

Logical relations. If *often* corresponds to probability 0.65, should *not often* correspond to $1 - 0.65 = 0.35$? In a certain logical sense, yes; we might doubt it psychologically, and indeed the two empirical average probabilities do not add to one. There may be other such plausible equalities that are or are not realized; logical inequalities seem to go in the right directions. I would welcome comment from the authors on this corner of the topic. They might wish to consider the trio *even chance, better than even chance, less than an even chance*.

Behavioral responses. Would it be possible to parallel this interesting study by one in which the responses were more concrete than naming probabilities? Perhaps statements about bets, or even actual bets, might be used, following one psychological tradition in which Mosteller has been active. There is again a possible confounding problem.

Codification. I worry about the hope that this line of research will lead to useful codification in our semantic lives. In an important sense, to be sure, semantic codification is essential; without it, languages would not exist as a social creation. Yet we see and hear every day how language structures and conventions have lives of their own and rarely respond to expert, specialized pleadings. Consider the recent fates of words like “disinterested” and “gratuitous.” Consider the general confusion over “significant,” “representative,” and other words that arise in statistical discourse. Consider the inability of the French Acad-

emy to keep the French language pure. . . whatever that means.

I do not doubt that there are cases in which codification or standardization of languages have been effective—possibly Norwegian is an example; but my hunch is that they are rather rare. (By that I mean a relative frequency of roughly 9%.)

There must be a literature about all this, I said to myself as I trotted to the library and used its electronic search system. In almost no time (5 minutes, excluding travel) I had two examples: Milroy and Milroy (1985) and Woods (1985). Both are interesting books with rather different emphases.

Codifications in other domains abound: railroad tracks, lumber, clothing sizes, nuts and bolts, typewriter keyboards, side of the road, even good manners, etc. There must be fascinating similarities and differences. When and how do these codifications get made and get changed?

The doers of any such study will be grateful to Mosteller and Youtz for their present contribution, for their past papers on related topics, and for future insights that they are bound to find.

ADDITIONAL REFERENCES

- MILROY, J. and MILROY, L. (1985). *Authority in Language. Investigating Language Prescription and Standardization*. Routledge and Kegan Paul, London.
- WOODS, J. D., ed. (1985). *Language Standards and their Codification: Process and Application. Exeter Linguistic Studies 9*. Univ. Exeter.

Comment: On the Possible Dangers of Isolation

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The Mosteller and Youtz paper makes fascinating reading. The authors have done us a great service by pulling together the results of so many studies on verbal quantifiers and in carrying out what seems to be the most comprehensive study yet in terms of the number of these quantifiers considered. They will do us a further great service if they can succeed in the proposed quantification.

But I have some serious doubts about the enterprise. I believe Mosteller and Youtz give too little weight to

the effects of the context in which words are used on the meaning of probabilistic expressions.

In understanding what another says or writes, we bring into play not only our knowledge of language, but also our understanding of the situation in which the words were produced and that to which they apply. In the case of a conversation with a friend or acquaintance, we also use our knowledge of that individual and of the relationship we share to interpret what is said. Similarly, in speaking with or writing for colleagues, we use specialized jargons. Thus conversations (or scientific papers) that are perfectly intelligible to the participants can sound like pure gibberish to an observer who misreads or is ignorant of the situation or not privy to the common stock of knowledge of the

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conversants. (Bryant and Norman, 1980, speak to this point when they speak of high reliability between first and second ratings of quantifiers within physicians but large ranges among physicians—"consistently different interpretations of expressions.") While I surely do not speak as a poet, objecting in principle to quantification of language, I feel that there may be issues somewhat more complicated than Mosteller and Youtz have as yet confronted.

While I feel that Mosteller and Youtz place too little emphasis on these subtleties of variation in meanings, they do indeed address the issue of context in several places in their paper. They quote an example taken from Mapes (1979) in which the meaning of "rare" for physicians seemed to change drastically depending on whether it was associated with side effects of antihistamines or those of beta-blockers. They then dismiss the argument that this is a change in meaning associated with a change in context by suggesting that physicians may perceive the rate of side effects differently for the two medications. But if the physicians use "rare" differently for the different medications, this seems to me to be precisely what is meant by an effect of context. (Surprisingly, these results did not find their way into Mosteller and Youtz's Table 1 for "rarely".)

Mosteller and Youtz also point out that the probabilities of rare events are hard to communicate and cite other examples of the importance of context (e.g., the report of Beyth-Marom (1982) that more variability arises in the evaluation of expressions when they are linked to specific future events than when they are presented in isolation).

But Mosteller and Youtz state that their "emphasis is more on the near constancy of opinions as illustrated in Table 1, rather than the differences, though the right hand side of Table 1 illustrates differences owing to samples, instructions, or context." I maintain that these differences hardly reflect variations in context, for very few of the studies cited used any context. I have had to resort to a vague quantifier ("very few") here, reinforcing Mosteller and Youtz's point that any writer has need of such devices, in order to provide for two uncertainties. First, while I attempted to look at all the papers cited by Mosteller and Youtz, some proved impossible to obtain in any reasonable time frame, so I have only examined 16 of the 20 cited. Second, for the four that could be said to use context, the context itself was vague. Kong, Barnett, Mosteller and Youtz (1986), Nakao and Axelrod (1983) and Robertson (1983) worked in a medical context. Their instructions were respectively as follows:

"One of the senior physicians in your hospital told you that a particular symptom was ____ in

the disease you were discussing. What would be your estimate of the frequency of the symptom in this disease?"

"What do the following terms mean to you when used in a medical context? For example, if you read that a finding is "atypical" in a certain disease, what percent of the cases of that disease do you think would have it?"

"Specify on a scale from 0% to 100% the likelihood of a disease being present as indicated by each term."

Note that none of these context settings included variation in such dimensions as the severity of the disease or symptom, the familiarity of the intended audience for the communication with the issues discussed, the relationship between the interactants, etc. And being all from the medical field, they afford no opportunity to address questions of whether the likelihood of complications, rainshowers, being elected, an outcome occurring if a null hypothesis is true, or judging an innocent person guilty can be discussed using the same metric for meanings of verbal quantifiers.

Thus it seems to me that the two broad kinds of questions remain substantially unaddressed and surely not yet clearly answered. The first asks whether the meanings of words presented in context differ either in mean or variation from the meanings of the same words presented in isolation. We have a shred of evidence on this point from Hartley, Trueman and Rodgers (1984) who presented a set of quantifiers in isolation and in the context of a questionnaire that measured "attitude to school." They concluded (page 153) that "the use of the context seems to sharpen the differences between the effects of the various quantifiers used." Is this effect more general?

The second broad question is whether meanings differ in mean or variation across different contexts. Again, we have some evidence. Mosteller and Youtz quote results from Pepper and Prytulak (1974) that suggest that divergences arise when probabilities are attached to calamities in contrast to when they are attached to trivial events. Mosteller and Youtz go on to say that for ordinary events the differences created by context are modest. I have not been able to examine the Pepper and Prytulak work myself, but I am almost certain (mean probability 0.86) that more extensive investigations are called for here as well.

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