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## MODIFIED CRIME INDICES FOR EIGHT COUNTRIES

KENNETH PEASE\*, JUDITH IRESON\*\* AND JENNIFER THORPE\*

In 1964 Sellin and Wolfgang published their book *The Measurement of Delinquency*.<sup>1</sup> In their research, Sellin and Wolfgang had various groups assign numbers to 141 offenses against the law, thereby indicating their views of the seriousness of the offenses.<sup>2</sup> To produce the scale score of offense seriousness, the seriousness scores assigned to each offense were averaged and these average seriousness ratings were expressed as a ratio of the average seriousness rating of larceny of one dollar. For example, if larceny of one dollar had an average seriousness rating of 17, and larceny of fifty dollars had an average seriousness rating of 34, then the scale score for a larceny of fifty dollars was  $34/17 = 2$ . Similarly, an offense with an average seriousness rating of 51 would have a scale score of  $51/17 = 3$ . From this method of calculation, it is seen that larceny of one dollar will have a scale score of 1 (in this case  $17/17$ ) irrespective of the average seriousness rating of larceny of one dollar.

Calculated in this manner, scale scores of offense seriousness are considered by Sellin and Wolfgang to constitute a ratio scale. That is, a scale with equal intervals between scale points and a fixed zero point. If this assumption is correct, it may be stated that an offense with a scale score of 2 is (on average) regarded as twice as serious as an offense with a scale score of 1. Further, an offense with a scale score of 4 is regarded as four times as serious as an offense with a scale score of 1.

Following the Sellin and Wolfgang study, research has been undertaken in several countries with the intent of providing an international weighted crime index. In line with this

intent, Normandeau has compiled the results of such studies from eight countries.<sup>3</sup> The purpose of this article is to show that Normandeau's method of international comparison of judgements of crime seriousness is misleading.<sup>4</sup>

Although it is not apparent from Normandeau's paper, it may be assumed that the procedures of administration and analysis which are employed in the studies he cited are the same as in Sellin and Wolfgang's study. The exception is that only eighteen offenses were judged, instead of the 141 offenses in the original study. There are two potential sources of error which must be noted in considering Normandeau's work. The first is Normandeau's reliance on Sellin and Wolfgang's approach to the measurement of offense seriousness. The problems inherent in this approach will not be dealt with in this article. The second source of error lies in Normandeau's use of the data which he gathers. This article is concerned with this source of error and raises two major and two subsidiary grounds of criticism of Normandeau's analysis. The two major grounds will be presented first.

### OBJECTIONS TO NORMANDEAU'S ANALYSIS

#### 1. *Range of Seriousness Scores Differs Between Countries*

Normandeau's table of scale scores (scores expressed as a ratio of the seriousness score of one dollar) is reproduced as Table I. This paper is not concerned with the validity of Normandeau's conclusion (a), since we have commented elsewhere on properties of the Sellin and Wolfgang scale relevant to this point.<sup>6</sup>

<sup>3</sup> Normandeau, *Crime Indices for Eight Countries*, 234 INT'L CRIM. POLICE REV. 15 (1970).

<sup>4</sup> This paper is not concerned with the problems inherent in the Sellin and Wolfgang approach. For a discussion of some of these problems see Pease, Ireson & Thorpe, *Additivity Assumptions in the Measurement of Delinquency*, 14 BRIT. J. CRIM. 256 (1974).

<sup>5</sup> Normandeau, *supra* note 3, at 16. (We thank Dr. Normandeau for his permission to reproduce the table.)

<sup>6</sup> Pease, Ireson & Thorpe, *supra* note 4.

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<sup>1</sup> T. SELLIN & M. WOLFGANG, *THE MEASUREMENT OF DELINQUENCY* (1964).

<sup>2</sup> The instructions in the study stated: "Your task is to show how serious *you* think each violation is, *not* what the law says or how the courts might act." *Id.* at 254 (emphasis in original).

TABLE I  
SERIOUSNESS SCORES CALCULATED BY NORMANDEAU <sup>5</sup>

	United States	Canada	England	Belgian Congo	China (Taiwan)	Indonesia	Brazil	Mexico
Theft of \$1 (U.S.).....	1	1	1	1	1	1	1	1
Theft of \$5.....	1	1	1	1	1	1	1	1
Theft of \$20.....	2	1	1	1	1	1	1	1
Theft of \$50.....	2	2	1	3	1	1	2	2
Theft of \$1,000.....	3	3	2	7	2	2	3	3
Theft of \$5,000.....	4	5	4	23	2	2	4	5
Burglary \$5.....	2	2	2	3	2	2	2	2
Aggravated theft \$5 (unarmed).....	3	3	4	1	2	3	3	4
Aggravated theft \$5 (armed)	5	4	6	4	4	4	4	5
Assault (causing death).....	26	28	51	117	8	9	15	17
Assault (necessitating hospital admission).....	7	7	9	5	3	4	6	7
Assault (necessitating medical treatment, followed by discharge)....	4	5	7	2	2	2	4	4
Assault (minor).....	1	2	3	1	1	1	2	1
Rape.....	11	12	15	7	5	6	8	9
Theft of car (vehicle recovered undamaged).....	2	2	1	1	1	1	1	1
Breaking and entering.....	1	1	1	2	1	1	1	1
Intimidation (involving verbal threats).....	2	2	3	1	1	2	2	3
Intimidation (involving weapons).....	4	3	5	3	3	3	8	4

"Aggravated theft" = Theft involving violence

"Burglary 5 dollars" = Breaking and entering and stealing \$5

"Assault" = Involving physical force

In this article, however, we contend that it is improper for Normandeau to draw conclusion (b). This is because the range over which seriousness judgments vary differs in the eight countries studied. A score of 6 when scores range from 1 to 8 is very different from a score of 6 when scores range from 1 to 117. In the former case, the score of 6 indicates that the offense is regarded as extremely serious since it is given a seriousness score which is three-quarters that of murder. In the latter case, the score of 6 is almost one-twentieth the seriousness score of murder.

It is dangerous to interpret the differences in range as indicating real differences between countries. Sellin and Wolfgang observed that "Some persons . . . used scales with very large ranges and variance, whereas others . . . used

scales with limited ranges and variance. But, as has been reasoned and demonstrated earlier, the choice of scale is arbitrary."<sup>7</sup> Stevens commented on inter-individual differences: "Perhaps the variations in how people use numbers and how they regard ratios are no more than the inevitable noise that characterizes these complex processes."<sup>8</sup> Stevens' tentative suggestion that "noise" can be averaged out to allow group comparisons in this kind of task is based on experience with groups within a particular culture. We are unaware of any evidence relevant to this suggestion when international comparisons are involved. We regard

<sup>7</sup> T. SELLIN & M. WOLFGANG, *supra* note 1, at 277.

<sup>8</sup> Stevens, *A Metric for the Social Consensus*, 151 SCIENCE 530, 540 (1966).

the situation which faced Normandeau with respect to national groups as precisely analogous with the situation which faced Sellin and Wolfgang when dealing with individual ratings. Sellin and Wolfgang regarded the choice of scale as arbitrary and standardized individual scores. Normandeau, however, interpreted rather than removed differences in scale.

## 2. Expression of Seriousness Scores as Ratios to the Larceny of One Dollar

Even if all eight countries used numbers in a similar manner and if inter-individual differences were "noise" which cancels out, Normandeau's conclusion (b) is still not legitimate. The reason for this stems from the fact discussed above that the scale score for larceny of 1 dollar for each country must be 1, irrespective of the average seriousness rating. Normandeau has, by his use of scale scores, implicitly assumed that all countries agree on the seriousness of larceny of one dollar. To the extent that this is false, the range of seriousness scores will be affected. As an example, let us assume the following average seriousness ratings of two countries for three offenses:

	Larceny 1 dollar	Larceny 50 dollars	Assault causing death
Country A	10	40	1000
Country B	20	40	1000

Calculating scale scores as a ratio of average seriousness ratings of an offense to average seriousness rating of one dollar, scale scores would be:

	Larceny 1 dollar	Larceny 50 dollars	Assault causing death
Country A	1	4	100
Country B	1	2	50

By his conclusion (b), Normandeau would report that country *A* regarded both theft of fifty dollars and assault causing death as twice as serious as country *B* regarded them. Assuming that the two countries use numbers similarly,<sup>9</sup> then in fact, people in the two countries differ only in their view of the seriousness of larceny of one dollar. The difference in

range between the countries is the outcome of this difference.

In brief, Normandeau has assumed that the designated seriousness of theft of one dollar is the same in each culture and that differences in other offenses' seriousness differ and are interpretable. On the basis of Normandeau's data, one could as easily equate seriousness judgments of murder and interpret resulting differences in judgements of the seriousness of theft of one dollar.

## 3. Comparison of Currency Values

For the purposes of international comparison, it is important to express the financial losses resulting from theft or damage to property in the currency of the country in question. These losses should really be expressed in relation to some measure of purchasing power. If the losses are not expressed in this manner, seriousness scores of offenses other than theft and damage are likely to be distorted by the tendency to rate offenses involving financial loss as more serious in countries in which the purchasing power of the equivalent of one dollar is relatively high. This results from the method of calculation of scale scores described earlier. Since the seriousness of all offenses is expressed as a ratio of the larceny of one dollar, the likely effect is to depress the seriousness scores of offenses not involving theft or damage in countries where the dollar equivalent has high purchasing power.

## 4. Assumed Circumstances Surrounding the Offense

In their original research Sellin and Wolfgang deliberately made their offense descriptions as brief as possible. The authors noted: "We tried to eliminate any reference to offender or victim variables except where obviously necessary (as in rape). The focus was on the act."<sup>10</sup> Although Sellin and Wolfgang's focus was on the act, their raters undoubtedly inferred some of the characteristics of people liable to commit such acts and the circumstances often surrounding such acts, and used these inferences when making judgments of offense seriousness. If this is true, then it must be assumed for the validity of the Sellin and

<sup>9</sup> If the numbers are not used similarly, our earlier objection applies.

<sup>10</sup> T. SELLIN & M. WOLFGANG, *supra* note 1, at 247.

Wolfgang system that there is a consensus among raters as to the usual characteristics of people who commit a given offense and the usual circumstances of that offense. Whatever the validity of this assumption within a culture, it is a very dubious one when one compares cultures.

#### STANDARDIZING SCORES OF OFFENSE SERIOUSNESS

It is possible to overcome the first two problems described in the foregoing section by expressing seriousness scores in a standardized form; that is, with a common mean or median judgment of offense seriousness in each country and with scores expressed relative to the average deviation of scores from the mean or median in that country.

Let

$X_{ni}$  = Seriousness score, where offense is represented by  $i$  and  $n$  stands for nation.

Med  $X_n$  = Median seriousness score for nation  $n$ .

$X_{ni(s)}$  = Standardized seriousness score for offense  $i$ , nation.<sup>11</sup>

Total number of offenses for each nation =

18. Then

$$X_{ni(s)} = \frac{X_{ni} - \text{Med } X_n}{\frac{1}{18} \sum_{i=1}^{18} |X_{ni} - \text{Med } X_n|}$$

Each offense in each country will thus be assigned a score in deviation units which indicates how extreme the judgement of seriousness of that offense is relative to the distribution of seriousness judgments for that country. Median seriousness scores will be equalized and range differences removed by expressing seriousness scores in terms of deviation units

which differ according to the variation of seriousness scores in a country. It is then legitimate to make comparisons between seriousness scores of the same offense in different countries.

This measure is not sensitive to overall differences between countries in judged seriousness of offense. For example, if the English judge all offenses as more serious than the Indonesians judge the offenses, this will not be evident from our analysis. However, it would not be evident from Normandeau's analysis either.

Our standardized scores are presented as Table II. Small differences between countries should not be interpreted as real differences because Normandeau rounds up his scale scores to the nearest whole number. Nevertheless, some of the points raised up by our method of analysis are notable. First, as expected, our analysis makes the judgment of the seriousness of murder very similar in England, Canada and the United States. Second, it makes the seriousness of murder remarkably similar in Taiwan, Indonesia, Brazil and Mexico. Third, the seriousness of rape looks very similar indeed in all countries except the Belgian Congo. Finally, our presentation of the data has the effect of making differences between scores in the Belgian Congo and scores elsewhere less enormous than in Normandeau's analysis, although the Congo remains distinctly different in its view of murder, rape and the theft of large sums of money. It is not evident, however, whether this results because of sampling errors or some particular characteristic of the Congolese culture.

#### DISCUSSION AND CONCLUSIONS

Although we believe that Table II constitutes a more reasonable basis for international comparison than does Table I, there are several reasons for regarding it with caution. First, although our analysis does not make the assumptions mentioned in our first two objections to Normandeau's analysis, it does contain two assumptions of its own. It treats as equivalent median seriousness judgments and range of seriousness judgments in the different countries and it allows comparison of seriousness scores with scales not tied to the seriousness of a single offense. It may be, however, that crime is

<sup>11</sup> Standardized scores were preferred to standard scores for presentational reasons, that is, they make low seriousness scores look less extreme and high seriousness scores more extreme than do standard scores, and thus, they are more faithful to the original data. They are also preferred for theoretical reasons. See Pease, Ireson & Thorpe, *supra* note 4. For present purposes of comparison, it is necessary to show how extreme each offense is judged relative to other offenses in the same country.

TABLE II  
STANDARDIZED SCORES OF OFFENSE SERIOUSNESS  
(Negative scores indicate offenses rated as below median seriousness for the country concerned)

	United States	Canada	England	Belgian Congo	China (Taiwan)	Indonesia	Brazil	Mexico
Theft of \$1 (U.S.).....	-0.60	-0.54	-0.44	-0.19	-0.67	-0.75	-0.75	-0.89
Theft of \$5.....	-0.60	-0.54	-0.44	-0.19	-0.67	-0.75	-0.75	-0.89
Theft of \$20.....	-0.26	-0.54	-0.44	-0.19	-0.67	-0.75	-0.75	-0.89
Theft of \$50.....	-0.26	-0.22	-0.44	0.04	-0.67	-0.75	-0.32	-0.49
Theft of \$1,000.....	0.09	0.11	-0.24	0.48	0.17	0	0.11	-0.10
Theft of \$5,000.....	0.43	0.75	0.15	2.27	0.17	0	0.54	0.69
Burglary \$5.....	-0.26	-0.22	-0.24	0.04	0.17	0	-0.32	-0.49
Aggravated theft \$5 (unarmed).....	0.09	0.11	0.15	-0.19	0.17	0.75	0.11	0.30
Aggravated theft \$5 (armed)	0.77	0.43	0.54	0.15	1.85	1.50	0.54	0.69
Assault (causing death).....	7.91	8.14	9.34	12.78	5.21	5.25	5.25	5.44
Assault (necessitating hospital admission).....	1.45	1.39	1.13	0.26	1.01	1.50	1.39	1.48
Assault (necessitating medical treatment, followed by discharge)....	0.43	0.75	0.73	-0.07	0.17	0	0.54	0.30
Assault (minor).....	-0.60	-0.22	0.15	-0.19	-0.67	-0.75	-0.32	-0.89
Rape.....	2.81	3.00	2.30	0.48	2.69	3.00	2.25	2.27
Theft of car (vehicle recovered undamaged)....	-0.26	-0.22	-0.44	-0.19	-0.67	-0.75	-0.75	-0.89
Breaking and entering.....	-0.60	-0.54	-0.44	-0.07	-0.67	-0.75	-0.75	-0.89
Intimidation (involving verbal threats).....	-0.26	-0.22	-0.05	-0.19	-0.67	0	-0.32	-0.10
Intimidation (involving weapon).....	0.43	0.11	0.34	0.04	1.01	0.75	2.25	0.30

"Aggravated theft" = Theft involving violence

"Burglary 5 dollars" = Breaking and entering and stealing \$5

"Assault" = Involving physical force

regarded as more serious in, the Belgian Congo than in Taiwan, and this would not be apparent from our analysis. Nevertheless, it would not be apparent from Normandeau's study either. It may be argued that judged seriousness of offenses should be ranked individually for each country. Comparison of countries in terms of ranks would then provide the least contentious (and least likely to be misleading) form of presentation of the data.

The second reason for caution is the assumption by Sellin and Wolfgang that scores of offense seriousness constitute a ratio scale. As stated earlier, the evidence on which Sellin and Wolfgang base their ratio scale assumption is indirect. Sellin and Wolfgang's failure to test this assumption more directly (for ex-

ample, in terms of the additivity of scale scores) has been criticized by Rose.<sup>12</sup> Rose observed that "it was extremely surprising that additivity in the scoring system was also assumed and not empirically tested. Although the scoring system is undoubtedly workable, it has clearly not been adequately validated."<sup>13</sup> Wolfgang admitted that this assumption "remains the most controversial item" of scaling offense seriousness.<sup>14</sup> Bryant, Chambers and Falcon have reported that people asked to judge offense seriousness are prepared to revise these

<sup>12</sup> Rose, *Concerning the Measurement of Delinquency*, 6 BRIT. J. CRIM. 414 (1966).

<sup>13</sup> *Id.* at 421.

<sup>14</sup> M. WOLFGANG, ON DEVISING THE CRIME INDEX, THE INDEX OF CRIME: SOME FURTHER STUDIES (1970).

judgments substantially.<sup>15</sup> This is inconsistent with the assumption of additivity.

In a recent article, we directly tested the additivity assumption of Sellin and Wolfgang.<sup>16</sup> We tested it by determining whether people regard committing the same offense twice in a short time as twice as serious as committing the offense once. In brief, we discovered that only 32 per cent of those tested regarded the two offenses as twice as serious as one. This signifies that one cannot hope to add scale scores of murder and theft of one dollar and expect to get the same score as would have been obtained by a direct assessment of the offense of murder and theft of one dollar. This result also shows that the implied model whereby each person mentally adds the seriousness of crime elements together to obtain a seriousness score for the composite crime cannot apply. Predictions of the seriousness judgments of complex crimes from the seriousness judgments of elements of this crime should

definitely not be made. However, it remains quite possible that people can make meaningful and consistent direct judgments of the seriousness of simple or complex offenses.

In summary, Normandeau's method of presenting international comparisons of judgments of offense seriousness is considered to be misleading. This stems largely from two related features of his research. First, he compares scale scores of offense seriousness directly between national groups although the ranges of their seriousness judgments differ. Second, his method of calculating scale scores means that the seriousness scores for larceny of one dollar are by definition equal in all countries. Expressing seriousness judgments made by different national groups as standardized scores allows comparison between countries to be made. Although the method of comparing countries in terms of crime seriousness which is presented by the present study may be less problematic than that outlined by Normandeau, there are difficulties, some of them inherent in the Sellin and Wolfgang approach, which must be resolved before confidence can be placed in the results derived from such an approach.

<sup>15</sup> Bryant, Chambers & Falcon, *Patrol Effectiveness and Patrol Deployment* (University of Lancaster, Department of Operational Research, November, 1968).

<sup>16</sup> Pease, Ireson & Thorpe, *supra* note 4.