GENERAL DISCUSSION

Main Findings

Averaging rule. The first main finding of the present research is that school teachers average information about motivation and ability when they predict performance of high school students. The same averaging rule was used in all the three task conditions, namely, exam performance, competition performance, and life performance. Such a consistent evidence for averaging rule lends support to the major hypothesis of the present research that occupational role of people determines their causal conception about how motivation and ability determine performance. This lends support to the role theory which states that role enactment produces changes in identity and in significant aspects of belief and attitude.

What does the averaging rule imply about the causal schema of school teachers? The averaging process basically reflects on the compensatory causal schema and multiple sufficient causation. That is, performance can be produced by either motivation or ability, and the two factors are compensatory. In other words, one can compensate for other; they are not necessary as Haider (1958) assumed.

The compensatory notion about motivation and ability reflects on the egalitarian value prevalent in Indian
society (Singh, 1981). The idea that motivation can compensate for the ability means that resources in society do not have to be allocated on the basis of only the capability or potentiality. By virtue of trying, one can always make up for the deficiency in the capability.

**Set-size effect.** One of the more reliable findings in person cognition is set-size effect. This effect refers to more polar response to a set with more than less information (Anderson, 1965, 1967). The explanation for this effect is averaging of a general initial opinion along with the given information.

In Experiments 1 and 2, set-size of motivation information was manipulated. Experiment 1 yielded no set-size effect. Experiment 2 obtained a weak set-size effect, and that was restricted to only positive information conditions. It seems that subjects do not have initial opinion about motivation or else they do not give any weight to initial opinion about motivation. In either case, it is clear that teachers are more influenced by the external sources of motivation than their subjective opinion.

**Initial opinion of ability.** Experiment 3 manipulated reliability of motivation and ability information. Manipulation of reliability of motivation did not produce any reliable effect. This result also agrees with the results mentioned
above that teachers give no or negligible importance to initial opinion of motivation.

In case of ability, however, strong effect of information reliability was found. Ability information was more effective when it came from a source of high reliability than low reliability. Furthermore, the Reliability x Value of ability information had semi-linear trend. As already noted, such a trend implies that subjects had non-zero initial opinion of ability. Accordingly, the general averaging model was revised by replacing the general initial opinion term with the initial opinion about ability.

**Positivity effect.** Although the set-size and reliability of motivation information had negligible or weak effect or judgments, there were indications for a positivity bias in teachers. Both factors had produced an effect at the level of positive information. That is, as the number of positive information increased, judgment became more positive. Reliability of information also produced similar effect. Credibility of source was more effective at the positive level of the information than at the negative level.

Considered together, these results suggest that school teachers care for amount and reliability of information only when information is positive. In negative conditions, one piece of negative information even from an undependable source is enough to make them negative toward stimulus student.
Within integration theory, this positivity bias actually reflects on a reduced weight for positive information. A negative piece of information carries so much weight that neither set-size nor information reliability is considered at all. Since positive information carries lower weight, more positive information is required before rendering any judgment. This means that teachers are more skeptical of positive than negative information.

Lack of imputation about missing information. When needed information is not available for judgment, it is natural for the subjects to infer some value information. Imputation about missing information has been found in a number of information integration tasks (Singh, in press). Therefore, nature of imputation was studied in Experiments 1, 2, and 4. All three experiments obtained evidence against any imputation. Teachers rendered their judgment on the basis of only the information given.

The above result is not surprising. The first finding of averaging rule implies a multiple sufficient causation. So it is possible to predict performance from just one of the two; both are not necessary. As information about motivation alone or ability alone was enough for prediction of performance, school teachers did not infer any value for missing information.
Task affects weighting pattern. Experiment 1 and 2 which studied exam and competition performance obtained evidence for the parallelism pattern in Motivation x Ability effect, whereas Experiments 3 and 4 obtained evidence for an approximate fan pattern. Since improved distinguishing tests between alternative rules confirmed the averaging rule but informed the alternative multiplying rule, it is reasonable to say that nature of task affected the weighting pattern, not information integration. Prediction of performance in examination and competition invoke equal weighting, whereas prediction of life performance invokes differential weighting. Nature of task thus affects valuation of information and not information rule per se.

Summary. The six findings of the present research bear upon the causal schemata of school teachers. Evidence for the averaging rule in prediction of performance has been useful in analysis of schemata for information valuation, imputation about missing information, and source effects. Equally important is the result that teachers have non-zero initial opinion about ability, and that they average it along with the external information given for judgment.

Implications

Results of the present series of experiments have some implications for the hypotheses for cultural difference, task
difficulty, nature of task, and role of subject which have been advanced to account for the emergence of adding, averaging, and multiplying rules in prediction of performance. These implications are briefly discussed below.

**Hypothesis of cultural difference.** Because American studies obtained evidence for linear fan pattern and Indian studies (Gupta & Singh, 1981; Singh et al, 1979) obtained evidence for parallelism pattern, a hypothesis of cultural-difference appeared to be reasonable (Singh, 1981). Subsequent studies indicate limitation of this hypothesis.

Surber (1980) obtained evidence for averaging rule with American college students. Bhargava (1983) found evidence for multiplying rule in prediction of life performance after the age of 20. Srivastava (1984) demonstrated multiplying rule in prediction of singing performance with children up to 11-years of age. She argued, therefore, that the cultural difference hypothesis is restricted to high school and under-graduate college students only.

Results presented in the present dissertation question the suggestions made by Bhargava and by Srivastava. In all the four experiments, subjects were at least of 22 years 10 months of age. Nevertheless, they followed the same averaging rule in prediction of performance in exam, competition, and life. This result extends the generality of the cultural difference hypothesis from student to teacher population.
In one experiment by Singh and Bhargava (1982 a), college lecturers had predicted performance in a college examination of extremely high difficulty. The factorial plot of the Motivation x Ability effect had the parallelism pattern. This pattern can be interpreted as supportive of both averaging and adding rules. On the basis of the results of the present research, however, it may be speculated that college lecturers also follow an averaging rule in prediction of college performance.

Hypothesis of task difficulty. Surber (1981 b) presented evidence that converging, parallelism, and fan patterns in the Motivation x Ability effect can be produced by specifying the task as easy, moderately difficult, and extremely difficult. In the present research, there was no specification of task difficulty at all. In Experiments 3 and 4, all the persons were described to have all opportunity for growth. Nevertheless the life performance task obtained evidence for an approximate fan pattern. These results along with the results presented by Singh and Bhargava (1982 a, 1982 b) clearly refute the hypothesis of task difficulty.

Hypothesis of nature of task. Bhargava (1983), Singh and Bhargava (1982 a, 1982 b), and Srivastava (1984) have suggested a third hypothesis of nature of task for the emergence of the parallelism and fan patterns in the Motivation x Ability effect. Srivastava has argued that nature of task determines rule at early age. Bhargava has argued that nature of task determines rule after the age of 20 years.
Results of the present research create complications for both interpretations. In Experiments 2 and 3, Srivastava included no distinguishing test between alternative rules. Her interpretation of the change in rule is thus tentative. In fact, evidence for averaging rule in prediction of exam performance in her Experiment 1 suggests that the divergence trend found in prediction of singing performance can also be accounted for by a differential weight averaging. If her results of parallelism and fan patterns are interpreted in terms of differential weight averaging, then nature of task becomes operative only in managerial population (Bhargava, 1983).

As the subjects of the present research were drawn from a relatively mature group of teachers, no evidence for the effect of nature of task on integration rule raises doubt against the hypothesis of nature of task. Subjects who had followed multiplying rule in prediction of life performance (Bhargava, 1983; Singh & Bhargava, 1982 b) were from a population of prospective managers. It is likely, therefore, that nature of task makes difference only in managerial population and is not a general explanation for the emergence of different patterns in the Motivation x Ability effect.

Hypothesis of role of subject. The main contribution of the present research is a demonstration that role brings uniformity in integration rule that people follow in prediction
of performance. Since all subjects were school teachers, strong evidence for the averaging rule argues that the teaching profession has caused emergence of this rule. This hypothesis cannot account for all the existing data. Nevertheless, it argues that role of subjects may be an important determinant of their causal schemata.

The present research is only a beginning of the role hypothesis. If it has any merit, it should hold true with subjects of other occupational roles also. Further research is, therefore, needed, using subjects from various professional groups.

Further Work

Caution in distinguishing test between adding and averaging. Consider the six descriptions of stimulus persons. The first three have Low (L), Moderate (M), and High (H) values of ability paired with a moderate value of motivation. The second set of three descriptions have the very three levels of ability but are paired with three moderate pieces of motivation information. According to the averaging hypothesis, the curve based on second set of descriptions would have a shallower slope than the curve based on first set of descriptions. If it does not happen, then underlying integration rule may be interpreted as adding.

Findings of Experiments 1 and 2 suggest a caution in such an interpretation. The prediction of slope difference
would hold true only if subjects considered the first set of descriptions consisting of two pieces of information and second set of descriptions consisting of four pieces of information. If number of pieces of motivation informations is ignored as results of Experiments 1 and 2 suggested, then both sets of descriptions would produce identical curve. No difference in the slope of the two curves is thus not attributable to the adding rule but to the differential processing of motivation cues. In future research, distinguishing test based on the logic of two-operation model (Singh, in press) should be prepared.

More work on teachers. In his review of status of educational psychology in India, Buch (1972) laments that much of the research in education is of "poor quality" (p. 103). The Second survey of research in psychology in India (Pareek, 1981) has only 6-page coverage of research in class room interaction and does not touch upon the attitudes and values of teachers. Even for general research in psychology, there is no proper use of any of the existing theoretical frameworks (Mukerjee, 1980).

The present research applied a theoretical framework to teacher cognition, and it represents a modest beginning of a systematic work on person cognition by school teachers. Many variables remain to be studied. They include sex, caste and religion of students as well as experience, education, and area of specialization of teachers. Indian schools vary
widely in the quality of education, and there are municipal, state government, central government, and missionary schools. The type of causal schemata the teachers of these school possess would directly affect their behaviors toward students. It is imperative, therefore, that a systematic study of teacher cognition be initiated. The present research illustrates the analytic power of information integration theory for such a research.

Concluding Comments

In his review of literature on psychological theory and research methods in India, Mukerjee (1980) noted,

"... a general impression that one is likely to get from reviewing published Indian studies on psychological research techniques ... is that much of it is trivial and much of it is methodologically deficient. This is so because most studies do not show much rigour in term of precision of measurement, in drawing appropriate inferences regarding the causal factors underlying the phenomenon studied and also in terms of accuracy of generalization in addition to neglect of a proper conceptualization (p. 4)"

He further notes that there is disregard for appropriate theoretical framework, neglect in the preparation of a well-defined study design, failure in drawing proper samples for study, and defective operationalization and measurement in psychological research in India. Mukerjee suggests that there is a need for a relevant theoretical framework as a tool for guiding research.
Last decade has seen a change in psychological research in India. Pandey's (1981) *Perspectives on experimental social psychology in India* reports a number of experimental studies which not only considered causal analysis but also tested theoretical models. Singh and his associates (Bhargava, 1983; Gupta & Singh, 1981; Singh, 1975, 1977, 1978, 1982, 1983; Singh and Bhargava, 1982 a, 1982 b; Singh, Bohra, & Dalal, 1979; Singh et al, 1979; Singh, Sidana, & Saluja, 1978 a, 1978 b; Singh, Sidana, & Srivastava, 1978; Srivastava, 1984) have done several studies of social cognition within the framework of information integration theory. These studies have detected interesting cross-cultural and developmental differences not only in integration rules but also in information processing. The present research was performed within the same tradition. It illustrates a successful application of a theoretical framework in analysis of achievement judgments by teachers.