CHAPTER 4

EXPERIMENT 3

Experiment 1 and 2 found evidence for the parallelism pattern in Motivation x Ability effect. This result may be because of the very nature of the task or because of the subject population of teachers. Therefore, Experiment 3 employed a new task, prediction of life performance, which has been found to obey the multiplying rule with subject above 20 years of age (Bhargava, 1983; Singh & Bhargava, 1982 b).

Experiment 2 demonstrated set-size effect of the positive motivation information. That is, three positive opinions produced more extreme response than one positive opinion. Experiment 3 manipulated reliability of both motivation and ability information to check whether sources of information matters in positive conditions alone.

Because both the multiplying rule and differential-weight averaging rule predict a similar linear fan pattern in Motivation x Ability effect, manipulation of information reliability allows a distinguishing test between the two rival rules. If the averaging rule (Anderson, 1981; Surber, 1981 a) holds, then as the reliability of one type of information would increase, the relative-weight and the relative effect of another type would decrease. Motivation information will, therefore, be more effective when the ability information
will come from a source of low than high reliability. If motivation and ability are multiplied, however, then an increase in weight of information of one type would also increase the effect of information of another type (Singh, in press).

Method

Stimuli and Design

Stimulus descriptions were prepared in much the same way as in previous experiments. Each card listed motivation, source of motivation information, ability, and source of ability information. Descriptions were constructed from a $3 \times 3 \times 3 \times 3$ factorial design. All the stimulus persons were described to have all opportunity for growth.

Motivation was defined by the frequency of serious effort the stimulus person puts on any assigned task, and it was described as never, very rarely, once in a while, sometimes, quite often, very often, and always. Ability was defined as intelligence, and it was described as extremely low, very much below average, below average, average, above average, very much above average, and extremely high. The three levels of serious efforts on task were very low (Lo), sometimes (MOD), and very high (Hi), and the three levels of ability were very much below average (VBA), average (AV), and very much above average (VAA).
Information about motivation and ability of stimulus students were known from different teachers who had known the stimulus persons for one week, one year, and five years. This manipulation of length of contact were intended to vary weight of information and thereby to distinguish between multiplying and differential-weight averaging rule.

In addition to the main set of 81 descriptions, there were nine filler descriptions. They were based on levels more extreme and other than those used in regular descriptions mentioned earlier. These descriptions were to serve as end anchors and to orient the subject to use the response scale in a uniform manner (Anderson, 1982). There were 15 practice examples also. They included all the nine filler descriptions plus six from the main set of descriptions.

Procedure

The general procedure was similar to that in previous experiments. A typed sheet of instructions described the nature of task and the role of subject. The task was introduced as dealing with prediction of life performance of some Standard X students. Subjects were urged to assume that each student would enter into a profession, and that life performance would mean how high the student will go in that profession. It was also emphasized that prediction of life performance would be based on whatever motivation and ability of the stimulus student had at the moment.
As already indicated, the reliability of information was manipulated by varying the length of contact between the student and the teacher. It was emphasized to the subjects that teachers had contact of one week, one year, or five years with the student. Opinions from those sources varied in dependability from low to high. The subjects were urged to consider not only the value of motivation and ability but also the source from which they were obtained.

After reading the instruction sheet twice, each subject worked with the practice examples. He (she) read the information typed on the card and predicted how high the stimulus person would go in life. This prediction was made along the same 21-step ladder used in the previous experiments.

After practice session, the main points were summarized by the experimenter. All queries about the task were answered. Finally, each subject rated the main set of cards one by one over two trials of judgment in different shuffled order. Data from both trials of judgments were coded and analyzed.

Immediately after the data collection, the experimenter described the general purpose of the experiment. She also thanked the subjects for their cooperation in the experiment.

Subjects

Eighteen male and 18 female teachers drawn from six Central Schools of Delhi (Kendriya Vidyalaya, R.K.Puram, Sector IV; Kendriya Vidyalaya, R.K.Puram, Sector VIII;
V. Kendriya Vidyalaya, Janakpuri; Kendriya Vidyalaya, Jharuda Kalan; Kendriya Vidyalaya, I.N.A. Colony; and Kendriya Vidyalaya, Cantt.1) served as subjects. The mean age was 35 years 3 months 5 days with a range 31 years 2 months to 50 years 7 months. Each subject spent approximately one hour and 30 minutes on the task.

Results

Data were analyzed by a 2 x 2 x 2 x 3 x 3 x 3 x 3 analysis of variance (Sex of subject x Order of presentation x Trials of judgments x Motivation x Reliability of motivation information x Ability x Reliability of ability information). The first two factors were subject classification factors, the remaining five had repeated measurements. The analysis of variance is given in Appendix D. Only the main results will be presented in this section.

Four-way Factorial Plot

Figure 5 presents mean life performance as a function of motivation (curve parameter) and ability (listed on horizontal axis) under the nine conditions of information reliability. Three trends emerge very clearly from Figure 5. First, the nine graphs have a tendency to diverge toward the right. That is, motivation has been perceived to play more effective role in life performance when the stimulus student was very much above average in ability than when he was very much below average in ability.
Figure 5. Mean life performance as a function of motivation and ability of stimulus students under nine conditions of information reliability. The abbreviations VBA, AB, and VAA refer to Very much below average, Average, and Very much above average levels of a factor, respectively. Data from Experiment 3.
This divergence trend was statistically reliable, for Motivation x Ability effect was highly significant, $F(4,128) = 110.83$. Partition of this interaction effect into Linear x Linear, Linear x Quadratic, Quadratic x Linear, Quadratic x Quadratic trends yielded $F(1,35) = 132.69, 23.73, 44.04, \text{ and } 0.20$ in order. According to the multiplying rule, the entire Motivation x Ability effect should reside in the Linear x Linear trend. Presence of Linear x Quadratic, Quadratic x Linear casts doubt about the plausibility of the multiplying rule.

Second, effect of reliability of motivation seems to be minimum. The vertical spread of the curves in the left, center and right panels at each of the three levels of reliability of ability is about the same. This means that source of motivation information did not play much critical role in prediction of performance. In statistical analysis, however, effect of motivation reliability was present at the level of very much above average. This result agrees with the previous results that teachers are more sensitive to sources of positive information about motivation than to those of negative and average information.

Finally, there is a strong effect of reliability of ability information on prediction of life performance. Look at the three graphs at any level of the reliability of motivation information. The slope of the curves has a tendency to increase
as we move from the top to bottom layers because reliability of ability information increases in the same way. There is also a strong tendency in the reliability of ability information to reduce the effectiveness of motivation information. The vertical spread of curves is greater when ability information is low in reliability than when high in reliability. This result is consistent with the averaging rule and contrary to the prescription of multiplying rule.

Three-way Factorial Plot

The interpretation made above emerges very clearly from the three-way factorial plot of the Motivation x Ability effect under the three conditions of reliability of ability information. Results are shown in Figure 6.

The curves of the three panels have systematic increase in the steepness of their slopes. On the contrary, the vertical spread of the curves has a systematic tendency to decrease as reliability of ability information increases. Increase in effectiveness of ability information and decrease in the effectiveness of motivation information as a function of reliability of ability information indicate that subjects predicted life performance by the differential-weight averaging rule.

The other three three-way interactions were also statistically significant. Their factorial plot, however, did not indicate as clear evidence of averaging as the factorial plot.
shown in Figure 6. They are thus not included in the main
text.

Revised Averaging Model

The general averaging model (Equation 2) can be revised
as follows:

\[
\text{Life Performance} = \frac{\bar{w}_M M + \bar{w}_A A + \bar{w}_O A_O}{\bar{w}_M + \bar{w}_A + \bar{w}_O}.
\] (9)

This equation is different from the general averaging model in
just one respect. The general initial opinion has been replaced
by the initial opinion of ability.

Inclusion of initial opinion of ability predicts that
integration of reliability and value of ability information
may follow either a multiplying rule or a semin-linear rule
depending upon the value of initial opinion. If \( A_O = 0 \) and
\( \bar{w}_O \neq 0 \), then the relationship between reliability and value
of ability information would become multiplying. The inter­
action effect would, therefore, reside in just the Linear x
Linear trend. However, if \( M_O \neq 0 \), then some higher-order
trends will be present in the interaction effect.

Figure 7 presents two-way factorial graphs for reliability
and value of information. In the left graph, as the reliability
of ability information increased, the effectiveness of ability
information also increased. In trend analysis of the interaction
effect, the Linear x Linear, Linear x Quadratic, Quadratic x
Figure 7. Factorial plots of Reliability x Value of Ability Information and Reliability x Value of Motivation Information effects from Experiment 3.
Linear, Quadratic x Quadratic trends yielded $F(1,35) = 441.98, 16.50, 93.35, \text{ and } 0.01$ in order. Presence of higher order trends suggests that the initial opinion of ability had non-zero value.

The graph of the right side of Figure 7 shows profile of Reliability x Value of motivation information. Except at the very much above average level of motivation, there is no systematic effect of motivation reliability on effectiveness of motivation information. In trend analysis, none of the four trends was statistically significant. Accordingly, it may be said that subjects did not have any initial opinion about motivation.

Discussion

There are three main findings of Experiment 3. First, prediction of life performance by teachers conforms to an approximate fan pattern. This pattern is caused by the differential-weight averaging and not the multiplying rule. Bhargava's assertion (1983) that multiplying rule develops in India by the age of 20 is thus questionable. It seems that background of the subject plays an important role in the rule they follow in prediction of life performance.

Second, reliability of motivation information produced effect only when the information was positive. In Experiment 2 also, it was found that number of sources matters only when
information is positive. Taken together, these results indicate that school teachers consider number of sources and reliability of sources only when the motivation information is positive in nature. This tendency may be called positivity schema.

Finally, teachers seem to have a non-zero initial opinion about ability. They process external information about ability by averaging their initial opinion of ability. It was appropriate, therefore, to replace the general initial opinion of averaging model by the initial opinion of ability.

As conclusion, it may be stated that teachers predict life performance by an averaging rule. Their information processing differs markedly from that of other groups of subjects (Singh & Bhargava, 1982 a, 1982 b).