Bills Reliability

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This memo calculates reliability scores for a portion of the congressional bills data set. The sample is 746 bills from the 106th Congress. The entire sample is drawn from the Senate with no other restrictions. I argue the sample is especially representative in terms of the major topic areas. The percentage of the 746 falling in any one major topic ranged between 1 and 16%–in raw figures, from 11 to 113 bills. The percent agreement at the subtopic level for these data were a very respectable 0.9276 (692/746).

The sample is a result of practicality in drawing bills by coders considered extremely competent. In this case, the set of bills were coded by "Stephanie" and "Jamie"–presumably past students in the Fellows Program at the CAPPP. I calculate reliability scores for the major topic areas only. I first calculate the AC1 measure and then Cohen's Kappa.

AC1 Reliability Measure [1]

$$AC1 = \frac{P(A) - P(E)}{1 - P(E)}$$

Where...

$$P(E) = \frac{1}{C-1}\sum_{c=1}^{19}(\pi_c(1-\pi_c))$$

And...

$$\pi_c = \frac{(Coder_{1c} + Coder_{2c})/2}{N}$$

For this particular sample,
$P(A) = 0.9276$
$P(E) = 0.0485$
$1 - P(E) = 0.9515$

So that...

$$\begin{aligned} AC1 &= \frac{0.9276 - 0.0485}{1 - 0.0485} \\ AC1 &= \frac{0.8791}{0.9515} \\ \mathbf{AC1} &= \mathbf{0.9239} \end{aligned}$$

The AC1 statistic for these particular coders well exceeds the usual standard of 0.70.[2]

[1] All calculations are dependent on rounding to four decimal places.
[2] Any measure of reliability should be viewed with caution. As in any statistical exercise, these are merely estimates.

Cohen's Kappa[3]

$$\kappa = \frac{P(A) - P(E)}{1 - P(E)}$$

Where

$$P(A) = \frac{1}{N}\sum_{n=1}^{N} I(Coder_{1n} == Coder_{2n})$$

$$P(E) = \frac{1}{N^2}\sum_{c=1}^{C}(Coder_{1c} \times Coder_{2c})$$

Under this sample, Cohen's Kappa (κ) is...

$$P(A) = 0.9276$$
$$P(E) = 0.0782$$
$$1 - P(E) = 0.9218$$
$$\kappa = \frac{0.9276 - 0.0782}{1 - 0.0782}$$
$$\kappa = \frac{0.8494}{0.9218}$$
$$\kappa = \mathbf{0.9215}$$

[3]Calculations are based on rounding to four decimal places.