APPLICATIONS OF NEYMAN'S $C(\alpha)$ TECHNIQUE

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1. Introduction

The χ^2 techniques are possibly the most widely used in statistical methods in that they are simple in application and interpretation. This very generality, however, leads to a lack of sensitivity of the test criterion since the hypotheses alternate to that under test are commonly only vaguely specified. During the past few years there have been procedures put forward which enable more sensitive tests to be made. We give here a series of models for the alternative hypothesis under χ^2 type situations and the appropriate test criteria. The technique used to derive the test criteria is that put forward by Neyman [1] and loosely referred to by us as the $C(\alpha)$ procedure. The power functions of these tests may be calculated, and in such cases as we have investigated, they show the chosen criteria to be comparable in sensitivity to others which may be proposed.

2. Models reflecting a change in the location parameter

Suppose two groups of individuals with n in the first group (A) and N in the second group (B). On each individual the same characteristic X is measured. These measurements are used to divide the groups into $s + 1$ categories, so that we have Table I.

TABLE I

	Categories of measurement				Total
	1	2	$\cdots$	$s+1$	
A	n_1	n_2	$\cdots$	n_{s+1}	n
B	N_1	N_2	$\cdots$	N_{s+1}	N
Totals	M_1	M_2	$\cdots$	M_{s+1}	M

It is apparent that if the measurements of the characteristic X are accurate and there are no "tied" values, a rank sum criterion is the appropriate quantity

This investigation was partially supported by USPHS Research Grant No. GM-10525-08, National Institutes of Health, Public Health Service.