APPLICATION OF INDUCTIVE LOGIC TO THE ANALYSIS OF CONSTRUCT VALIDITY

I. INTRODUCTION

The process of construct validation is an important concern of both educational and psychological researchers. Lord and Novick (1968), for example, have referred to construct validity as the most important characteristic of a test for scientific purposes, while Campbell and Stanley (1963) have referred to the interpretability and representativeness of experiments as minima for understanding experimental results. A clear statement of what is the logic of construct validation was presented by Cronbach and Meehl (1955) in an earlier paper entitled ‘Construct Validity in Psychological Tests’. Their remarks offer an appropriate introduction to the present study, although concern here is primarily for demonstrating the applicability of certain logical theories for analysis of this validity. These authors wrote:

A construct is some postulated attribute of people, assumed to be reflected in test performance. In test validation the attribute about which we make statements in interpreting a test is a construct. We expect a person at any time to possess or not possess a qualitative attribute (amnesia) or structure, or to possess some degree of a quantitative attribute (cheerfulness). A construct has certain associated meanings carried in statements of this general character: Persons who possess this attribute will, in situation X, act in manner Y (with a stated probability). The logic of construct validation is invoked whether the construct is highly systematized or loose, used in ramified theory or in a few simple propositions, used in absolute propositions or probability statements. We seek to specify how one is to defend a proposed interpretation of a test . . . . (p. 247)

A test or an experiment is therefore valid with respect to a construct when it produces results that can be interpreted in terms of the construct definition under consideration.

Tests and experiments that are construct valid provide researchers with two types of information: information about the persons tested in terms of the construct (e.g., ‘S/he is highly motivated to achieve’) and information about the construct definition itself – how it can be strengthened, extended, and so on. These two ways in which a construct valid test, for
example, can be informative offer some perspective on how the construct validity of tests generally may be understood. High construct validity signals that a test is likely to be highly informative with respect to both persons tested and the construct definition being considered, whereas lower degrees of this validity may suggest high person-low construct informativeness, low person—high construct informativeness, or low person—low construct informativeness. Depending on the researcher's primary purpose, selection of an appropriately construct valid test may be made by review of how much information of what type(s) alternative tests can provide. Measurement of the type and amount of information associated with particular degrees of construct validity is thus important for both the assessment and the evaluation of this experimental episode characteristic.

It is unfortunate that presently used (statistical) methods for assessing and evaluating construct validity neither utilize nor are related to formal measures of information. Since the assumption usually made is that high degrees of validity are preferable in every situation, correlation coefficients suffice as indicators of those tests that are best. However, while this approach is feasible when the choice is between valid and less than valid tests, it falls short in less than extreme cases. For these cases a way of evaluating validity that is related to informativeness would be of use. This paper is thus concerned with the evaluation of test and experimental episode construct validity in terms of the type and amount of information that can be provided by these episodes. The approach taken is mainly a logical rather than an empirical one and should therefore be regarded as a preliminary step toward explicating logically what is meant by saying of a test or experiment that it is construct valid. Unlike the logical characterization of this validity offered by Tuomela (1970), however, the one presented here does consider directly the relation between models of experiments (experimental episodes) and theoretical models. As a result, this application of inductive methods to experimental episode analysis should provide both philosophers and researchers with a new perspective on current research practices.

The measurement of information provided by experimental episodes requires clarity with respect to the kind of information that is to be assessed. In a report entitled *A Generalized Psychometric Theory Based on Information Measure*, Cronbach (1952) attempted to use the