ABSTRACT


Singh and his associates have proposed a hypothesis of cultural difference between America and India. Americans follow a multiplying rule, which implies that motivation will be more effective with persons of high than of low ability. In contrast, Indians follow an adding-type rule, which implies that motivation will be equally effective with persons of low to high ability. The multiplying and adding-type rules thus reflect cultural outlook on how motivation and ability determine performance.
Two recent studies in the United States also yielded results similar to those of Singh and his associates Surber, C.F. (1981a). *Journal of Personality and Social Psychology, 40*, 977-989; Surber, C.F. (1981b). *Journal of Experimental Social Psychology, 17*, 569-586. Therefore, Surber challenged the hypothesis of cultural difference and offered an alternative hypothesis of task difficulty. According to her, converging, parallelism, and diverging patterns in Motivation x Ability effect are obtained with tasks described as easy, moderately difficult, and very difficult, respectively.

Recent work in India has yielded no evidence for the hypothesis of task difficulty. In prediction of life performance, evidence for a multiplying rule has been obtained with 20-year-olds. A hypothesis of nature of task has thus been suggested as an alternative to the cultural difference hypothesis in the doctoral research by Bhargava (1983). The first principal purpose of the present research was to demonstrate an interaction between age of subjects and nature of task in prediction of task performance. Children ranged in age from 4-16 years and the prediction tasks were school exam, puzzle competition, and singing competition. If nature of task determines cognitive algebra, then some tasks would have just one rule and other tasks would have multiple rules.
Because children are believed to be of a limited cognitive capacity (Flavell, J.H. (1963). *The developmental psychology of Jean Piaget*. New York: Van Nostrand Reinhold) and the present research required them to coordinate multiple pieces of information, the notion of "limited cognitive capacity" in children also received systematic assessment. For this second purpose, developmental changes in information utilization and nature of order effects were systematically examined. If children are indeed of "limited cognitive capacity", then they should not utilize all given pieces of information in their judgments. Furthermore, they should give greater importance to information encountered later than those encountered earlier. That is, their judgments should show recency effects, and such a recency effect should decrease over age.

Experiment 1 (n = 120) studied prediction of exam performance with children of Kindergarten, Standard I, Standard II, Standard III, and Standard IV over three consecutive days. Information about motivation of the stimulus children came from mother and neighbor and information about ability came from two teachers. Results indicated that children were quite able to utilize all the four pieces of information in prediction of exam performance. More interestingly, their predictions were in
accord with the specifications of the averaging rule proposed by Singh and his associates. Experiment 1 thus replicated the findings of Gupta and Singh (1981) and extended their averaging result to younger children. No less important, it challenged the notion of "limited cognitive capacity" in children.

Experiment 2 (n = 96) studied prediction of performance in puzzle and music competitions by children of Standards IV and VIII. For prediction of performance in puzzle competition, the results were similar to those in Experiment 1. Prediction of performance in singing competition had the linear fan pattern at the level of Standard IV but parallelism pattern at the level of Standard VIII. This result is contrary to those reported in the United States. Again, results pertaining to information utilization and order effects were not supportive of the hypothesis of "limited cognitive capacity" in children.

Experiment 3 (n = 144) required children of kindergarten and Standards II, IV, VI, VII, and XI to predict performance in singing competition. The main result of this experiment was that integration rules underlying prediction of performance in music competition undergo several developmental changes. Predictions by children of Standards II and IV conform to the multiplying rule; predictions by
children of Standards VIII and XI satisfy the requirement of an adding-type rule; and predictions by children of Kindergarten and Standard VI represent a transition. Whereas Kindergarten children exhibit a transition from adding to multiplying, children of Standard VI exhibit a transition from multiplying to adding rule. Results related to information utilization and order effects were again contrary to the prescriptions of the hypothesis of the "limited cognitive capacity" in children.

Taken collectively, results from the present set of three experiments clearly indicate that cognitive algebra for prediction of task performance is linked with the nature of task and with developmental level of the subjects. Some tasks have just one causal schema, and prediction of exam performance appears to be one such task. On the contrary, there are some tasks which have multiple causal schemata. With these tasks, integration rules change as a function of age of the subjects. Prediction of performance in singing competition belongs to this second category of task. The results indicate that young children in India are able to utilize multiplying rule when they predict performance in singing contest. Bhargava's (1983) assertion that multiplying rule develops in India around the age of 20 years is thus attributable to the nature of life performance task and not to the age of subjects. Accordingly, the hypothesis
of an interaction between the nature of task and developmental level of judges appears to have received a reasonably good support in the present work.

Success of the hypothesis of interaction between nature of task and age of subjects brings a qualification on the generality of the cultural difference hypothesis. Bhargava (1983) found that 20-year-olds predict life performance by multiplying rule; present results show that primary and middle school children (i.e., 4-9-year-olds) also follow multiplying rule in prediction of singing performance. This means that the parallelism pattern predicted by the cultural difference hypothesis is true with only high school and undergraduate college students in India.

Perhaps the period of high school and undergraduate college education is a period of **optimism and idealism** in India, for these students believe that effort (trying) is equally effective with persons of low to high ability. In other words, each person regardless of his or her native ability has equal opportunity to improve upon his or her lot by virtue of trying. This outlook reflects on the egalitarian attitude of this adolescent group of boys and girls in India.
Comparable groups of students in the United States seem to follow the multiplying rule in prediction of exam performance, puzzle performance, and athletic performance. The cultural difference hypothesis thus appears to be a reasonable explanation for the differences in pattern in Motivation x Ability effect. It should also be noted that the present results raise serious doubt on the plausibility of the task-difficulty hypothesis (Surber, 1981a, 1981b) for the emergence of fan and parallelism patterns in Motivation x Ability effect.

Intuitively, it is appealing to believe that young children are of limited cognitive capacity. But the results of the present research question this notion. Kindergarten children utilized four pieces of information efficiently in their judgments. Also, they paid equal attention to motivation and ability information irrespective of the order in which they were presented. More importantly, their judgments conformed to the precise requirements of various cognitive algebra. These results portray young children as a "highly adaptive information processor" contrary to what they are commonly believed to be.

This conception of children as highly adaptive information processors emerged primarily because of the penetrating approach provided by information integration theory (Anderson, N.H. (1981). Foundations of information integration theory.