Combining personal and outside opinions: An information integration analysis*

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Each of 37 college students was asked to rate and indicate how many times he had seen each movie in a list of 54 popular old movies to be used for assembling a college film festival. The student was then shown a set of ratings said to have been supplied by a committee selecting movies for the festival. Finally, he was asked to rerate each movie, giving the rating each movie would receive if he himself were added to the selection committee. Results supported a weighted average model in which the weight of a person's initial rating on the composite rating was assumed to increase with the number of times he had seen the movie, and the weight of the committee's rating was assumed to increase as a function of the number of committee members reported to have seen the movie.

This paper describes a study of how people consider the opinions of others when making decisions. The task required the participant to rely in part on his personal evaluation of the situation and in part on the evaluation by others. This is considered to be a form of information integration and was analyzed accordingly.

The particular task chosen follows the renewed interest in nostalgia on today's college campuses. Prominent within the nostalgia movement is a rediscovery of the movies of previous decades. On campus after campus, pallid-faced Bela Lugosi again proclaims, "I am Dracula," Humphrey Bogart relentlessly pursues the elusive "Maltese Falcon," "King Kong" climbs to the top of the Empire State Building clutching the beautiful Fay Wray, and Buster Crabbe braves the perils of outer space as "Flash Gordon."

Ratings of popular old movies such as these for a campus film festival were used as a vehicle for studying how people combine their own opinions with those of others. College students were asked to combine their personal ratings with the ratings of a hypothetical committee to select films for a festival. Averaging theory predicts that the students will average their personal rating of a given movie with the committee's rating by differentially weighting each of these two ratings. (See Anderson, 1971, for a discussion of models of this type applied to attitude change.) The weight or influence of the personal rating should depend on the person's familiarity with the movie, as indexed by the number of times he reports having seen the movie. The weight of the committee's rating should vary as a function of its perceived credibility, as manipulated by the number of committee members said to have seen the movie.

Previous studies have manipulated factors affecting the weight of information supplied by outside sources. These include specification of sources differing in credibility (Rosenbaum & Levin, 1968) and the designation of multiple vs single sources of information (Himmelfarb, 1972). Kaplan (1973) has shown that individuals differ in their initial dispositions or response tendencies, and these are averaged with the value of the information presented. The greater the experimentally produced impact of the information presented, the less the effect of the person's initial disposition. The present study is the first to investigate simultaneously factors that affect the degree to which a person weights his own opinion and factors that affect the degree to which he weights information presented by outside sources.

METHOD

Twenty students from introductory psychology classes at the University of Iowa and 17 students from introductory psychology classes at the University of California, San Diego, agreed to participate. Students were asked to volunteer only if they had a familiarity and interest in movies of the 1930s, '40s, and '50s.

A list of 54 motion pictures was chosen from among the most popular films of 1931-1958, and included stars and titles dear to the heart of any true movie buff (including the author). In addition to those already mentioned, the list included W. C. Fields in "The Bank Dick," Orson Wells in "Citizen Kane," Gary Cooper in "High Noon," Edward G. Robinson in "Little Ceasar," Tyrone Power in "The Mark of Zorro," Clark Gable in "Mutiny on the Bounty," and the Marx Brothers in "A Night at the Opera." Accompanying the list was a booklet giving the stars, the year of release, and a brief description of each movie.

Ss were shown an alphabetical list of the movies and their descriptions. They were told to suppose that their university was planning a festival of old movies and that about half of those on the list could be included. They were asked to give their recommendations concerning the movies that students would most enjoy seeing. A rating scale of +10 to −10 was employed. Ss were told to assign a positive number to movies they thought should be included and a negative number to movies they thought should not be included, and that the more strongly they recommended that a movie be included or excluded, the more extreme should be the number they assigned. In addition, they were asked to record on their rating sheet, to the best of their memory, how many times they had seen each movie.

Ss worked at their own pace and returned the completed rating sheet to the E. They were then given a new sheet supposedly showing how each movie was rated by a committee of three upperclassmen who had volunteered to select movies for the film festival because of their interest and experience with movies of that era. They were told that each movie had been seen by at least one of the committee members and was rated following discussion by the members. In addition to the committee's rating of each movie, the sheet given S told how many of the committee members had seen the movie.

The committee ratings were programmed as follows: All rating values between +1 and +9 and between −1 and −9 were represented and were paired with the number 1, 2, or 3, indicating the number of committee members having seen the

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Table 1
Mean Proportional Change Scores

	Number of Committee Members Seeing Movie (n_c)			
n_p*	1	2	3	Mean
0	.73	.76	.80	.76
1	.63	.74	.78	.72
2 or more	.55	.60	.65	.60
Mean	.64	.70	.74	.69

**Number of times participant has seen movie.*

movie. One movie was assigned at random to each of the 54 combinations. Half of the students received this assignment, and the other half received the same values except the sign of the rating was reversed for each movie.

Finally, Ss were given a new rating sheet and were instructed to rerate each movie on a +10 to −10 scale. This rating was to be based on S's prediction of what the committee's new rating of each movie would be if S himself were added to the committee and allowed to participate in the committee rating. (Note that S was not asked to change his rating on the basis of the committee's rating. Rather, he was asked to *combine* his personal rating with that of the committee.) For this part of the task, S was again allowed to consult the movie descriptions and was specifically told to refer to the sheet giving the committee's ratings and the number of committee members having seen each movie. He was not, however, allowed to consult his own previous ratings.

RESULTS

Proportional change scores were computed by taking the difference between S's final (composite) rating and his initial rating and dividing this difference by the difference between the committee's rating and S's initial rating. The closer the composite rating is to the committee's rating, the closer to 1.0 is the proportional change score. A proportional change score was computed for each movie except ones for which S's initial rating and the committee's rating were within 1 point of each other.

Scores for individual movies were classified in terms of the combination of number of times S had reported seeing the movie, n_p, and the number of committee members said to have seen the movie, n_c. This results in the 3 x 3 classification shown in Table 1. For each S, a mean proportional change score was computed for each cell of the table, except when no movies fell into a particular cell. Standard statistical procedures were used to estimate missing scores, but these occurred only 10 times out of a possible 333. Table 1 gives the mean proportional change score, averaged over the 37 students from the two universities, for each cell.

The mean proportional change score is greater than .50 in each cell, indicating that Ss' final composite ratings were closer to the committee's ratings than to their own personal ratings. Means can be seen to vary systematically as a function of n_p and n_c. Within each column, the mean score decreases as n_p increases. Across each row, mean scores increase as n_c increases.

Analysis of variance revealed that n_p and n_c were each significant sources of variance, $F(2,72) = 40.12$ and 8.99, respectively, $p < .01$ in each case. The interaction of these two factors did not approach statistical significance.

DISCUSSION

The present results indicate that people are capable of combining in a systematic fashion their own personal ratings and the ratings of others. Specifically, one can infer from the analysis of proportional change scores that the final composite ratings are increasingly closer to the committee's ratings as the number of committee members reported to have seen the movie is increased, and the composite ratings are increasingly closer to S's initial ratings as the number of times S has seen the movie increases. The mean composite rating was closer to the committee's rating than to S's initial rating. This is particularly interesting, since in some cases no more than one committee member was reported as having seen the movie, while S himself may have seen the movie several times. However, instructions stressed that all committee members participated in the discussion and rating of each movie, so the student evidently gave greater weight to an opinion coming from several people than to his own personal opinion.

It appears that Ss average their own and the committee's rating, weighting each factor as a function of the relative reliability or credibility of that factor. The greater the number of times S has seen the movie, the greater would be the degree to which he weights his own personal rating relative to that of the committee. The greater the number of committee members reported to have seen the movie, the greater would be the degree to which he weights the committee's rating. The present results thus appear consistent with those of earlier information integration studies showing that the weight of a given stimulus dimension varies directly with the reliability or credibility of that dimension (Himmelfarb, 1970; Levin, 1973).

A more formal test of the differential weighting hypothesis can be derived for the present data. Assume that S's final composite rating of a given movie, R_f, is a weighted average of his initial rating, R_o, and the committee's rating, R_c. A weighted average model would take the following form:

$$R_f = wR_c + (1 - w)\,R_o, \qquad (1)$$

where w and $(1 - w)$ represent the weights assigned to R_c and R_o, respectively, and are constrained to add to one.

Equation 1 can be used to derive the following prediction for the proportional change scores given in Table 1:

$$\frac{R_f - R_o}{R_c - R_o} = w. \qquad (2)$$

If w, the weight of the committee's rating relative to the weight of S's initial rating, is assumed to vary directly with n_c and indirectly with n_p, then Eq. 2 predicts the pattern of results observed in Table 1. It would be of interest to test the generality of models of this type across an important class of human information processing situations, namely those in which an individual's decision relies in part on his personal evaluation of the situation and in part on the evaluation by others.

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The enhancement of schedule-induced polydipsia by preschedule noncontingent shock*

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Eight food-deprived female albino rats, with electrode attachments to the back of their necks, were divided into two groups, a shock-before-schedule group and a no-shock-before-schedule group, with four Ss in each group. Ss were subjected to five successive experimental phases, during each of which individual water intakes were recorded for each 200-min daily session. The predicted result, that electric shock preceding the reinforcement schedule condition would lead to increases in water intakes, was generally upheld by the data. Increases in drinking associated with shock appeared to be a result of both increased frequency of drink bout initiation and a lengthening of the lick burst.

In early descriptions of schedule-induced polydipsia (Falk, 1961, 1964), naive rats which were receiving 45-mg food pellets on a VI 1-min schedule drank an average of 92.5 ml of water in a 3-h session, whereas the average 24-h water intake of a rat in the home cage was about 20-25 ml.

Segal & Oden (1965) proposed that excessive drinking in schedule-induced polydipsia (SIP) develops as a result of any one or a combination of determinants, including timing behaviors, adventitious reinforcement, a thirst state, and "emotional pacification," which may be akin to the anxiety assumed to underlie compulsive eating or drinking in humans. A great deal of research has been devoted to assessing the credibility of the first three of these possible explanations for SIP, but relatively little experimental investigation has been devoted to determining the role of emotional factors in the initiation and maintenance of SIP.

Although it may be difficult at first to accept the notion that excessive water intake may develop in organisms as a result of emotional arousal, various experiments have provided strong evidence that this may be the case. It appears that excessive drinking occurs, or is substantially enhanced, by raising monkeys in total isolation (Miller, Mirsky, Caul, & Sakata, 1969), exposing rats to a strange environment with or without shock (Moyer, 1965), and applying mild noncontingent footshock to polydipsic rats (Segal & Oden, 1969).

An explanation of these experimental findings may be that when an organism is exposed to conditions such as food deprivation, intermittent schedules of reinforcement, and other potentially aversive stimuli, an emotional state develops in the organism which produces an energization of the most highly probable response. In SIP, excessive drinking occurs because when the rat consumes food it is highly probable that drinking will follow, and this is the response which is energized. If SIP is an energization of the normal drinking response following food reinforcement due to some emotional state, the amount of drinking, as the indicator of the intensity of that emotional state, should be subject to change by altering the emotional state.

The purpose of this experiment was to determine if an intensified emotional state, induced by an intermittent presentation of food, can be further increased by the additional stress of electric shock, as would be indicated by an increase in the amount of drinking during a shock-plus-intermittent-schedule phase, relative to the usual polydipsia situation without shock.

METHOD

Subjects

The Ss were eight naive female albino Dublin SDD/DR rats, approximately 120-150 days old. The animals were individually housed under conditions of constant illumination, temperature, and humidity. During the experiment, the Ss were maintained at 80% of their free-feeding weights, with water freely available in

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