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The empirical study of social norms has been hampered by a lack of standardized quantitative measures and criteria for the interpretation of research data. Two such criteria are suggested, both of them derived from the modal proportion of responses. The first, $pk_{1\,rep}$, signifies a modal proportion large enough to represent a population norm. The second criterian, $pk_{1\,prom}$, is less stringent and indicates the presence of a prominent norm. Minority norms and plurality norms are also quantitatively defined. Two empirical examples are given to illustrate the utility of the suggested criteria.

Interpreting Modal Frequencies To Measure Social Norms

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Social norms have traditionally been among the central concerns of theoretical sociology. Various suggestions have been made over the years to bring order to their variety by developing typologies, taxonomies, and other descriptive systems (Sumner, 1906; Williams, 1951; Morris, 1956; Gibbs, 1965). In the empirical study of normative systems and deviant behavior, however, these insights have not been utilized to the extent one should have expected. This is due, in part, to the unwieldy multidimensionality of the concept, but probably no less to the lack of established quantitative criteria by which norms could be assessed (Gibbs, 1968: 210). An increase in publications about

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these issues (see Labovitz and Hagedorn, 1973; Hawkes, 1975; Hendrix, 1976) suggests that the need for methodological refinement in the study of social norms is becoming more widely felt.

A social norm is "a standard shared by the members of a social group, to which the members are expected to conform" (Kolb, 1964: 472). Although authorities differ as to what else should be included in the definition (see Gibbs, 1965), it seems to be generally accepted that norms "must be shared prescriptions" (Morris, 1956). Thus, the level of agreement about normative statements is a critical part of their definition, and we may take the degree to which people agree about a prescription as a valid indication of the degree to which it is a social norm.

But there are methodological problems. It is easy enough to recognize unanimity and extreme conflict of opinion when one sees them, but the intermediate levels of agreement (or disagreement) with normative statements, or approval (or disapproval) of a given mode of conduct, pose difficulties in measurement as well as interpretation (Williams, 1968: 207-208; Rossi et al., 1974).

Concerning measurement, there are some norms which prescribe an appropriate amount or intensity of behavior in a given situation. For these, the variance of the amount or intensity expected will indicate the level of agreement (for an example, see Turk, 1965). Many social situations, however, are not governed by this type of norm and are therefore not measureable in this manner. Different people may expect categorically different modes of conduct in terms of "either this or that," of dos and don'ts. The variation here is in kind, not in degree. The logically most appropriate measure for ascertaining the existence and status of a social norm in such situations is the relative frequency of the modal response, but for this we have no associated measure of variation.

Problems of interpretation arise in both types of cases. How small must the variance be, or how large must be the relative frequency of the modal response to enable us to say that there is a social norm? Obviously, we cannot speak meaningfully of conformity or deviance in observed behavior unless we have

independent evidence that there is, indeed, a norm.[1] Objective and standardized criteria are needed for determining the point at which normative statements are accepted by a proportion of a population large enough to constitute a social norm (see Mueller and Schuessler, 1961: 120).

In this article we shall propose a series of criteria to facilitate the sociological interpretation of modal responses. We are well aware, of course, that agreement is a necessary condition not only for the definition of social norms but also for establishing the validity of sociological concepts. Therefore, for all the confidence we have in the soundness of the proposed criteria, their practical utility will depend very much on the degree to which they are accepted and applied by practicing social scientists.

REPRESENTATIVE NORMS

To infer the existence of a norm from a modal response, we must look at the proportion of responses (p) in the modal category (k_1). The normative significance of a modal response varies directly with the proportion of people who made it: The greater the proportion, the more likely it is to represent a social norm. However, the normative significance of a modal proportion also varies inversely with the number of possible response categories. A proportion which would clearly signify a norm when there are, say, ten different response categories may be much too low to speak of a norm when there are only two or three such categories. In other words, the fewer response categories there are, the larger must be the proportion of responses in the modal category to signify a norm. Can we establish a standard lower limit for the modal proportion which takes account of this constraint?[2]

In mathematical terms, consensus exists when the proportion in the modal category (pk_1) is unity. Total disagreement is found when $pk_1 = pk_2 = pk_3 = \ldots = pk_k = 1/K$ (K denoting the number of response categories). Assuming a linear increasing function of modal proportions from total disagreement ($pk_1 = 1/K$) to

consensus ($pk_1 = 1.00$),[3] we can define the proportion which lies exactly midway between consensus and disagreement.

$$\text{"midway" proportion} = 1/2\ (1 + 1/K). \qquad [1]$$

Any modal proportion greater than expression 1 is closer to consensus than to disagreement and therefore implies a tendency toward convergence rather than divergence of opinions, while any proportion smaller than that implies the opposite (Figure 1). Moreover, expression 1 varies inversely with the number of response categories, its range being (1/2, 3/4). It is, therefore, an accurate reflection of the normative significance of the modal proportion, and establishes an objective standard lower boundary to agreement.

We shall call this boundary pk_{1rep} because when it is found it may safely be said to indicate a *representative norm,* the relative frequency of the modal category being so great that it represents the population's response for most intents and purposes. For samples, a one-tailed lower confidence limit for the observed proportion can be computed at the desired level of probability (Blalock, 1960: 163-165), giving an estimate with known probability of agreement in the population.[4]

Applying this criterion to various sets of empirical data, however, we have found that it is met only rarely. This is not surprising, really, because researchers are much more likely to study equivocal norms than those which are distinct enough to yield a pk_{1rep}. For many empirical cases, therefore, we need an additional, less stringent criterion in order to make clear and objective interpretations.

PROMINENT NORMS

When a modal response does not reach pk_{1rep}, its normative connotation depends very heavily on its relative prominence, that is, on the difference between the proportion in the modal category and that in the next most frequent category, ($pk_1 - pk_2$). Generally speaking, the larger this difference is, the more likely it is that the

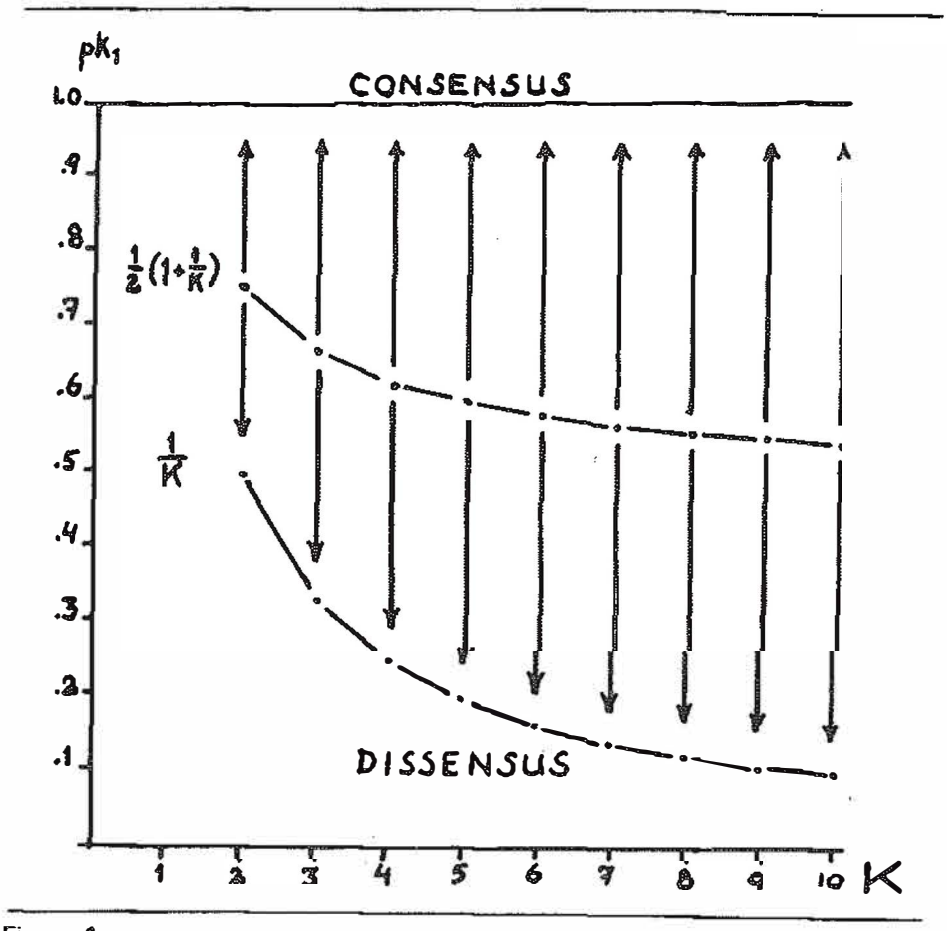


Figure 1

modal response signifies a norm. As an indicator of agreement, however, ($pk_1 - pk_2$) is less clear-cut than the modal proportion by itself, because ($pk_1 - pk_2$) can be quite large even when pk_1 is much less than pk_{1rep}, provided that pk_2 is small enough. Thus, the normative connotation of a modal proportion which is less than pk_{1rep} depends not only on ($pk_1 - pk_2$), but also on the combined proportions of the first two categories, ($pk_1 + pk_2$). If these approach unity, then a large value for ($pk_1 - pk_2$) indicates that k_1 has received much agreement. But if ($pk_1 + pk_2$) is relatively small, then the same large value for ($pk_1 - pk_2$) means that even the most frequent response was made by only a small proportion of the respondents, and that there is much disagreement among them.

We can overcome this difficulty by taking ($pk_1 - pk_2$) and weighting it with ($pk_1 + pk_2$). In this manner we shall have obtained a measure which is sensitive to variations in pk_1 as well as in pk_2, and which therefore accurately reflects the relative prominence of the statistical mode. We have given this expression the symbol Δ^2 because algebraically, it is the difference of squared proportions of the two largest response categories. It has a range of (0, 1).[5]

$$\Delta^2 = (pk_1 - pk_2) \cdot (pk_1 + pk_2) = pk_1^2 - pk_2^2. \qquad [2]$$

To establish the standard lower limit for Δ^2, we start by replacing pk_1 in formula 2 with pk_{1rep}, thereby making sure that a modal proportion which meets the criterion of pk_{1rep} will always be above the lower limit of Δ^2.

$$\Delta^2 = [1/2(1 + 1/K)]^2 - pk_2^2. \qquad [3]$$

Now let us consider the distribution of pk_2, this being the additional element that has to be taken into account. So long as pk_1 is greater than pk_{1rep}, the value of pk_2 does not make much difference, since its range is in any case severely restricted by the magnitude of pk_1. But when pk_1 is less than pk_{1rep} (and these are the cases with which we are now concerned), then pk_2 can reach considerably higher values, and it is precisely these higher values of pk_2 which reduce the relative prominence of pk_1. The lower cutoff point for Δ^2 should therefore incorporate an upper limit for pk_2.

For any value of pk_{1rep} there is a corresponding maximal value for pk_2. This will occur when all proportions besides those in the first two categories are minimal but nonzero—that is to say, when the proportion in each of the remaining categories is $1/N$.

$$pk_{2max} | pk_{1rep} = 1 - 1/2(1 + 1/K) - (K - 2)/N. \qquad [4]$$

If we now substitute the relatively low value of $pk_{2max} | pk_{1rep}$ into equation 3, the result will be a Δ^2 value for any K and N which, when applied to pk_1 values that are less than pk_{1rep}, sets a minimal level of prominence for the modal category, based on the logic of

pk_{1rep}, but one that is always lower than pk_{1rep},

$$\Delta^2_{prom} = (pk_{1rep})^2 - (pk_{2max}|pk_{1rep})^2$$
$$= [1/2(1 + 1/k)]^2 - [1 - 1/2(1 + 1/K) - (K - 2)/N]^2 \qquad [5]$$

Any Δ^2 value below this point will mean, in fact, that pk_2 is so close to pk_1 that the modal response is no longer sufficiently different from the next most frequent response to be called a social norm of that population (for minority norms, see below).

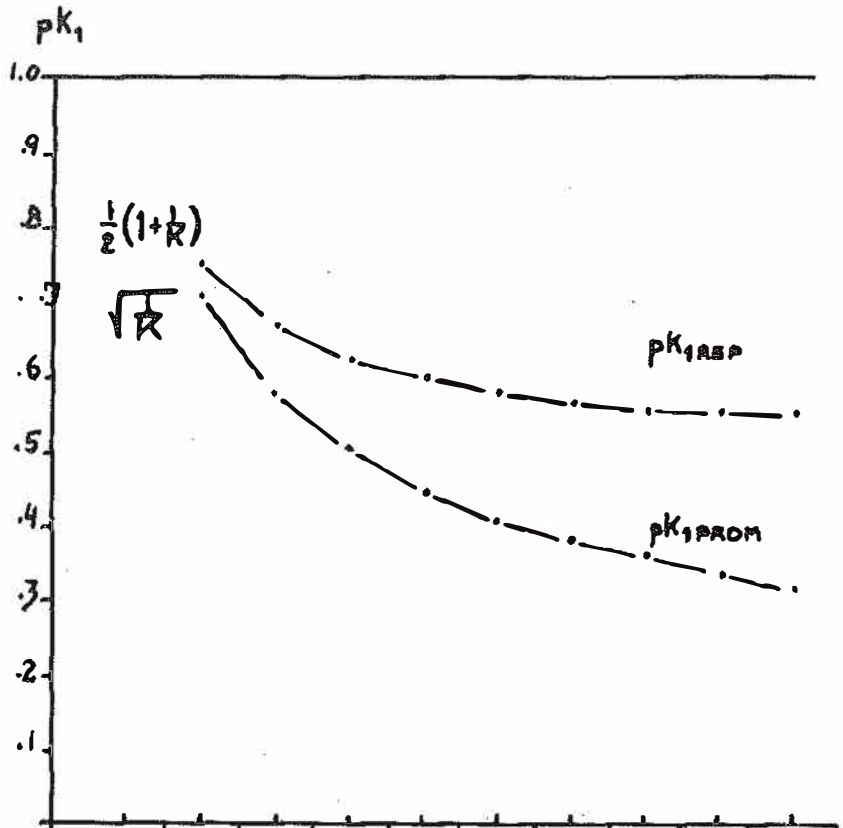
Now, when dealing with large populations or when K = 2, the term (K − 2)/N in equation 5 tends to zero, and the whole formula cancels down to 1/K. This convenient fact allows us to compute minimal pk_1 values which will correspond to Δ^2_{prom}. We shall call this pk_{1prom}, and the argument is as follows.

Given Δ^2_{prom}, pk_1 can be minimal when pk_2 is also minimal, because then we have the largest possible difference between pk_1 and pk_2. The minimal value for pk_2 is 1/N, and for a large N this approaches zero. For large populations, therefore,

$$\Delta^2_{prom} = pk^2_{1prom} - 0^2 = 1/K; \text{ or}$$
$$pk^2_{1prom} = 1/K; \text{ or} \qquad [6]$$
$$pk_{1prom} = \sqrt{1/K}.$$

For smaller populations, we have computed the appropriate values for pk_{1prom} from formula 5, and they are given in the Appendix. Results from samples can be tested for significance by computing a one-tailed lower confidence limit for the observed modal proportion at the desired fiducial level, and checking whether this is equal to or greater than $\sqrt{1/K}$.[6]

In sum, then, when pk_1 is less that pk_{1rep} but greater than pk_{1prom}, we shall call the modal response a *prominent norm,* because that is the distinguishing characteristic of such a mode. It is not large enough to be a representative norm, but it is still so prominent among all the other response categories that it definitely indicates a norm.



K	1	2	3	4	5	6	7	8	9	10
pk_{1RSP}		.7500	.6667	.6250	.6000	.5833	.5714	.5625	.5556	.5050
pk_{1PROM}		.7071	.5774	.5000	.4472	.4083	.3780	.3536	.3333	.3162

Figure 2

MINORITY NORMS

Having discovered a prominent norm does not permit us to conclude that we are dealing with an exclusive norm. Constellations may arise in which pk_2 is still so large that, in sociological terms, we should consider the distribution bimodal. In fact, the more perplexing problems in the sociological analysis of normative systems, those which are most in need of quantitative criteria for consistent interpretation, are found where we suspect the existence of minority norms in a population. Of course, the frequency distribution itself, if it contains two or more peaks, can

give us a rough indication of bimodality or multimodality. But to arrive at reliable and reproducible decisions, we need a standardized and convincing cutoff point to determine just when pk_2 is large enough to be interpreted as a minority norm.

The procedure we propose is directly analogous to, and follows the same logic as, that used in determining pk_{1rep}. The upper limit of pk_2 is, by definition, always just below .5, because if $pk_2 = .5$, it is no longer the second largest proportion, but becomes equal to pk_1. This is the situation in which we would be certain that the distribution is bimodal, and the closer pk_2 is to .5, the more grounds we have to say that there is a minority norm.

At the other extreme, we are certain that there is no minority norm when pk_2 is at its minimum, namely $1/N$. The midway point, then, between $pk_2 = 1/N$ and $pk_2 = .5$, namely

$$1/N + [.5 - (1/N)]/2 = .25 + 1/2N, \qquad [7]$$

is the point where we can say that any pk_2 above it indicates a distribution which is nearer to bimodality than to unimodality, and therefore represents a *minority norm*. For large populations, $1/2N$ tends to zero, so that $pk_2 = .25$ may be taken as a convenient approximate cutoff point for a minority norm.

Note that this cutoff point is based on the theoretical distribution of pk_2 and can therefore be logically justified only to interpret pk_2. A pk_3 as high as .25 can occur only when pk_2 is more than .25, and then pk_1 is always less than pk_{1prom}. In such cases, then, there simply is no norm.

On the other hand, a pk_1 as low as .25 can be pk_{1prom} only when two conditions are met: pk_2 must be at a minimum ($1/N$), and at the same time there must be at least 16 response categories. In those special cases, then, pk_1 can be no more than .25 and still indicate a prominent norm. For all practical purposes, however, when pk_1 is as low as that, it means that there is widespread disagreement. To be consistent in our terminology, however, having called a proportion of $.25 + 1/N$ a norm (albeit a minority norm) when it occurs in pk_2, we should also call it a norm of some sort when it is found in a pk_1. Obviously, it cannot be a minority norm, but since it represents the plurality of responses, we shall call it a *plurality norm*.

CONTINGUITY

A special problem arises when the response categories are not nominally different from one another but are arranged in some order on one dimension. In such cases it makes a difference whether or not k_1 is contiguous to k_2. If the two largest categories are not contiguous, then the logic of pk_{1prom} and minority norms holds just as if we were dealing with nominal categories. However, if k_1 and k_2 are contiguous and $pk_2 > .25 + (1/2N)$, then it is probably more correct to interpret k_2 as a *tendency* toward the modal category rather than as a distinct and different minority norm.

Sometimes, when k_1 is contiguous to k_2, the researcher may want to collapse the two largest categories, thereby obtaining a prominent or even a representative norm. While this is possible, it should never be done as a mere matter of computational convenience, since the implication of such a decision is that there was something wrong with the original formulation of the response categories. The collapsing of adjacent categories should therefore always be justified on conceptual grounds. Only then will the interpretation be valid.

Not only response categories but also questionnaire items may be conceptually contiguous. In principle, any suitably worded question could yield a norm as here defined. That is as it should be, since we do not want the procedure to rule out any empirical possibility. But questions with contiguous or overlapping behavioral referents could conceivably yield different norms for much the same behavior.[7] The seriousness of this problem depends on what the researcher is trying to do: to identify the "true" norm or to explain behavior in terms of normative expectations.

In studies attempting to describe social reality as precisely as possible, contiguous items are an advantage because they are the means whereby normative system can be accurately presented in all its complexity. This, presumably, is Schuman and Duncan's (1974: 234-236) intention in their use of the phrase "meaningful variations in question marginals." If the pk_1 values for the contiguous items are different from one another, the item with the

largest pk_1 will be the closest description of the normatively regulated behavior, and k_1 of that item will reflect the norm. But if the contiguous items yield equally prominent modes, it simply means that the norm reflected in the one mode is the same as that reflected in the others, regardless of variations in wording, and nothing is lost except a few redundant questions.

However, if we want to find out whether a given type of behavior is socially required, permitted, tolerated, or proscribed, then contiguity between items should be avoided and the stimulus made as unambiguous as possible. Repeated pretesting is one way of obtaining the necessary iterations to eliminate conceptual contiguity between questionnaire items and to identify the single most fitting description of the behavior to be studied. In our own research on littering and traffic violations, we have used visual stimuli (movies, television) to reduce variation on this score. Whatever the technique, great care must always be taken when constructing questionnaire items to measure social norms.

SUMMARY

In response to the repeatedly voiced need for quantitative techniques to measure social norms, we are proposing a series of standard criteria to facilitate the consistent sociological interpretation of modal frequencies. The procedure may be summarized as follows:

(1) Compute pk_1. If $pk_1 > 1/2[1 + (1/K)]$, the modal category indicates a *representative norm.*

(2) If $1/2[1 + (1/K)] > pk_1 > \sqrt{1/K}$, then the modal category signifies a *prominent norm.*

(3) If $\sqrt{1/K} > pk_1 > .25 + (1/2N)$, there is no prominent norm, but the modal category may be called a *plurality norm.*

(4) In any case, even if there is a representative norm or a prominent norm, but especially if there is none, check for bimodality. If $pk_2 > .25 + (1/2N)$, then k_2 represents a *minority norm,* provided that it is not contiguous with k_1. If k_1 and k_2 are contiguous, $pk_2 > .25 + (1/2N)$ indicates a tendency toward the modal category and should be so reported.

EXAMPLE 1

In a study of college students' value patterns, Hoge (1974) compared students at Dartmouth College with those at Michigan University in the 1950s and 1960s. One of the items to which he asked respondents to react was the following statement: "People who talk about politics without knowing what they are talking about should be kept quiet."

The modal response in each case was "disagree." But which of these modes signifies social norms? The 80% of the Dartmouth students who disagreed in 1968 seem to answer the questions clearly enough, but what about the 72% of the Michigan students in 1969? Still more uncertain are the modal responses found in 1952. With our proposed criteria, the interpretation is clear and unequivocal.

In 1952, opinions were divided among the Dartmouth students. There was a plurality norm disagreeing with the statement but also a significant minority norm agreeing with it. Michigan students of the same year, on the other hand, had a highly significant prominent norm negating the statement, while the 27% that agreed are not enough to constitute a minority norm. By 1968-1969 the difference in normative structure between the two universities had narrowed, although the raw percentage difference in modal responses is larger (!). In both places there was a significant representative norm negating the statement, although in Michigan it is not as clear as at Dartmouth.

EXAMPLE 2

Our second example has been chosen to demonstrate the case of contiguity. It is taken from a study by Mäkelä (1967), in which he compared the public sense of justice with legal practice in Finland. On a scale ranging from "acquittal" (0) to "more than one year of unconditional imprisonment" (5), the punitive demands made by the public were compared to the sentences pronounced by judges. Table 2 is based on data from Mäkelä's original Table 8.

TABLE 1
Responses and Interpretation of Item 3 on Social Constraints (from Table 6 in Hoge, 1971)

$K = 3$; $pk_{1rep} = \underline{.6667}$; $pk_{1prom} = \underline{.5774}$; $pk_{2min} = \underline{.2500}$

	Dartmouth 1952 (n=364)	Michigan 1952 (n=398)	Dartmouth 1968 (n=368)	Michigan 1969 (n=387)
AGREE	.31	.27	.14	.20
DISAGREE	.61	.67	.80	.72
UNCERTAIN	.07	.06	.06	.09
Lower Confidence limits (.01)				
$pk_1 - 2.33\sqrt{pq/n}$	.5504	.6151	.7514	.6668
$pk_2 - 2.33\sqrt{pq/n}$	.2535	.2182	-	-
Interpretation	Plurality norm; + Minority norm	Prominent norm; no Minority norm	Represent. norm; no Minority norm	Represent. norm; no Minority norm

In order to show the degree to which the public agrees with or differs from the judges Mäkelä computed the means for the public and the judges, respectively, and subtracted the one from the other. He reports that in the case of drunkenness, the public's mean is 0.2 (degrees? levels?) more severe than the judges', and in the case of abortion the difference is 0.1, with the public's mean being slightly more severe.

Using our suggested criteria, we find that there is a significant prominent norm among members of the public (45%) that drunkenness should be punished with a small fine. While a minority would acquit (27%), they are not enough to make a significant minority norm. There is, moreover, a second minority of 23% who would give a substantial fine. For judges, however,

TABLE 2
Punitive Demands Made by the Public and Sentences Pronounced by Judges for Drunkenness and Abortion: Responses and Interpretation

K = 6

	Public	Judges[8]
pk_{1rep}	.5833	.5833
pk_{1prom}	.4082	.4252
pk_{2min}	.2500	.2517

	DRUNKENNESS		ABORTION	
	Public n=2023	Judges n=143	Public n=2023	Judges n=143
(0) ACQUITTAL	.27	.11	.05	-
(1) SMALL FINE	.45	.89	.03	-
(2) SUBSTANTIAL FINE	.23	-	.09	-
(3) UP TO 1 YEAR CONDITIONAL IMPRISONMENT	.03	-	.19	.46
(4) UP TO 1 YEAR UNCONDITIONAL IMPRISONMENT	.01	-	.19	.41
(5) OVER 1 YEAR UNCONDITIONAL IMPRISONMENT	.01	-	.46	.13
Lower Confidence limits (.01)				
$pk_1 - 2.33 \sqrt{pq/n}$	.4242	.8290	.4333	.3629
$pk_2 - 2.33 \sqrt{pq/n}$	.2470	-	-	.3142
Interpretation	Prom. norm; no Mino. norm	Repre. norm; no Mino. norm	Prom. norm; no Mino. norm	Plur. norm; + Mino. norm

the small fine is a representative norm (89%), despite the 11% who did acquit. Our conclusion, therefore, is not that members of the public are more severe than the judges, but that they are more divided in their opinions.

For abortion, there is a prominent norm among the public (46%) demanding the maximum sentence. It is true that the others

in the sample were more lenient, but they don't coalesce into a minority norm. Judges are much more lenient toward this offense. The plurality norm among them is to give up to one year conditional imprisonment (probation). Although the modal category has the same proportion (46%) as that of the public, it is not enough to make a significant prominent norm because the sample is so much smaller. There is also a significant minority norm (41%) giving up to one year unconditional imprisonment, but the two categories are contiguous and the tendency is toward the more lenient norm. Thus, our conclusion is again different from Mäkelä's. The difference between the public and the judges is much greater with regard to abortion than to drunkenness.

NOTES

1. Some writers have defined norms by the frequency with which a behavior occurs (for an example, see Hill, 1974). This seems to us unacceptable, conceptually as well as methodologically.

2. Hofstaetter (1963: 132n) has suggested a formula for computing majority opinions: $M = (p_+ - p_-) \cdot (100 - p_0)/100$, where p_+ and p_- signify percentages agreeing and disagreeing, respectively, and p_0 the percentage undecided. However, he does not suggest any criterion for deciding when a majority is large enough to indicate a norm.

3. In the absence of evidence pointing to alternative functions, we have followed the principle of Occam's razor and made what seemed the simplest assumption.

4. This kind of procedure, though common enough, is not really appropriate by the strict logic of inferential statistics. It treats pk_1 as if it were based on a binomial distribution, whereas in fact (except when $K = 2$) it is based on a multinomial distribution (see Guttman, 1977: problem 1). Thus, the confidence interval tends to be too narrow, leading us to the possible error of identifying sample mode as a representative norm when, in fact, the population mode is below pk_{1rep}. However, since the exact calculation of the distribution of pk_1 for different values of pk_2, pk_3 . . . pk_n is a complicated and time-consuming matter, we suggest, a rough-and-ready provisional procedure until appropriate tables are available, compensating for the underestimation by raising the fiducial level from the customary .05 to .01.

5. Bechofer et al. (1959) have suggested the ratio pk_1/pk_2 for a similar problem. For two reasons, this seems less appropriate than Δ^2 to our purposes: (1) the ratio pk_1/pk_2, like $(pk_1 - pk_2)$, is not sufficiently sensitive to pk_1, so that the same large (or small) values can result from widely different modal responses; (2) unlike Δ^2, which has a permanent and heuristically convenient reference point in $\Delta^2_{max} = 1.00$, pk_1/pk_{2max} varies with the total number of responses.

6. See note 4.

7. We are indebted to the editors for pointing out to us this difficulty.

8. This case illustrates the need for pk_{1prom} values for small populations. Since the total population of judges in Finland was reported as approximately 300, $pk_{1prom} = .4252$ (see Appendix), and not $\sqrt{1/K} = .4082$.

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APPENDIX

Some Useful Minimal Values of pk_{1prom} for Small Populations (decimal point omitted)

K =	2	3	4	5	6	7	8	9	10
N									
30	7303	6231	5736	5507	5415	5396	5416	5453	5498
40	7246	6124	5568	5286	5147	5092	5086	5110	5148
50	7211	6058	5463	5142	4968	4884	4854	4879	4883
100	7141	5921	5240	4828	4564	4395	4288	4225	4190
200	7106	5851	5192	4776	4509	4338	4230	4165	4130
300	7095	5825	5084	4596	4252	4001	3813	3677	3558
400	7089	5814	4894	4565	4212	3948	3747	3592	3466
500	7085	5808	5050	4548	4186	3915	3705	3543	3407
1000	7071	5794	5025	4510	4098	3848	3622	3441	3288
∞	7071	5744	5000	4472	4087	3782	3536	3332	3162

$$pk_{1prom} = \sqrt{\left[\tfrac{1}{2}\left(1 + \frac{1}{K}\right)\right]^2 - \left[1 - \tfrac{1}{2}\left(1 + \frac{1}{K}\right) - \frac{(K-2)}{N}\right]^2 + \frac{1}{N}}$$

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