AN INVESTIGATION OF SUBJECTIVE PREFERENCE ORDERINGS FOR MULTI-ATTRIBUTED ALTERNATIVES*

ABSTRACT. This paper reports an investigation linking Raiffa's (1969) analysis of preference for multi-attributed alternatives with a technique for the elicitation of attribute dimensions known as the 'repertory grid'.

Providing the assumptions underlying the repertory grid were reasonably upheld, people's actual preference orderings were closely replicated by preference orderings predicted by a technique developed from Raiffa's Model. The basis for such replication was examined by comparing the accuracy of predictions based on the Raiffa analysis with those based on several other analyses which did not incorporate the complete set of operations prescribed by the Raiffa Model. These comparisons indicated that: (i) Models for deriving uni-dimensional preference orderings from multi-dimensional data which do not take utilities into account were unsuccessful. (ii) Techniques for converting multi-dimensional representations of utility into preference orderings based on additive rules, such as that in the Raiffa Model yielded considerably better results than did a 'selection' rule. (iii) Given the adoption of an additive model, the use of a lottery technique for assessing the relative 'value-wise importance' of the various attribute dimensions resulted, in most cases, in an improvement of the predictive efficiency of the model over models which assign equal weights to all dimensions.

This paper describes an investigation of a model for the analysis of preference orderings put forward by Raiffa (1969). Raiffa, in developing his model, was concerned with the Manheim and Hall (1968) paper discussing the transportation problems for the North East Corridor in the United States. The choices open were the development of either high speed rail or vertical take-off and landing aircraft systems. Twenty attributes, including noise, cost, comfort, travel time, and so on, were considered important in making this choice.

The attributes were not derived through any systematic technique, and Raiffa himself points out:

There is a real substantive question that I would like to duck, even though it is of major importance; that is: are these twenty attributes a sufficiently rich and meaningful set of descriptors to capture the essence of the problem area? (1969, p. 22)

In the investigation described here, we attempted to obtain meaningful sets of descriptors by linking Raiffa's analysis to the 'repertory grid' technique for the elicitation of attribute dimensions developed by George Kelly (1955). We used this combination of techniques to study
the psychological-processes used by intuitive decision makers in making preference orderings for a set of films.

Consider the following decision situation: Once a year members of the British Film Institute receive a booklet describing the film to be shown at the forthcoming London Festival. Each film is described by a photograph and a one paragraph write-up. This is the only explicit information available about a film; however it may invoke quite a few beliefs about the film, according to how the person feels about the film’s director, content matter, and so on.

Together with the booklet is a booking form which explains that due to the large number of members wishing to see these films, it is advisable when ordering tickets to write down the chosen films in order of preference. Presuming that you would like to see some of the films, your immediate task would be to read the descriptions, choose a subset of films you would like to see and rank them in order of preference on the booking form.

1. FORMALIZATION OF THE DECISION SITUATION

Raiffa’s model provides an analysis of choice behaviour in such a situation. The model makes the fundamental assumption that all films under consideration can be characterized in terms of values describing attributes scaled on a set of dimensions of variability.

Kozielecki (1970) and others, have presented evidence that intuitive decision makers are able to make use of a maximum of about six dimensions of variability at any one time, so we decided to elicit six attribute dimensions from each person who took part in our experiment. Each person was presented with descriptions of six films that he or she had not seen before, and all films were rated on a scale running from 1 to 7 on each dimension, yielding representations like that shown in Figure 1.

Each column vector represents the set of attributes associated with a particular film. In the example ‘1’ represents an attribute closely associated with the left hand pole of the relevant dimension whereas ‘7’ is closely associated with the right hand pole. However, the first step in obtaining such representations was to find a way to elicit the six salient dimensions from each person whose decision processes we wished to model.

Methods for eliciting such dimensions were developed by George