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A Behavioral Choice Model Analysis of the Budget Allocation Behavior of Academic Deans[1]

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A model of behavioral choice based on expectancy theory was tested in the context of budget allocation decision making by academic deans. Hypotheses dealing with both the direction and magnitude of the criterion behavior received moderate support. Two methods of scaling outcome affect led to similar results. Weighting expectancy by affect did not account for greater criterion variance.

Behavioral choice models based on expectancy theory have been investigated extensively in recent years. Vroom (1964) is credited with stimulating the development of expectancy theory in the area of organizational behavior. (See Lawler, 1971, for a description of similar theoretical models in other areas of psychological research.) A number of reviewers (Wahba & House, 1974; Mitchell, 1974; Locke, 1975) have described expectancy theory as the most widely accepted theory of work and motivation among today's industrial and organizational psychologists. These authors also noted a number of significant conceptual and methodological issues in expectancy research.

In perhaps the most comprehensive review of expectancy theory research, Mitchell (1974) distinguished between the valence model and the force or behavioral choice model. He further distinguished between behavioral choice models intended to predict and understand job effort and behavioral

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choice models intended to predict and understand behaviors other than effort. Mitchell found that the most frequently tested example of the behavioral choice model was the job effort. model.

If the behavioral choice model is to be offered as a *general* model of individual-level organizational behavior, it would seem imperative that additional research be directed toward not only the effort model but also toward a broader range of other behaviors. One of the objectives of the present study was to test the behavioral choice model with one such "other" behavior, the budget allocation behavior of academic deans.

The specific model to be tested is Vroom's (1964) force model. Symbolically,

$$F_i = \sum_{j=1}^{n} (E_{ij} V_j),$$

where:

F_i = the force on the person to perform, act i;
E_{ij} = the strength of the expectancy that act i will be followed by outcome j;
V_j = the valance of outcome j;
n = the number of outcomes;

The model is clearly a *choice* model. While the force associated with a given behavior may have some predictive value, conceptually and empirically, it is necessary to assess the force associated with *alternative* behavior or levels of a given behavior. [See Dachler and Mobley (1973), Mitchell (1974), and Schneider (1976) for a further discussion of this point with respect to performance-goals, effort-behavioral choice, and occupational choice respectively.]

Relatedly, the model is most appropriately conceptualized and tested in terms of an ipsative or *within-subject* design (Dachler & Mobley, 1973; Mitchell, 1974). An individual's chosen behavior is hypothesized to be the alternative with the highest force relative to the force of alternatives the individual considers. Between-subjects analysis of the force of a single alternative fails to recognize the ipsative nature of the choice process. The present study tests the force model in the context of a within-subject choice design.

This study also addresses a recurrent issue in expectancy theory research—the most appropriate means of operationalizing valence. Vroom (1964) conceptualized valence in terms of affective orientations toward particular outcomes. . . . the strength of a person's desire or aversion for outcomes. He distinguished between valence (anticipated affect) and value (actual affect). Mitchell (1974) noted some disagreement in the literature about how valances should be operationalized. He further noted the general absence of research comparing alternative valence scaling strategies. The

present study uses two alternative outcome affect scaling procedures, one intended to assess importance (value), the other intended to assess desire (valence).

Another issue is worthy of note. Any complete model of motivation and behavior should address not only *direction* of behavior but also *magnitude* or intensity of the behavior. The present study permitted assessment of both direction and magnitude of the criterion behavior.

Summarizing, the present study used a behavioral choice model based on expectancy theory to analyze an infrequently studied behavior, the budget allocation behavior of academic deans. The research design permitted within-subject analysis of the direction of choice as well as an analysis of the magnitude of the choice behavior. Finally, the research design permitted comparison of two methods for scaling outcome affect.

The ΣEV formula was used to analyze the budget allocation behavior of academic deans. It was hypothesized that the alternative with the highest force, as defined above, would receive the largest dollar allocation. Additionally, it was hypothesized that the greater the difference in the force between the alternatives, the greater the difference in actual budget dollars allocated between the alternatives. Finally, it was hypothesized that the composite variables incorporating the valence outcome affect scaling would be better predictors of the criterion behavior than would the composite variables incorporating the value outcome affect scaling.

METHOD

Subjects

A national sample of 41 new deans of colleges of business administration served as subjects. The group was attending the American Assembly of Collegiate Schools of Business conference for new deans. As a part of the conference, the deans participated in an experimental study designed to collect data on decision making of deans and to demonstrate the use of the behavioral research laboratory.

Measures

A list of 20 outcomes of potential relevance to academic budget decisions was used. The outcomes were generated from earlier college of business dean interviews. The outcomes included such things as: student employability in the job market; college visibility in the academic community; private financial support of the college; enhanced student enrollment; faculty unionization; HEW-EEO problems; enhanced AACSB evaluation, et cetera. The outcome list included potentially positive and negative items. However, all were worded in the positive, e.g., enhanced position regarding HEW-EEO requirements. This was done to facilitate the dual affect scaling

procedure used in this study and to simplify the expectancy summation procedure described later. However, it should be noted that the model does not require the use of only positively worded outcomes. [See Hackman and Porter (1968) and Mitchell (1974) for a discussion of positive and negative outcomes.]

The outcomes were scaled two ways. First, subjects rated each outcome on a five-point Likert scale of importance. The verbal anchors ranged from none to very great. [As Mitchell (1974) and others have noted, importance may be more akin to value than valence.]. The second outcome scaling procedure asked subjects to allocate 100 "emphasis points" among the 20 outcomes "in a manner consistent with the emphasis you think each outcome should have in your business school." This procedure was intended to tap the desire dimension inherent in the definition of valence. (As will be noted later, this may not have been the case.)

Expectancy is defined by Vroom as "A momentary belief concerning the likelihood that a particular act will be followed by a particular outcome" (1964, p. 17). The present study operationalized expectancy by asking subjects to rate, for each choice alternative separately, the probability that the alternative would contribute to the attainment of each of the 20 outcomes. The expectancy ratings used a four-point scale with verbal anchors ranging from none to considerable and numerical anchors of zero to three.

Two force indices (ΣEV) were calculated for each choice alternative. One force index was the sum of the cross products of the expectancy and importance ratings (F, imp.). The other force index was the sum of the cross products of the expectancy and emphasis ratings (F, emp.). Previous expectancy theory research has found that weighting act-outcome expectancies (or outcome-outcome instrumentalities) by outcome affect does not consistently account for greater criterion variance [see, e.g., Lawler and Suttle (1973), Dachler and Mobley (1973), Mitchell (1974), and Schneider (1976)] To assess this possibility in the present study, the sum of the expectancy ratings (ΣE), unweighted by outcome affect ratings, was computed for each choice alternative. Since the outcomes were worded in the positive, a straight summation of the expectancies is appropriate (Schneider, 1976).

Procedure

One day prior to the experimental session, the subjects evaluated the 20 outcomes using the affect scaling procedures. During the experimental session, the subjects were told that although budgets had been set, an additional $27,375.00 had just become available and could be allocated between departments A and B. Subjects were then exposed to two separate video taped budget request presentations by heads of departments A and B. To control the impact of the communicator, individuals giving the presentations, college professors, were matched on credibility and persuasiveness

through prior selection from a group of eight individuals in a pilot scaling study. Each presentation was matched on duration, number of points made, and the amount of time devoted to each point. The budget presentation of A was teaching oriented and argued for reduced student loads and increased administrative help to enhance teaching effectiveness. The budget presentation of B was research oriented and argued for reduced teaching loads and increased administrative help to aid in the conduct of research.

Following each budget presentation, subjects were asked to provide expectancy ratings regarding the probability that allocating available funds to the department just reviewed would contribute to attainment of each of the 20 outcomes. Finally, at the end of the experimental session, subjects were asked to allocate the $27,375.00 between departments A and B.

RESULTS AND DISCUSSION

Table 1 presents the outcome means and standard deviations for the two affect scaling procedures. There was some variance in the ratings of each outcome as well as variance in the means across outcomes.

TABLE 1

Means and Standard Deviations for Two Outcome Affect Scaling Procedures

Outcome	*Importance*		*Emphasis*	
	Mean	*SD*	*Mean*	*SD*
Student development	4.35	0.77	8.63	6.88
Visibility in academic community	3.95	0.78	5.63	7.62
Faculty effectiveness	4.68	0.62	9.54	6.09
Teaching effectiveness	3.30	0.88	2.88	3.54
Student employability in job market	3.73	1.01	5.22	4.74
Faculty support of Dean	3.20	0.91	2.73	3.09
Image in eyes of university administration	3.95	0.93	5.63	5.24
Private financial support	3.98	1.14	6.78	7.21
Faculty recruiting	4.33	0.89	12.05	17.86
Attraction of quality students	3.93	0.97	4.98	4.17
HEW-EEO requirements	2.88	0.88	1.24	2.20
Funded research support	3.56	1.08	5.05	4.85
Image in eyes of state government	3.60	1.10	3.49	3.77
AACSB evaluation	3.77	1.13	6.22	5.83
Faculty perceptions of MBO-based budgeting	3.30	0.97	2.44	3.18
Visibility in business community	4.10	0.71	7.02	5.39
Immunity to faculty unionization	2.58	1.13	1.29	2.29
Student enrollment	2.95	1.28	2.83	3.28
Relevance of educational process	4.05	0.78	5.20	4.48
Continuing education program	3.58	1.01	5.27	9.11

Table 2 presents the means, standard deviations, and significance of the pair-wise differences for the sum of expectancies, force based on the importance outcome affect scaling (F, imp.), force based on the emphasis scaling of outcome affect (F, emp.), and the dollar allocations. As can be

TABLE 2

Expectancy, Force, and Allocation Means and Standard Deviations

Variable	*Alternative*				
	A		*B*		
	Mean	*SD*	*Mean*	*SD*	*p(A-B)* [a]
Sum E	25.44	8.85	31.76	7.50	<.001
F, imp.	97.90	39.49	121.48	31.71	<.001
F, emp.	147.98	57.90	181.15	46.47	<.003
Dollar allocations	12,128.80	5,019.34	15,258.00	5,032.53	<.053

[a] Two-tailed test based on paired *t*-tests.

seen, department B had the higher sum of expectancies, the higher force using either the importance affect scaling or the emphasis affect scaling, and received the higher average dollar budget allocation.

The first hypothesis stated that the alternative with the highest force will receive the highest dollar allocation. This hypothesis was tested by using two 3 × 3 contingency tables for dollar allocation (1 = A highest; 2 = equal allocation; 3 = B highest) and force (1 = A highest; 2 = equal force; 3 = B highest). The contingency tables are presented in Table 3. Note that 16 subjects allocated the most dollars to department A, 22 to department B, and two subjects made equal allocations. As can be seen by inspection of the diagonals, direction of allocation was predicted for 27 of the 41 participants using the *F*, imp. index and for 30 of the 41 participants using the *F*, emp. index .The chi-square analysis for dollar allocation and force using the importance affect ratings (*F*, imp.) showed $p < .01$, contingency coefficient = .50. For dollar allocation and force using the emphasis scaling of affect (*F*, emp.), the analysis revealed $p < .01$, contingency coefficient = .57. The first hypothesis received moderate support in this analysis.

TABLE 3

Contingency Tables Between Alternative Receiving Highest Dollar Allocation and Alternative Having Highest Force Index (n = 41)

Dollar Allocation	*Force*					
	F, imp.			*F, emp.*		
	A highest	*Equal*	*B highest*	*A highest*	*Equal*	*B highest*
A highest	6	0	10	8	1	7
Equal	2	0	0	2	0	0
B highest	1	1	21	0	1	22

The second hypothesis stated that the greater the difference in force between the alternative departments, the greater the difference in actual dollars allocated between the two departments. (Since there were only two

alternatives and a fixed number of dollars in the present study, dollars allocated to A, dollars allocated to B, or the difference in dollars can be used as the criterion and will lead to correlations of identical magnitudes with only sign changing.) The correlation between the difference in force using the importance scaling (F, imp. A $-$ F, imp. B) and the dollar allocation criterion was .62 ($p < .01$). (Tests of significance were two-tailed.) The correlation between the difference in force using the emphasis scaling procedure (F, emp. A $-$ F, emp. B) was .51 ($p < .01$). Thus, the greater the difference in force using either force index, the greater the difference in dollar allocation in the predicted direction. The correlations using the different forces indices were not significantly different. This analysis offers some support for the second hypothesis, although accounting for 38 percent and 26 percent of the criterion variance is hardly strong support.

The correlation between the differences in the sum of expectancies, unweighted by affect ratings, and the dollar allocation criterion was .65 ($p < .01$). This correlation is slightly higher than either of the correlations using the force indices, although the differences in correlations were not statistically significant. As in previous research using the expectancy behavioral choice model, weighting by affect did not account for more criterion variance than the simple sum of the expectancies.

It is important to note that while the model and the chi-square analysis are within-subject, the correlations are across-subjects. However, the use of the differences in force or expectancies in the correlations gives recognition to the fact that it is the relative difference in force or expectancies among alternatives, rather than the absolute level for a single alternative, that is the conceptually relevant level of analysis.

Mitchell (1974) noted that although valence has been operationalized in a number of ways, there have been few comparative studies. The present study used two methods of operationalizing valence, a Likert scaling of outcome importance and an allocation of 100 emphasis points among the outcomes. As noted earlier, the contingency coefficient between dollar allocation and force using the importance scaling was .50; using the emphasis scaling the contingency coefficient was .57. The correlation between the dollar allocation criterion and the difference in force was slightly but not significantly higher when importance was used in the force calculation than when the emphasis affect scaling was used to compute force. The correlation between the two force difference scores using the alternative affect scales was .85. The average correlation (following r to z transformations) between the two force indices for each decision alternative was .76. The average within-subject correlation (following r to z transformations) between the importance ratings and the emphasis ratings was .75. When paired t-tests were run between the standardized force indices for each decision alternative the differences were not statistically significant. The results do not point to the clear superiority of either affect scaling pro-

cedure. It may be that the emphasis scaling did not tap a desirability dimension as intended and that both affect scaling procedures were assessing an importance dimension.

CONCLUSIONS

The expectancy based behavioral choice model was used to analyze both the direction and magnitude of the budget allocation decisions of academic deans. Evaluating the behavioral choice model with criteria other than effort is important if this model is to be offered as a general individual-level organizational behavior model. The results of this study indicated that the direction and magnitude of the choice behavior was partially understandable using this model. However, significant levels of criterion variance were unexplained, especially in view of the use of only two departments and the relatively short time between the expectancy ratings and collection of criterion data. The results were similar in magnitude to those summarized by Mitchell (1974) for both effort and other-than-effort applications of the model.

Weighting expectancy ratings by affect ratings did not account for more criterion variance than use of expectancies alone. This finding again calls into question the multiplicative assumptions of the model.

The two affect scaling procedures were highly intercorrelated and led to similar results when used in the force indices. It is probable that both affect scaling procedures were tapping the importance (value) dimension. Alternatively, the important conceptual distinction between importance (value) and emphasis-desire (valence) may be empirically unimportant. Clearly additional conceptual and empirical work is needed in the area of outcome affect scaling.

Finally, the present study used only two decision alternatives. While this is an improvement over the more frequently encountered single alternative test of the model, it is clear that a stronger within-subject design requires more decision alternatives.

Although the expectancy model may have broad acceptance, the results of the present study suggest that it accounted for only 25-30 percent of the criterion variance and that the multiplicative assumptions and affect scaling procedures remain problematic.

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