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Syllogisms with Statistical Quantifiers

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1 Introduction In this paper I will develop a system of categorical syllogisms, with square of opposition and rules of validity, for categorical statements having statistical quantifiers. Rules for the development of syllogistic systems having an indefinitely large number of quantifiers have already been worked out by Peterson and Carnes [3]. More recently, Brown [1] has provided a syntax and a semantics for quantifiers of all types. My approach differs from the work of Peterson and Carnes in two important respects:

1. Their approach was to develop infinitely many separate systems, each with a finite set of quantifiers defined within it. My approach in this paper will be to develop a single system within which infinitely many quantifiers are defined.

2. Their approach gave the normally vague quantifiers 'few' and 'many' a precise meaning within each system (through that meaning could vary from one system to the next). This was accomplished by selecting a pair of quantifiers within each system with which 'few' and 'many' could be arbitrarily identified. My approach will be to treat 'few' and 'many' as strictly associated with the base quantifier "100% of". They will, however, retain their vagueness, and this will make it necessary to add an arbitrary element elsewhere in the system.

2 Percentile quantifiers To express quantities other than those recognized for classical and intermediate categorical propositions, Peterson and Carnes use ratios, such as "$\frac{2}{3}$ of", rather than using quantifiers expressed as percentages. In this system we will take the alternative approach. We will recognize an infinite number of quantifiers for categorical propositions, all of the form "n% of", where 'n' is any real number such that $0 \leq n \leq 100$. This basic form may be modified by adding the word "almost", to produce another infinitely large set of quantifiers of the form "Almost n% of".

Both kinds of quantifiers receive minimal interpretation. In [5] I explain that a quantifier receives "minimal" interpretation when it means *at least* that

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