PARTICIPATION IN BUDGETING, LOCUS OF CONTROL
AND ORGANIZATIONAL EFFECTIVENESS

by

Peter Brownell

WP 1168-80

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ABSTRACT

This study examines the role of the personality variable, locus of control, as a moderator of the relationship between budgetary participation and managerial performance. The results of a laboratory study employing two separate subject groups — undergraduate accounting students and managers from a large manufacturing company — show a statistically significant interaction between participation and locus of control affecting performance. Budgetary participation was found to have a positive effect on individuals who feel they have a large degree of control over their destiny ("internals" on the locus of control scale), while having a negative effect on those individuals who feel that their destinies are controlled by luck, chance or fate ("externals" on the locus of control scale). The results are discussed and possible applications in the areas of job redesign and personnel selection and placement are considered.
Participation in Budgeting, Locus of Control and Organizational Effectiveness

The issue of participation in the budgetary process has occupied the attention of researchers in management accounting, perhaps to an extent greater than for any other budget-related variable. The findings from this line of research have been very fruitful in the area of cognitive consequences of participation. In a study of foremen in a large manufacturing company, Milani [1975] showed that participation was positively associated with attitudes toward both job and company and Collins [1978] found a similar association with attitude toward the budgetary system. In the area of job satisfaction, both French, Kay and Meyer [1966] and Cherrington and Cherrington [1973] report results which show a positive association with participation. Hofstede [1967] found that participation increased the "internalization" of budgeted goals thereby enhancing motivation, while French, Israel and As [1960] found that participation was positively associated with morale.

On the question of behavioral outcomes resulting from participation, in particular that of performance, the evidence is mixed. On the positive side, Argyris [1952] concluded that the key to effective performance is in gaining acceptance of budget goals and that participation plays a central role in accomplishing this. Becker and Green [1962] extended this conclusion by noting the key role of participation in inducing motivation. Bass and Leavitt, [1963] employing business managers and supervisors as experimental subjects, found a clear tendency for performance to be superior in the
experimental group which was more highly involved in target formulation. Kenis [1979] reached a similar conclusion in a survey study of department managers and supervisors, where he found participation positively and significantly associated with performance. Less convincing results on the question are due to Milani [1975], who found only a weak positive association between participation and performance. In a similar vein, Morse and Reimer [1956], who compared the effect of two change programs, one involving an increase in the level of participation, found an increase in performance in both programs which could not, therefore, be attributed to participation. Even contradictory results are to be found in the literature. In a laboratory setting, Bryan and Locke [1967] found a negative association between participation and performance and Stedry [1960] produced similar results, showing that a more authoritarian structure resulted in higher productivity. Commenting on a literature survey of the subject, Hopwood [1976, p. 79] provides the following capsule summary:

"While it appears that an increase in participation in decision making can often improve morale, its effect on productivity is equivocal at the best, increasing it under some circumstances but possibly even decreasing it under other circumstances. The practical problem is in trying to identify which conditional factors determine the wider impact of a particular type of participative management programme."

The purpose of this paper is to report the results of a laboratory study conducted to investigate the role of a personality variable, locus of control, as one "conditional factor", using Hopwood's term, in the relationship between budgetary participation and performance. The next section presents a review of the empirical evidence which supports the general proposition that the most fruitful framework within which to study the effects of participation on performance is one which includes
the role of "conditional factors". This is followed by a section which introduces the locus of control variable, develops a rationale for its relevance in the context of budgetary participation, and presents the hypothesis of the study. Sections presenting the experimental method, the results and the conclusions and limitations will follow in turn.

PREVIOUS LITERATURE

Few studies have been undertaken specifically to explore the proposition suggested above. Instead,

"Many researchers .... have been concerned with the broad overall problem of either proving or disproving the general argument (that participation is associated with improved performance) rather than specifying the conditions for various results". [Hopwood, op. cit., p. 79, parentheses added].

However, several influential studies, exploring the relationship at various levels of analysis, do provide support for the proposition.

The earliest evidence suggesting a more complex relationship between participation and performance is probably due to Coch and French [1948]. From a field investigation in a U.S. company, they found strong evidence supporting a direct link between participation and improved performance. In an attempt to replicate this result in a field study conducted in a Norwegian company, French, Israel and As [1960] could find no significant relationship between participation and performance. One explanation offered for these conflicting results was the different cultural setting, an important conditioning factor also suggested by Hofstede [1967, p. 281]. Hofstede concluded his extensive field study of budgeting practice in Dutch companies with the caveat that the "game of budget control (as he describes it) is a western game." [Parentheses added].
At the organizational level, Bruns and Waterhouse [1975] found that managers in decentralized organizations perceived themselves as having more influence, as participating more in budget planning, and as appearing more satisfied with budget-related activities than their counterparts in centralized organizations where the relative lack of emphasis on budgets and on participation in the process was viewed as being more appropriate. This suggests that organizational structure may be an important factor influencing the effectiveness of participation.

At the individual level, the role of reward structure as a conditioning variable was studied by Cherrington and Cherrington [1973]. In an experimental setting, they found that where participation in budgeting was low, rewards administered on the basis of aggregate output rather than budget-related output, led to higher performance. Conversely, under conditions of high participation, performance was clearly superior when rewards were linked to budget achievement. The findings support the intuitively appealing notion that budgets, if provided salience through a process of high participation, should logically provide a primary basis for performance evaluation of the members of an organization.

Finally, in the realm of personality variables, the now classic study by Vroom [1960], demonstrating the role of authoritarianism as a factor which conditions the relationship between participation and performance, is important. Vroom found that high participation was effective only for individuals who were low on the authoritarianism measure; individuals at the other extreme on this measure performed better under conditions of low participation.
In general, then, there are few empirical findings which support the view that the relationship between participation and performance is moderated by a variety of intervening variables. The Vroom study in particular may be taken as evidence of the potential of personality variables in this context. The present study is concerned with locus of control, another personality variable, and its effect on the participation-performance relationship.

LOCUS OF CONTROL

In an expository paper dealing with the locus of control dimension of personality [Rotter, Seeman and Liverant, 1962], the construct is described as distributing individuals according to the degree to which they accept personal responsibility for what happens to them. As a general principle,

"internal control refers to the perception of positive and/or negative events as being a consequence of one's own actions and thereby under personal control; external control refers to the perception of positive and/or negative events as being unrelated to one's behaviors and therefore beyond personal control." [Lefcourt, 1966, p.207].

Evidence from the psychology literature suggests the relevance of locus of control in the context of budgetary participation. In an early study, Cromwell et al. [1961] found that internals preferred, and performed better, under conditions of self-control in a reaction-time test, while externals preferred, and performed better, under experimenter-controlled conditions. The results of this study motivated a series of inquiries into the impact of congruence between individual personality (characterized in terms of locus of control) and the conditions of control inherent in a particular task-related situation. These confirm the basic result, namely that task-performance is a
function of personality/situation congruence for a wide variety of experimental tasks, including decision-time [Rotter and Mulry, 1965], paired nonsense syllable recall [Watson and Paumal, 1967], and digits reversal tests [Houston, 1972].

The pattern suggested by the results of these studies is depicted in Figure 1.

INSERT FIGURE 1 HERE

It should be noted that the relationships depicted in Figure 1 are probably only valid in a ceteris paribus sense. Other variables, explicitly controlled for in the experiments from which the framework is derived are likely to exert some influence on the relationships. In the present context, for example, reward structure is an important variable, but one which is explicitly excluded in the research study reported in this paper. Reward structure has been suggested [Rotter, 1975] and found [Gregory, 1978] to have an influence on the strength of the relationships presented in Figure 1.

The relevance of the results portrayed above stems from the connection between the notion of source of control in a particular situation and the concept of budgetary participation. Several writers in the area of participation [e.g., Vroom, 1960; Heller and Yukl, 1969; Hopwood, 1976] ascribe to it the idea of providing organizational members with some degree of influence in the process of budget formulation. Moreover, if subsequent performance is measured in terms of departure from budget, the source of control can be viewed as being dependent on the degree of budgetary participation. Under conditions of
high participation, an organizational member is likely to be able to exert substantial influence on the setting of budget goals, and, hence, the source of control over performance is internal in this situation. Alternatively, in a situation characterized by low budgetary participation, the source of situational control can be described as more external.

HYPOTHESIS

The hypothesis of the present study follows from the preceding discussion. Characterizing high budgetary participation as an internally-controlled situation, this will be congruent only for individuals who are internals on the locus of control dimension and they are hypothesized to perform better in this situation. Conversely, low participation will be congruent only for externals, and they are hypothesized to perform better under low than under high participation conditions.

The hypothesis at test can be formally stated in its null form as follows:

There will be no significant interaction between locus of control and participation affecting performance.

METHOD

A laboratory experiment using subjects drawn from two separate populations was employed to investigate the research question. First, a sample of students from an undergraduate accounting course took part in the study, primarily to provide pilot testing of the experimental design. Subsequently, a sample of managerial personnel from a large San
Francisco Bay Area manufacturing company undertook the experiment. The latter sample provided a systematic replication by not only testing a sample of subjects different from the student group, but also by testing a sample of subjects characteristically closer to the population of ultimate interest, namely managers whose activities embrace budget preparation, and control through the use of budgets. All subjects took part voluntarily without monetary compensation.

The choice of an experimental approach was based on three considerations. Of primary importance, the methodology permits statements of causation which are precluded by the use of, for example, a survey method. Second, the study of the effects of personality variables is particularly amenable to a laboratory approach, since these effects are considered to manifest themselves over a wide variety of situations. Finally, the approach provides for experimental control over variables which are not focal to the research.

The experiment was conducted in the Management and Behavioral Sciences Laboratory of the Center for Research in Management at the University of California, Berkeley. It entailed the use of a business game, which was administered to subjects using the computer terminals in the laboratory.

Subjects were greeted upon their arrival at the laboratory and escorted to their individual cubicles in which they remained for the duration of the experiment. Subjects read an instruction sheet explaining the business game, after which general questions concerning the game were answered. The first part of a subject's interaction with the computer was the administration of the locus of control instrument [Rotter, Liverant and Crowne, 1961]. This instrument is widely used in
psychological research and several extensive literature reviews attest to its validity and reliability [Potter, 1966; Joe, 1971; Strickland, 1977]. These are important considerations in the present context since the strength of the experimental approach in producing causal statements depends in part on the soundness of the measure. The instrument measures locus of control on a scale from zero (extreme internal) to 23 (extreme external); an additional six items are included as fillers, giving a total of 29 items.

After subjects had completed the locus of control instrument, the business game started. Subjects assumed the role of one of four senior managers in an organization which manufactured and sold a single perishable product. For each of twenty fiscal quarters, the subjects were required to make two decisions; one regarding a recommendation for the budgeted level of unit sales for the quarter, and one regarding the price to be charged for the product during the quarter.

For each quarter's play of the game, a subject was first asked to make a submission of their recommendation for the unit sales budget. To guide subjects in the first few quarters of the game, performance reports from a simulation of the previous four quarters were provided on a sheet of paper in the laboratory cubicle. These were the only data subjects had available to work with in the first of the twenty quarters. As the game proceeded, however, the results of each completed quarter became available in hard copy, and the subject could refer back to these data as desired. The last section of Appendix 1 presents a sample performance report.

Following the subject's submission of a budget volume recommendation, the recommendations of each of the other three managers
were presented and, after a short delay, the final determination of the budget by top management was presented. Subjects had been informed in the instruction sheet that top management would make the final determination of the budget, giving consideration to the four managers' recommendations.

It was at this point that the participation induction took place. Top management's final determination was a weighted average of the four recommendations, but with the weights differing in each of two participation conditions. In the high participation condition, a weight of 0.9 was attached to the subject's recommendation and a weight of 0.1 was attached to the average of the other three recommendations. In the low participation condition, the weights were, respectively, 0.05 and 0.95. Subjects were randomly assigned to one of these two conditions for the duration of the game.

After being informed of top management's determination of the budget, the subjects were presented with a statement of the percentage deviation of each of the four recommendations from the final decision of top management. Due to the nature of the manipulation, subjects in the high participation condition would typically observe a much smaller percentage deviation of their own recommendation from the final budget than the percentage deviation of any of the other three managers. The purpose of this statement of percentage deviations was to emphasize the extent to which the subject's recommendation was reflected in the final budget, thereby strengthening the participation induction.

In the present context, therefore, participation was operationalized as the amount of influence an individual had on a final budget which was jointly set. In order to check the level of perceived
participation, some important items (numbers 2, 4 and 6) were included in a post-experimental check questionnaire, presented in Appendix 2.

Subjects were next informed of the level of advertising expenditure to be undertaken in the forthcoming quarter. This was followed by a request for the subject's second decision, the price to be charged. Each subject, alone, was responsible for this decision. The task confronting a subject was the selection of a price which, combined with the advertising expenditure, would produce an actual sales volume exactly equal to the final budget. In the instruction sheet mentioned earlier, subjects were told to view departures from budget in either direction as equally undesirable. Sales levels which fell short of budget (due to too high a price) led to unsold product which was dumped due to its perishable nature. Conversely, too low a price would result in the sale of all available product but would also generate unfilled orders. The game objective was, therefore, to minimize the departure, in either direction, of actual sales from budget, and performance was measured in this way.

The underlying functional relationship between sales volume, price and advertising was as follows:

\[ Q = 40,000 - 20p + A/2 \]

where \( Q \) is quantity sold (including unfilled orders)

\( p \) is the price charged in cents, and

\( A \) is the advertising expenditure

Pilot testing of several functional relationships indicated that while this function could not be uncovered by subjects, neither was it so complex as to preclude performance differences across subjects.
In the final phase of each quarter, a performance report was presented. This report summarized the decisions made and the budget variance which resulted, performance being measured by the absolute value of the budget variance. A sample output for a high participation subject is presented in Appendix 1.

An important point to note in connection with the game design is the fact that no budgeted sales level was any more difficult to achieve than any other. For all possible budget levels, there existed one price (in combination with the given advertising expenditure) which would "clear the market" and produce the desired zero variance, regardless of the participation condition under which the final budget was arrived at. Thus, no systematic difference in task difficulty existed between the high and low participation groups.

RESULTS

A. Phase One - Student Subjects

Forty-six undergraduate accounting students volunteered to take part in the study. On the basis of the responses to the post-experimental check questionnaire items 2, 4 and 6, the random assignment to the two participation treatment conditions appeared to induce the intended perceptions of participation. The mean scores for each question together with the results of a statistical check for differences between the means, are presented in Table 1.

Table 2 presents the results of the administration of the locus of control measure. These results are consistent with a wide range of results for other student samples reported by Rotter (1966).
The analysis relating to the hypothesis was performed under the assumption that the correct model specification was as follows:

\[
Y = \beta_1 + \beta_2X + \gamma Z + \delta XZ + \epsilon
\]

where \( Y \) is performance, the average budget variance over the twenty trials of the game for each subject. Note that larger values of \( Y \) denote inferior performance.

\( X \) is locus of control score

\( Z \) is a 0/1 binary variable for participation

\[
Z = \begin{cases} 
0 & \text{for low participation} \\
1 & \text{for high participation}
\end{cases}
\]

and \( XZ \) is the interaction between locus of control and participation.

As a first approximation, this model can be justified in that there is no evidence, empirical or theoretical, either in the accounting or the psychology literature, supporting a non-linear relationship involving, for example, higher-order levels of the independent variables.

The results of this regression are presented in Table 3. The null hypothesis is tested by means of an examination of \( \delta \), the coefficient for the interaction term in equation (1). The results were as expected. \( \delta \) was significantly different from zero, permitting rejection of the null hypothesis of no interaction. In addition, \( \beta_2 \) was negative and significant implying that high locus of control scores (externals) were associated with low scores on budget variance, the dependent variable (i.e. high performance). \( \gamma \) was also negative and significant, suggesting that performance was generally superior in conditions of high participation. The importance of these "main effects" should be
considered in light of the nature of the interaction and two forms of further analysis were conducted to explore the overall meaning of the results and to more precisely assess whether the null hypothesis is rejected in a fashion consistent with the expectations.

As a first approach, a useful form of further analysis involves decomposing equation (1) into two separate equations, as follows:

For \( Z = 1, \) i.e. high participation,
\[
Y = (\beta_1 + \gamma) + (\beta_2 + \delta)X + \epsilon 
\]  \hspace{1cm} (2)

For \( Z = 0, \) i.e. low participation,
\[
Y = \beta_1 + \beta_2X + \epsilon 
\]  \hspace{1cm} (3)

The composite coefficients and their standard errors were developed from the coefficients generated from the regression in equation (1). Table 4 presents all four coefficients in equations (2) and (3). The slope coefficient for the high participation model \([ (\beta_2 + \delta) \text{ in equation (2)}],\) was significantly positive. This implies that larger locus of control scores (more external) were associated with larger budget variances (inferior performance) and this was as expected. By contrast, the slope coefficient for the low participation model \([ \beta_2 \text{ in equation (3)}],\) was significantly negative, implying that performance improvement (lower budget variances) was associated with higher locus of control scores (more external). The interaction was, therefore, of the predicted type.

A test of intercepts was also conducted to establish whether the interaction was ordinal or disordinal.\(^5\) The intercept for the high participation model, \((\beta_1 + \gamma),\) is significantly smaller than the intercept for the low participation model, \(\beta_1.\) The two curves of equations (2) and (3) intersect at \( X \) (locus of control score) = 10.21, which is \( \bar{X} + 0.47\sigma_x, \) i.e. not significantly above the mean score for \( X.\)
These analyses suggest a disordinal interaction although the fact that the curves intersect at a locus of control score larger than the mean implies that high participation is generally the preferred condition (in terms of performance), except for relatively extreme externals. This result is consistent with the discussion of the results presented in Table 3.

As a second, more reliable test of interaction ordinality, the Johnson-Neyman technique [Johnson and Neyman, 1936] was conducted. On the basis of the slopes and intercepts in Table 4, this test establishes a region for the continuous variable (locus of control) within which no significant differences in the dependent variable (performance) can be ascribed to the categorical variable (participation). The range calculated was 8.46 to 13.00, and this result, depicted graphically in Figure 2, also suggests a disordinal interaction.

The hatched areas in Figure 2 represent performance differences between the high and low participation subjects which do not reach statistical significance. For locus of control scores below 8.46 ($\bar{X} - 0.02\sigma_x$), i.e. internal subjects with scores approximately equal to, or less than, the mean, low participation results in significantly poorer performance than does high participation. On the other hand, significantly better performance under conditions of low participation is noted only for subjects with locus of control scores at least as high as 13.00 ($\bar{X} + 1.23\sigma_x$). This result suggests that performance is significantly poorer under conditions of high participation only for relatively extreme
externals, a result which is consistent with the previous discussion.

The question of whether the scale properties of the locus of control measure permit the use of the locus scores in a regression approach suggested the need to perform an analysis based on the assumption that the scale provides an ordinal measure only. The Spearman rank correlation coefficient [Siegel, 1956] was used to perform this test. For each of the two participation conditions, locus of control ranks were correlated with performance ranks making the results of the test comparable with the analysis and discussion of Table 4. For the high participation group, \( r_s = 0.74 \) \((p<0.01)\), higher ranked locus of control scores (externals) being associated with higher ranked scores on the dependent variable (inferior performance). For the low participation group, \( r_s = -0.63 \) \((p<0.01)\). These results are entirely consistent with those discussed above in connection with Table 4, permitting rejection of the null hypothesis.

One final analysis was conducted, examining one potential explanation for superior performance on the part of subjects in their "preferred" participation condition (i.e. high participation internals and low participation externals). For each subject, a learning coefficient was employed as the dependent variable. The learning coefficient was derived from the following model:

\[
Y = ax^{-L}
\]

Taking log transforms converts this exponential function into a linear form, giving

\[
\log y = \log a - L \log x
\]

where \( y \) is budget variance

\( x \) is experience (number of quarters), and

\( a \) and \( L \) are coefficients estimated by regressing \( y \) on \( x \).
1. represents the slope of the curve in this model and the L values were transformed into learning coefficients and used as the dependent variable in a regression identical to equation (1). The interaction coefficient, $b$, from this regression suggested an interaction consistent with the notion that better learning rates were associated with high participation internals and low participation externals; however the coefficient failed to reach significance. To sharpen the analysis, locus of control was categorized into two groups by splitting at the mean value and omitting the data with $X = 9$, the closest integer-valued $X$ score to the mean of 8.52. The data of four subjects were lost as a result of this procedure, and the remaining forty-two sets of data were analyzed with a $2 \times 2$ factorial ANOVA. The marginal means are presented in Table 5, and are denoted $L_{ij}$. The marginal means have the following interpretation: $L_{11} = 0.74$ implies that for internal subjects in the high participation condition, the budget variance is reduced, on average, to 74% of its previous level as experience doubles. For example, a subject with $L = 0.80$ who begins with a budget variance of 10,000 on the first trial can expect to reduce the variance to 8,000 at the second trial and to 6,400 at the fourth trial, etc.

The results presented in Table 5 suggest an interaction of the predicted form, namely faster learning is evident in the "congruent" high participation/internal and low participation/external groups, than in the "incongruent" groups. The results of the ANOVA, presented in Table 6, confirm this.

B. Phase Two - Manager Subjects

Forty-eight middle level managers from a San Francisco Bay Area manufacturing company formed the sample for the second phase of the study.
With minor exceptions, the results obtained for the student sample were also obtained for the manager sample. These results are presented in Tables 9 through 12. Tables 7 and 8 present the results of the post-experimental check questionnaire and locus of control administrations. The results in Table 7 again confirm the effectiveness of the participation manipulation. A comparison of the results of Tables 2 and 8 reveals that the managers appear significantly more internal than the students. A test shows that the two means are significantly different \( t = 5.52, p < 0.01 \). In fact, a comparison of the mean score for the managers with those for a variety of other subject samples reported in the literature confirms that the managers appear more internal than most other populations of respondents. The implications of this are potentially significant in that if managers are indeed characteristically extreme internals, it is possible that participative budgetary environments could be viewed as more suitable without specific reference to the personality profile of the personnel involved. However, this conclusion is too strong as far as the data from the present study are concerned. The Johnson-Meyman technique reveals that the range of scores for locus of control outside which performance differences across the two participation conditions are significant is \( 2.56 (\overline{X} - 0.74 \sigma_X) \) to \( 6.35 (\overline{X} + 0.54 \sigma_X) \).

Thus, on the basis of both types of testing — one using a dependent variable formed by averaging the twenty observations for budget variance for each subject, and a second using a dependent variable formed on the basis of the observed learning over the twenty trials of the game — the null hypothesis is rejected for two independent samples.
DISCUSSION

From these results, it can be concluded that the experimental realization of participation interacted with the personality variable, locus of control, and that this interaction significantly affected performance. At least in part, the superior performance of subjects in congruent personality/situation conditions -- i.e. high participation internals and low participation externals -- was seen to be the result of better learning rates over the course of the twenty trials of the game.

Within the confines of experimental design, statements of causation are possible, recognizing, however, that care should be exercised in generalizing such statements principally because the causal variable, participation, is only an experimental realization. In other words, we cannot be certain that the operationalization of participation employed in this study is a faithful replica of the process which operates in a real managerial setting. In particular, the "real-world" process possesses important interpersonal aspects such as conflict resolution, the dynamics of which are absent from the operationalization employed in this study. In a broader sense, the generalizability or external validity of the observed experimental effect depends critically on the extent to which all the characteristics of the experimental setting faithfully replicate those which would be observed in the real world. In view of the surrogation of task, reward and situation, care should be exercised to avoid unqualified statements of applicability of the present results to a real setting.

In retrospect, the methodology could have been strengthened by the inclusion in the post-experimental check questionnaire of items which
elicit a subject protocol of the behavioral effects of factors which could impair the internal validity of the experimental effect. Examples include the behavioral impact of the unobservable "other managers" and the level of subject commitment to the stated game objective of absolute variance minimization (versus other strategies such as minimization of objectively determinable out-of-pocket costs only). The use of a monetary reward may have helped to reinforce the stated game objective.

The implications of these limitations assume greatest importance if their effects are systematically different across treatment groups or along the locus of control continuum, because, in such a case, identification of the causal variables is made more difficult due to confounding. The random assignment of subjects to treatment groups helps to minimize the likelihood of a systematic differences resulting along other dimensions, but the post-experimental check questionnaire, if it had included items addressing these issues, would have provided data to specifically test for the existence of such differences.

Pearing these caveats in mind, however, it is possible to consider the implications of the results of this study from two perspectives, job re-design and personnel management.

For an organization, or organizational sub-unit, which has discretion over the level of budgetary participation afforded to its members, it is conceivable that role descriptions can be modified (specifically with regard to participation) to suit the individual characteristics of role occupants.

It may be the case, however, that an organization, or organizational sub-unit, faces environmental and technological conditions which to a large extent dictate the necessary level of
participation of members in budgetary matters. That is, the role characteristics may have very little flexibility in terms of the level of participation. In such circumstances, the placement and mobility of people within the organization can be consciously and purposely supported by management with a view to achieving a fit between individual characteristics and role characteristics. Figler [1977] calls this the creation of the right "chemistry" between individual and role characteristics, and Dunnette [1966, p.223] concludes his discussion of selection and placement with the following comment:

"Our major theme in this book has been that wise personnel decisions demand evidence about the individuality of people, the special requirements of jobs, and interactions between the two." (emphasis added).

Further research which improves the generalizability of the present results, and which investigates the role of other variables in a similar context will enhance our knowledge and understanding of the relationship between the characteristics of budgetary control systems and the characteristics of the individuals whose behavior the systems are designed to control.
TABLE 1

POST-EXPERIMENTAL CHECK QUESTIONS - STUDENT SAMPLE N=46

<table>
<thead>
<tr>
<th>Q</th>
<th>High Participation N=23</th>
<th>Low Participation N=23</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2*</td>
<td>2.13</td>
<td>5.78</td>
<td>t = 9.15, p&lt;0.01</td>
</tr>
<tr>
<td>4</td>
<td>6.00</td>
<td>2.52</td>
<td>t = 8.87, p&lt;0.01</td>
</tr>
<tr>
<td>6</td>
<td>5.83</td>
<td>1.65</td>
<td>t = 11.34, p&lt;0.01</td>
</tr>
</tbody>
</table>

*The polarity of question 2 was reversed. See Appendix 1

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TABLE 2

LOCUS OF CONTROL SCORES - STUDENT SAMPLE N=46

<table>
<thead>
<tr>
<th>MEAN</th>
<th>STANDARD DEVIATION</th>
<th>RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.52</td>
<td>3.63</td>
<td>1 - 17</td>
</tr>
</tbody>
</table>

---

TABLE 3

RESULTS OF REGRESSION - HYPOTHESIS TEST

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Value</th>
<th>Standard Error</th>
<th>t</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_1$</td>
<td>4899.46</td>
<td>707.48</td>
<td>6.93</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\beta_2$</td>
<td>-228.37</td>
<td>74.99</td>
<td>-3.05</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>-4475.54</td>
<td>973.88</td>
<td>-4.60</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\delta$</td>
<td>438.28</td>
<td>105.31</td>
<td>4.16</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

$R^2 = 0.335$ df=42
TABLE 4

COMPOSITE REGRESSION COEFFICIENTS - STUDENT SAMPLE

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Value</th>
<th>Standard Error</th>
<th>t</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>(γ₁ + γ₂)</td>
<td>423.92</td>
<td>669.26</td>
<td>0.63</td>
<td>N.S.</td>
</tr>
<tr>
<td>(β₁ + δ)</td>
<td>209.92</td>
<td>73.93</td>
<td>2.84</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>β₁</td>
<td>4899.46</td>
<td>707.48</td>
<td>6.93</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>β₂</td>
<td>-228.37</td>
<td>74.99</td>
<td>-3.05</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

TABLE 5

MARGINAL MEANS FOR LEARNING ANALYSIS, STUDENT SAMPLE N=42

<table>
<thead>
<tr>
<th></th>
<th>HIGH PARTICIPATION</th>
<th>LOW PARTICIPATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERNAL</td>
<td>n = 11</td>
<td>n = 10</td>
</tr>
<tr>
<td>L₁₁</td>
<td>0.74</td>
<td>L₁₂</td>
</tr>
<tr>
<td>EXTERNAL</td>
<td>n = 9</td>
<td>n = 12</td>
</tr>
<tr>
<td>L₂₁</td>
<td>0.86</td>
<td>L₂₂</td>
</tr>
</tbody>
</table>

TABLE 6

ANALYSIS OF VARIANCE - LEARNING EFFECTS - STUDENT SAMPLE N=42

<table>
<thead>
<tr>
<th>Source</th>
<th>ss</th>
<th>df</th>
<th>F</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Locus of Control</td>
<td>0.005</td>
<td>1</td>
<td>0.12</td>
<td>N.S.</td>
</tr>
<tr>
<td>B. Participation</td>
<td>0.01</td>
<td>1</td>
<td>0.19</td>
<td>N.S.</td>
</tr>
<tr>
<td>Ax B Locus of Control. x Particip'n</td>
<td>0.19</td>
<td>1</td>
<td>4.22</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Residual</td>
<td>1.73</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Σy² = 1.942*</td>
<td>1.935*</td>
<td>41</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note that the sum of the separate components of the sums of squares (1.935) differs slightly from the total sum of squares of the dependent variable (1.942) due to unequal cell frequencies.
### TABLE 7

**POST EXPERIMENTAL CHECK QUESTIONS - MANAGER SAMPLE N=48**

<table>
<thead>
<tr>
<th>Q</th>
<th>High Participation</th>
<th>Low Participation</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2*</td>
<td>2.17</td>
<td>5.50</td>
<td>t = 9.27, p&lt;0.01</td>
</tr>
<tr>
<td>4</td>
<td>5.58</td>
<td>2.58</td>
<td>t = 8.44, p&lt;0.01</td>
</tr>
<tr>
<td>6</td>
<td>5.21</td>
<td>2.50</td>
<td>t = 6.18, p&lt;0.01</td>
</tr>
</tbody>
</table>

*The polarity of question 2 was reversed. See Appendix 1*

### TABLE 8

**LOCUS OF CONTROL SCORES - MANAGER SAMPLE N=48**

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.75</td>
<td>2.94</td>
<td>0 - 13</td>
</tr>
</tbody>
</table>

### TABLE 9

**RESULTS OF REGRESSION - HYPOTHESIS TEST**

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Value</th>
<th>Standard Error</th>
<th>t</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_1$</td>
<td>5846.64</td>
<td>834.67</td>
<td>7.00</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\beta_2$</td>
<td>-439.45</td>
<td>150.01</td>
<td>-2.93</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\gamma$</td>
<td>-3779.27</td>
<td>1247.8</td>
<td>-3.03</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\delta$</td>
<td>832.44</td>
<td>222.74</td>
<td>3.74</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

$R^2 = 0.246$ df=44
TABLE 10

COMPOSITE REGRESSION COEFFICIENTS - MANAGER SAMPLE

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Value</th>
<th>Standard Error</th>
<th>t</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>(β₁ + γ)</td>
<td>2067.37</td>
<td>927.11</td>
<td>2.23</td>
<td>&lt;0.025</td>
</tr>
<tr>
<td>(β₂ + δ)</td>
<td>392.98</td>
<td>164.64</td>
<td>2.39</td>
<td>&lt;0.025</td>
</tr>
<tr>
<td>β₁</td>
<td>5846.64</td>
<td>834.67</td>
<td>7.00</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>β₂</td>
<td>-439.45</td>
<td>150.01</td>
<td>-2.93</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

TABLE 11

MARGINAL MEANS FOR LEARNING ANALYSIS, MANAGER SAMPLE N=43

<table>
<thead>
<tr>
<th></th>
<th>HIGH PARTICIPATION</th>
<th>LOW PARTICIPATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERNAL</td>
<td>n = 11</td>
<td>n = 14</td>
</tr>
<tr>
<td></td>
<td>L₁₁ = 0.89</td>
<td>L₁₂ = 0.91</td>
</tr>
<tr>
<td>EXTERNAL</td>
<td>n = 11</td>
<td>n = 7</td>
</tr>
<tr>
<td></td>
<td>L₂₁ = 1.03</td>
<td>L₂₂ = 0.72</td>
</tr>
</tbody>
</table>

TABLE 12

ANALYSIS OF VARIANCE - LEARNING EFFECTS - MANAGER SAMPLE N=43

<table>
<thead>
<tr>
<th>Source</th>
<th>ss</th>
<th>df</th>
<th>F</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Locus of Control</td>
<td>0.002</td>
<td>1</td>
<td>0.04</td>
<td>N.S.</td>
</tr>
<tr>
<td>B. Participation</td>
<td>0.149</td>
<td>1</td>
<td>2.67</td>
<td>N.S.</td>
</tr>
<tr>
<td>AxB Locus of Control x Particip'n</td>
<td>0.263</td>
<td>1</td>
<td>5.35</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Residual</td>
<td>1.916</td>
<td>39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ey² = 2.328*</td>
<td>2.330*</td>
<td>42</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note that the sum of the separate components of the sums of squares (2.33) differs slightly from the total sum of squares of the dependent variable (2.328) due to unequal cell frequencies.
FIGURE 1

DIAGRAMMATIC REPRESENTATION OF PAST RESULTS

PERSONALITY:
LOCUS OF CONTROL

<table>
<thead>
<tr>
<th>SOURCE OF CONTROL IN PARTICULAR SITUATION:</th>
<th>INTERNAL CONGRUENCE</th>
<th>EXTERNAL INCONGRUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH (PARTICIPATIVE)</td>
<td>High Performance</td>
<td>Low Performance</td>
</tr>
<tr>
<td>LOW (NON-PARTICIPATIVE)</td>
<td>Low Performance</td>
<td>High Performance</td>
</tr>
</tbody>
</table>
FIGURE 2

RESULTS OF JOHNSON-MEHLMAN TECHNIQUE (STUDENT SAMPLE)

Budget Variance (i.e., performance) ↓

High Participation

Low Participation

8.45  10.21  13.00

←internal  Locus of Control  external→
FOOTNOTES

1. On the issue of construct validity, Joe [1971] presents an extensive coverage of data which, he concludes, generally supports the contention that the construct operates consistently across a wide variety of situations. On construct independence, Joe also reports satisfactorily low correlations between locus of control and a wide variety of variables ranging from intelligence to political affiliation. However, one problematical area which persists is with the Marlowe-Crowne Social Desirability (S.D.) Scale [Crowne and Marlowe, 1964]. While Rotter [1966] reported insignificant correlations with S.D., Joe reports more recent correlations as high as -0.42, externals tending to be more susceptible to social norms of behavior. On reliability, Harrow and Ferrante [1969] established a six month test-retest coefficient of 0.75, while Rotter reports several internal reliability coefficients ranging from 0.65 to 0.79.

2. In actual fact, these were robots, and their recommendations were randomly generated from a uniform distribution.

3. The residuals of this regression were tested for constant variance. Bartlett's test, \( \chi^2 = 18.06 \) fails to permit rejection of the null hypothesis of homoscedastic error structure. However the direction of the test result did reveal a (statistically insignificant) tendency for error variance to be larger among externals in the high participation condition and internals in the low participation condition. This result is interesting because the notion that incongruence (in terms of figure 1) should produce erratic performance is consistent with the expectations for the major hypothesis. The model in equation 1 proved satisfactory in terms of fit with 33.5\% of the criterion variance explained by the independent variables. This proportion is statistically significant (\( F = 7.05, p<0.01 \)). In addition, an examination of the residual plot for normality, a critical least squares assumption, revealed no evidence of serious departure. This evidence, together with the Bartlett test results, provides some ex post facto justification of the suitability of equation 1.

4. This decomposition follows Kmenta's [1971] use of equation 1 to specify peace-time and war-time consumption functions. See Kmenta p. 421.

5. Formally, an ordinal interaction is one in which the "rank order of the treatments is constant," whereas a disordinal interaction is one in which the "rank order of the treatments changes" [Lubin, 1961]. A less rigid approach to the issue of interaction ordinality is taken by Kerlinger and Pedhazur [1973, p. 246] who suggest that if the regression lines for two treatments intersect at a value for the independent variable which is within the "research range of interest", the interaction is considered disordinal.

6. This model has been suggested by Andress [1954], Baloff and Kennelly [1967], and by Dopuch, Birnberg and Demski [1974].
7. \( t = 1.45, \text{n.s.,} \) and \( t = 1.00, \text{n.s.,} \) for the student and manager groups respectively.

8. Equation 1 again proved satisfactory statistically. Bartlett's test \( \chi^2 = 17.34 \) fails to permit rejection of the null hypothesis of constant error variance and the regression explained a significant \( (F=4.79, p<0.01) \) proportion of the criterion variance. The Spearman rank correlation coefficients were also consistent with the regression results. For the high participation group, \( r_s = 0.50 \) and for the low participation group \( r_s = -0.68 \), both significant at \( p<0.01 \). For the learning analysis reported in Tables 11 and 12, five data points were lost by removing the data of subjects with a locus of control score \( X=5 \), the closest integer-valued \( X \) score to the mean of 4.75.

9. Rotter [1966] reports mean scores from ten different samples, the means ranging from 5.9 for peace corp trainees to 9.6 for 18-year old non-student subjects.

10. An interesting further result is worthy of note. Using the response to question 1 of the post-experimental check questionnaire (Appendix 2) as an admittedly crude surrogate for "job satisfaction", reveals significant interaction terms, \( \delta \), from equation 1 for both students and managers. For students, \( t = -1.71, p<0.05 \), while for managers \( t = -1.95, p<0.05 \). The coefficients assume negative values (rather than positive values as shown in tables 3 and 9 for performance) because while performance is a negative function of budget variance, "job satisfaction" is a positive function of the post-experimental check question response.
REFERENCES


Argyris, C., The Impact of Budgets on People (School of Business and Public Administration, Cornell University, 1952)


Hofstede, G.H., The Game of Budget Control (Van Gorcum, 1967).


Rotter, J.B., "Generalized Expectancies for Internal Versus External Control of Reinforcement" Psychological Monographs (1966, 80, 1, whole No. 609).


APPENDIX 1

SAMPLE OUTPUT FOR ONE PERIOD OF GAME - HIGH PARTICIPATION SUBJECT

BUDGET FORMULATION FOR QUARTER #1

PLEASE ENTER YOUR RECOMMENDED SALES BUDGET:

24600

IS 24600 CORRECT? (Y/N) Y

OTHER MANAGERS' RECOMMENDATIONS:

#2 ................................. 28300
#3 ................................. 27600
#4 ................................. 31400

THE FINAL DETERMINATION BY TOP MANAGEMENT IS 25000. THIS IS YOUR TARGET FOR THE FORTHCOMING QUARTER.

THE PERCENTAGE DEVIATION OF EACH MANAGER'S RECOMMENDATION FROM THIS FINAL DETERMINATION IS AS FOLLOWS:

YOUR RECOMMENDATION .......................... 0.02%
MANAGER #2 ................................. 12.00%
MANAGER #3 ................................. 11.20%
MANAGER #4 ................................. 25.60%

OPERATING DECISIONS FOR QUARTER #1

THE MARKETING DEPARTMENT HAS ADVISED THAT ADVERTISING EXPENDITURE FOR THE COMING QUARTER WILL BE $14000. BASED ON A SALES BUDGET OF 25000 UNITS AND AN ADVERTISING EXPENDITURE OF $14000,

PLEASE ENTER YOUR DECISION FOR THE QUARTER'S PRICE:

10.00

IS 10.00 CORRECT? (Y/N) Y

PERFORMANCE REPORT FOR QUARTER #1

PRICE CHARGED DURING QUARTER ($) ............... 10.00
ADVERTISING EXPENDITURE ($) ............... 14000
SALES BUDGET (UNITS) ....................... 25000
ACTUAL SALES PLUS UNFILLED ORDERS (UNITS) ... 27000
UNFILLED ORDERS (UNITS) .................... 2000
BUDGET VARIANCE (UNITS) .................... 2000
APPENDIX 2  POST-EXPERIMENTAL CHECK QUESTIONNAIRE

The following set of questions is intended to elicit your opinions and impressions of the business game in general. Each question is responded to by circling the number on the scale which corresponds to the point which you feel best indicates your belief. It is important that you carefully consider your responses, since they will be taken into consideration in the improvement of the game for future use.

1. Indicate the extent of which you enjoyed playing the game.

   1  2  3  4  5  6  7
   Minimal  Moderate  Great
   Enjoyment  Enjoyment

2. Indicate the extent to which you felt your input to the BUDGET formulation influenced top management in their final determinations on the budget.

   1  2  3  4  5  6  7
   Great  Moderate  Minimal
   Influence  Influence

3. Indicate the extent to which you felt confident about the decisions for PRODUCT PRICE which you were required to make during the game.

   1  2  3  4  5  6  7
   Great  Moderate  Minimal
   Confidence  Confidence

4. Indicate the extent to which you felt that your recommendations for the BUDGET were reflected in the final determinations of top management.

   1  2  3  4  5  6  7
   Minimal  Moderate  Great
   Reflection  Reflection

5. Indicate the extent to which you felt that your PRICE decisions had an impact on the demand for product.

   1  2  3  4  5  6  7
   Great  Moderate  Minimal
   Impact  Impact

6. Indicate the extent to which you feel that your recommendations for the BUDGET dominated those of the other managers.

   1  2  3  4  5  6  7
   Minimal  Moderate  Great
   Dominance  Dominance