But (*iii*) states that $Q/\sigma^2$ has a $\chi^2$-distribution for *all* parameter values. This contradiction completes the proof.

We remark in closing that we have at hand a counter example of practical interest to the statement found in several statistics texts that if $z$ is a normal variable with zero mean and $v$ is an independent unbiased quadratic estimate of the variance of $z$, then $z/v^{\frac{1}{2}}$ has a $t$-distribution. The counter example consists of taking $z = \bar{x} - \bar{y} - \delta$ and $v = Q/k$ defined by (9). It may be shown that $z/v^{\frac{1}{2}}$ does not have a $t$-distribution except in the trivial case (10).

REFERENCE

[1] H. Scheffé, *Annals of Math. Stat.*, Vol. 15 (1943), pp. 35–44.

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# ON MULTIPLE MATCHING WITH ONE VARIABLE DECK

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The problem of card matching has been considered by a number of writers. A complete bibliography has been given by Battin [1], who also published the most general treatment of the subject to date, dealing with the simultaneous matching of any number of decks of arbitrary composition. He considers, however, only the case in which the order of every deck is variable, all possible permutations being equally likely. Some interest attaches to the case in which all the decks but one have fixed orders in relation to one another, especially in connection with radio experiments in telepathy, where a large number of subjects simultaneously attempt to call the same target.

The simplest case is that in which the target for each trial is chosen at random, independently of the other trials. If the target is to be selected from $s$ possibilities, and if $p_i$ denotes the probability that the $i$th possibility will be chosen as the target, while $m_i$ denotes the number of subjects who call the $i$th possibility, then the mean value of $h$, the number of correct calls is, of course,

$$M_h = \sum_{i=1}^{s} p_i m_i , \tag{1}$$

and the variance is

$$V_h = \sum_{i=1}^{s} p_i m_i^2 - M_h^2 . \tag{2}$$

Evidently, the mean number of hits for a succession of trials is the sum of the means for the individual trials, and the variance is the sum of the variances.

A slightly more difficult problem is presented when the target series is a true "deck": that is, when its composition is determined in advance, only the order being left to chance. Let $n$ denote the number of trials and $n_i(i = 1, 2, \cdots , s)$

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