent, exponents greater than one indicate overestimation. It should be remarked that this type of analysis is commonly used to examine the results of magnitude estimation in perceptual and social psychology as suggested by Stevens (1957, 1975). Average exponents for the sample were 1.08 for assault, 0.92 for murder, 0.63 for burglary, and 0.87 for crimes of all kinds. Application of the two-tailed sign test revealed that significantly more than half the sample produced exponents of less than one for burglary (80%) and crimes of all kinds (69%), but not for assaults (52%)

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Table 2: *Correlation between Estimates of Crime Rates*

|  |  | Assault | Murder | Burglary | All Crime |
|---|---|---|---|---|---|
| 1984 Estimates | ( Assaults | — | 0.31* (123) | 0.74* (124) | 0.63* (123) |
| | ( Murder | | — | 0.26* (127) | 0.21* (126) |
| | ( Burglary | | | — | 0.80* (125) |
| Exponent | ( Assaults | — | 0.49* (119) | 0.49* (123) | 0.30* (121) |
| | ( Murder | | — | 0.42* (122) | 0.19* (121) |
| | ( Burglary | | | — | 0.47* (123) |
| Exponent with 1984 Estimate | | 0.10 (123) | 0.09 (127) | 0.15 (124) | 0.20* (125) |

*Note.* Pearson correlation coefficients (*r*) between respondents' (logarithmically transformed) estimates of numbers of crimes reported in 1984 in four crime categories are shown in the first three rows. The next three rows show correlations between the exponents (which summarize the perceived rate of increase in crimes) for the four crimes. The final row gives the correlations between the exponent and number of crimes estimated in 1984 for each crime. Significant ($p < .05$, two-tailed) correlations are asterisked (*). The number of respondents on which each correlation is based is bracketed below.

or murder (61%). Clearly the interpretation of these exponents agrees with the results shown in Figure. 1.

Table 2 shows the correlations between the crime categories for the 1984 estimates and the exponents as well as the correlation between 1984 estimates and exponents for each crime category. Actual 1984 estimates were logarithmically transformed for this exercise because the distributions were markedly skewed (as is implied by the results shown in Table 1). It is clear from Table 2 that the 1984 estimates were strongly related; thus respondents who reported a high number of assaults also reported high numbers of burglaries, crimes of all kinds, and, to a lesser extent, murders. The lower correlations with the murder estimates may reflect the fact that these estimates were generally more accurate and less variable (see Table 1). The exponents were also positively correlated; thus respondents perceiving a high rate of increase in one crime tended to perceive high rates of increase in other crimes as well.

Only one of the four correlations between 1984 estimate and exponent was significant. In general, respondents perceiving greater numbers of a crime in 1984 did not also perceive a high rate of increase of the crime. Perhaps surprisingly, perception of amount of crime and perception of its rate of increase were not strongly related.

Analyses of variance carried out on the four (logarithmically transformed) estimates and the four exponents revealed no significant ($p > .05$) effects of age group, marital status, socioeconomic status, or political party supported on any of the exponents or estimates. Women estimated significantly more burglaries (Harmonic mean = 24,826) in 1984 than men (Harmonic mean = 10,867; $F(1, 125) = 4.78$, $p < .05$) but there was no sigificant effect of sex on any other 1984 estimate or exponent.

Seven respondents reported that they had been a victim of an assault in the previous five years, 30 reported being a victim of a burglary, and 49 reported being a victim of a crime of any kind. Victims of assault estimated significantly more assaults (Harmonic mean = 16,838) occurred in 1984 than non-victims (Harmonic mean = 2,732; $F(1, 122) = 4.52$, $p < .05$). Victims of crime of any kind estimated more crime of all kinds (Harmonic mean =

82,490) occurred in 1984 than non-victims (Harmonic mean = 25,604; $F(1, 125) = 6.01$, $p < .05$). Victims of burglary, however, did not estimate significantly more burglaries to occur in 1984 than non-victims; nor did victims of a crime perceive a significantly different rate of increase in that crime than non-victims.

## Discussion

In general respondents underestimated the numbers of crimes committed in 1984 but they overestimated the number of murders. This result is similar to that found by Warr (1980). It also resembles the findings of Lichtenstein, Slovic, Fischoff, Layman, and Combs (1978) on the judged frequency of causes of death: deaths from common causes or unspectacular events were underestimated while those from rare causes and dramatic events were overestimated.

Slovic, Fischoff, and Lichtenstein (1982) suggested a number of possible explanations for the biases in judging causes of death. One of these stems from the use of a heuristic called "availability" (e.g., Tversky & Kahnemann, 1973), in which subjects estimate frequencies of events by recalling as many "available" or retrievable instances of the event as they can and then base their frequency estimates on the number of instances recalled. Some indication that availability heuristics may have played a role in the present study is given by the fact that victims of crimes generally estimated greater numbers of crimes to have occurred in 1984 than non-victims. Another, related possibility is that the estimates were influenced by media reports. The media are known to be important in influencing judgements of death rates (Slovic et al., 1982) and the level of crime in the community generally (e.g., Tyler, 1984; Tyler & Cook, 1984). In New Zealand, all murders, but relatively few of the assaults or burglaries committed, are reported nationally. It could be that the frequencies judged by the respondents reflect biases in media coverage. Yet another explanation of the results obtained here stems from the size of the numbers involved for the commoner crimes. Wagenaar (1982) found that subjects tended to underestimate the psychological magnitude of large numbers. Wagenaar's finding suggests the possibility that the underestimation of frequency of common events might then have its origin in a rather general judgemental distortion.

Judgements of the rate of increase in crime were generally more accurate than the estimates of the 1984 crime rates. Moreover the exponential rate of growth displayed by the actual figures was also apparent in the estimates of the respondents. There was moderately good correlation between the exponents for the different crimes, indicating that the respondents tended to think of all the crimes as increasing at a similar rate. This conclusion is strengthened by the general underestimation of the rate of increase in burglaries reported which has in fact been rather faster than that of the other crimes.

The general accuracy of the estimated rates of increase was rather unexpected in view of the finding that the rate of exponential growth is generally underestimated both in the laboratory and by respondents estimating past prices over similar periods (Kemp, 1984, in press). It is true that in the present study there was significant underestimation of the rate of increase of crimes of all kinds and burglaries, but the former effect is slight and the latter easily explained by the faster actual rate of increase in burglaries than other crimes. Thus, in contrast to the 1984 crime estimates, the estimated rates of increase in crime were comparatively unbiased, even though a bias was predicted. One possible explanation of the difference between the results reported here and the finding that the rate of price increase over a similar period was markedly underestimated is that estimation of past prices is likely to be affected by more recent, and in general higher, prices for the same item. Kemp (in press) found some empirical support for this phenomenon in the finding that respondents, for example, who frequently paid the telephone bill gave more inaccurate (and inflated) estimates of the cost of a telephone bill 15 years previously than those who were not responsible for paying the bill. The influence of more recent events is not expected to be so marked in the present study since few if any respondents had any direct knowledge of the crime rate statistics they were estimating.

Perhaps the most puzzling finding of the study was the lack of relationship between the 1984 crime estimates and estimation of the rate of increase of crime. One might have expected that estimation of higher 1984 crime rates would accompany perception of a steep increase in the crime rate. The results, however,

showed only a very small effect of this kind. The finding suggests that the two sorts of judgement were effectively independent. Consistent with this interpretation is the result that being a victim of a crime affected estimation of the amount of crime but not its rate of increase.

Finally it should be remarked that recent community concern about the levels of crime, and in particular violent crime, has not arisen from exaggerated misperception of the problem. The results here indicate that public perception of crime is partly accurate and partly an underestimation of the problem.

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