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INTRAORGANIZATIONAL DISTRIBUTIONS OF POWER: REPLICATION RESEARCH[1]

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The concentration of power in an organization is viewed as inevitable (Hedberg, Edstroem, Mueller, & Wilpert, 1975; Pfeffer & Salancik, 1978). It arises from a need to take organized action in cases in which the interests of a number of parties are involved. Because the interests of one party cannot be achieved without other parties, concentration of effort and coordination of self-interests are necessary. Subunits (i.e., departments) vie for scarce organizational resources, and exchange relationships, often asymmetrical, are established. Within any exchange relationship there is an assessment of power bases of involved departments.

Hickson, Hinings, Less, Schneck and Pennings (1971) developed a theory of subunit power based on the ability of subunits to deal with potential or actual organizational problem areas. In 1974 they tested their theory, called the strategic contingency model, in five breweries. A department is said to have control of a strategic contingency if it is able to

control activities of other departments critical to its functioning. A department's power results from control of these dependencies among subunits derived from some unspecified combination of three determinants: (1) a department's ability to reduce unpredictability ensuing from its lack of information about future events, or its ability to cope with uncertainty; (2) the difficulty with which the activities of a department may be performed by an alternate department, or its nonsubstitutability; and (3) the flow of information and work between departments, or its centrality.

The Hickson et al. (1971) paper describing the theory of strategic contingencies is frequently referenced in the literature. In fact, the *Social Science Citation Index* lists 34 journal articles that referenced the paper from January 1975 to August 1978. The paper also has been cited in several recently published books (Hedberg et al., 1975; Ivancevich, Szilagyi, & Wallace, 1977; Lucas, 1976; Pfeffer & Salancik, 1978). Yet, although that paper has been frequently referenced, there have been no replications of the Hinings, Hickson, Pennings, and Schneck (1974) research, which was designed to test the model of strategic contingencies. The present paper reports the findings from two studies designed to replicate the Hinings et al. (1974) test of this model.

Study 1--University Study

Procedures and Measures. This research was conducted at 6 universities with student bodies from 1,500 to 9,000 students. The sample consisted of top administrators (i.e., vice presidents, deans, university librarians, etc.) at each university and ranged from 8 to 20 per institution. A total of 74 people participated in the study. Of these, 62 completed the questionnaire.

Questionnaire and structured interview items were used to measure departmental nonsubstitutability, the need to cope with uncertainty and centrality. Two aspects of centrality were measured: (1) immediacy, or the speed and severity with which the activities of a subunit affect the primary activities of the organization; and (2) pervasiveness, or the degree to which a subunit interacts with other subunits. Three types of power (i.e., position, perceived, and participation) were measured in this research. Position power (status and scope) was based on the duties and formal positions of the departments as listed in faculty or administrative manuals. Questionnaire items were used to measure perceived and participation power (scope, involvement, net scope deviation, and net scope involvement). Both the questionnaire and interview schedules were modeled after the instruments used in the Hinings et al. (1974) study, but they were modified to reflect the difference between a sample drawn from a population of breweries versus one drawn from a population of universities.

Validity of Measures. Convergent and discriminant validity of the determinants of power were assessed by the multitrait-multimethod approach (Campbell & Fiske, 1959). Only pervasiveness (with a validity coefficient of .57; $p \leq .01$) and immediacy (with a validity coefficient of .26; $p \leq .05$)

exhibited convergent validity. With respect to discriminant validity, only pervasiveness met the three tests suggested by Campbell and Fiske (1959); however, immediacy did approach significance ($p \leq .10$) on two of the three tests of discriminant validity. Nonsubstitutability and coping with uncertainty failed to show either convergent or discriminant validity.

Nonetheless, it should be noted that validity judgments based on the multitrait-multimethod matrix must take into account the stage of development of the constructs and the level of technical refinement of methods (Campbell & Fiske, 1959). Studies to measure departmental power and its determinants are meager, most of the constructs used in this study are relatively new, and technical refinements of the methods used have been limited.

In order to determine the agreement of the raters at each university on the power measures, coefficients of concordance, W, uncorrected for ties, were calculated for perceived and participation measures of power. The degree of agreement was moderate to high ($W = .383$ to $W = .813$, $p \leq .01$) at all but one of the six universities. The coefficient of concordance ranged from $W = .323$ to $W = .786$ for the measures of criticalness and the determinants of power at the six universities.

Results. Table 1 contains the correlations between the determinants of power and the multimeasures of power across 74 university departments. Table 2 contains the pattern of correlations for the 20 subunits in the five breweries studied by Hinings et al. (1974). The pattern of correlations for interview and questionnaire responses differs in both samples. The correlations between the questionnaire measures of the determinants and the power measures, except for perceived power, are moderate or low.

In general, correlations of interview and questionnaire measures of nonsubstitutability with power measures are low, and correlations between measures of pervasiveness and the power measures are moderate in both the university and brewery samples. The primary significant differences between the two sets of correlations are: (1) the high correlation of interview measures of coping with uncertainty with the power measures in the brewery sample, but not in the university sample, and (2) the negative correlations of interview measures of immediacy to power measures in the university study, but the positive and moderate to high correlations in the brewery sample. Using Fisher Z_r, the differences between correlations of the two samples for immediacy and coping with uncertainty are significant at the .05 level or better in 11 of the 14 cases (Table 2).

The correlations of the Hinings et al. (1974) study are in accord with an interpretation that coping with uncertainty is most important to power, supported by immediacy, nonsubstitutability, and pervasiveness, in that order. This interpretation is reinforced by partial correlations in which the second order correlation of perceived power and coping remains high ($r = .66$) when immediacy and nonsubstitutability are held constant. Application of partial correlation analysis to the data gathered for this study does not produce similar results.

Table 1
Correlations of Determinants of Power with Power (University Study)
(N = 74 Departments)

| | Power | | | | | | |
| | Participation[a] | | | | | Position | |
Determinants of Power	Perceived	Involvement	Scope	Net Involvement Deviation	Net Scope Deviation	Status	Scope
Pervasiveness:							
Interview	.50**	.44**	.37**	.39**	.37**	.25*	.37**
Questionnaire	.61**	.21**	.14	.15	.12	.39**	.20
Immediacy:							
Interview	-.25*	-.22*	-.13	-.20*	-.12	-.24*	-.18
Questionnaire	.34**	0	-.15	.01	-.13	-.01	.01
Nonsubstitutability:							
Interview	.11	.04	.06	.01	.06	.10	-.01
Questionnaire	.62**	.10	-.12	.03	-.14	.29**	.28**
Coping with uncertainty:							
Interview	.26*	.09	.02	.09	.04	.14	.13
Questionnaire (perceived uncertainty)	.08	-.12	.08	-.12	.06	-.02	-.09

[a]Participation scope was determined from the number of decision areas in which a department had some influence. Participation involvement was based on the extent of influence in making important university decisions. Net scope deviation and net involvement deviation were based on the scope and involvement in decision areas beyond the purview of the department.

$*p \leq .05$
$**p \leq .01$

Table 2
Correlations of Determinants of Power with Power, Hinings et al. (1974) Study[a]
(N = 20 Departments)

Determinants of Power	Power						
	Participation[d]					Position	
	Perceived	Involvement	Scope	Net Involvement Deviation	Net Scope Deviation	Status	Scope
Pervasiveness:							
Interview	.27	.31	.26	.28	.52	.19	-.01
Questionnaire	.53	.45	.36	.26	.08	.42	.31
Immediacy:							
Interview	.73c	.65c	.54c	.52c	.40b	.13	.44c
Questionnaire	.55	.38	.34	.32	.33	.08	.25
Nonsubstitutability:							
Interview	.60b	.40	.31	.24	.18	.11	.17
Questionnaire	.28	.13	.06	-.08	-.18	.03	0
Coping with uncertainty:							
Interview	.81c	.74c	.73c	.64b	.44	.67b	.44
Questionnaire (perceived uncertainty)	.15	.18	.13	.13	.15	.03	.30

[a] Levels of significance were not reported in Hinings et al. study.
[b] Using Fisher Z_t transformation, differences between correlations of the two samples are significant at .05 level.
[c] Using Fisher Z_t transformation, differences between correlations of the two samples are significant at .01 level.
[d] Participation scope was determined from the number of decision areas in which a department had some influence. Participation involvement was based on the extent of influence in making important university decisions. Net scope deviation and net involvement deviation were based on the scope and involvement in decision areas beyond the purview of the department.

Study 2--Oil and Gas Companies

Procedures and Measures. Study 2 also was designed to replicate the Hinings et al. (1974) study. The sample consisted of the department heads of production, accounting/finance, engineering, marketing, and computer services from four companies in the oil and gas industry in the Houston area. A total of 17 usable questionnaires were received from the 20 departments that participated in this study. The questionnaire included items similar to those used both in the Hinings et al. (1974) study and in study 1. Participating companies did not agree to be interviewed.

Results. Because of the small size, reliabilities were not calculated. The intercorrelations of the measures of the determinants of power are at least significant at the .05 level in all but one of the six correlations, moderately high (i.e., $r = .43$ to $r = .69$), and significant. Thus, it appears that response bias exists.

Table 3 contains correlations between the determinants of power and the multimeasures of power. Observe that the pattern of correlations for this sample also differs from that reported by Hinings et al. (1974). It is noted that the correlations of the determinants of power with measures of participation power are negative, and in many cases are moderately high and significant at the .01 level. The correlations of the determinants with perceived power are all positive, high, and significant at the .01 level.

Table 3
Correlations of Determinants of Power with Power
(Oil and Gas Study)
($N = 17$ Departments)

	Power				
		Participation[a]			
Determinants of Power	Perceived	Involvement	Scope	Net Involvement Deviation	Net Scope Deviation
Pervasiveness	.63**	-.53**	-.43**	-.09	-.05
Immediacy	.66**	-.70**	-.51**	-.08	.05
Nonsubstitutability	.87**	-.64**	-.62**	-.33	-.30
Coping with uncertainty	.61**	-.54**	-.64**	-.43**	-.50*

[a]Participation scope was determined from the number of decision areas in which a department had some influence. Participation involvement was based on the extent of influence in making important decisions. Net scope deviation and net involvement deviation were based on the scope and involvement in decision areas beyond the purview of the department.
*$p \le .05$
**$p \le .01$

Discussion

Before analyzing the results of the two studies and comparing them with the Hinings et al. (1974) study, it should be noted that the analysis in the Hinings et al. study was presented as if there were four determinants of

power. However, a means of deriving a measure of centrality from the measures of pervasiveness and immediacy was not addressed. Perhaps it is more appropriate to modify the theory to include four determinants of power, or to redefine the relationships of these four variables.

The university study supports some of the findings of the Hinings et al. (1974) research: (1) the interview measure of pervasiveness is positively, moderately, and significantly related to all measures of power; and (2) the questionnaire measures of pervasiveness, immediacy, and nonsubstitutability are positively, strongly, and significantly related to perceived power. The results diverge with respect to the relative importance of the determinants of power as measured by interview responses. In particular, coping with uncertainty is not as highly related to power as are the other determinants of power in the university sample. This difference may be attributed to differences in the types of organizations studied or to differences in administering the interviews and questionnaires. The following discussion pertains to differences in the correlations of the interview measures.

The Hinings et al. (1974) sample consisted of four departments at five breweries. In a brewery, a product is generated whose flow through the company can be followed precisely. On the other hand, in a university no such traceable workflow exists. Instead, the workflow is primarily informational in nature. The possibility of obtaining critical information can be enhanced through an increased number of contacts with other departments. Thus, it is not surprising that pervasiveness and power are more strongly related in an organization in which the workflow is informational, rather than product oriented.

Because the workflow in a university is informational in nature, immediacy may be negatively related to power. The time span of discretion may be greater for the more powerful departments than for those that are less powerful. That is, information required by the more powerful subunits may be more future oriented and may cover broader spans of time. The impact of decisions made by these departments may take longer to be felt than the more operationally oriented decisions of less powerful departments. In a brewery, however, cessation of the workflow could immediately and severely impinge on organizational activity. Thus, immediacy understandably would be positively related to power measures in the brewery sample but not in the university sample.

Further, a university environment typically is both complex and stable. It is complex in the sense that many jobs require the use of difficult procedures that are learned in extensive formal training programs. Yet the environment is stable enough to enable the skills learned during a training program to become well defined (Mintzberg, 1979). Of course, uncertainty exists for university personnel, but their environment may be less uncertain than that encountered by brewery personnel. Brewery personnel must face uncertainties of internal operations, and they must strive to reduce work stoppages from inoperable equipment, labor problems, or a myriad

of other problems. Furthermore, like university personnel, brewery personnel also must confront uncertainties arising from their environment. For instance, although the trend of overall beer consumption is stable, market uncertainties arise from shifts of broad allegiance within the total.

The findings of the oil and gas study must be viewed as suspect because of indications of strong response bias. Further, because interviews were not permitted, this study is only a partial replication of the Hinings et al. (1974) research and is based upon a very small sample. Nonetheless, the findings can be used to argue that the relationships between power and its determinants vary with the industry studied. In this study, the relationships between all determinants and two measures of participation power are moderately strong, significant at the .01 level, and negative. Perhaps the ability to cope with uncertainty, nonsubstitutability, and pervasiveness were negatively related to participation power in the sample because powerful departments, limited by time and other resources, could focus on only one or two major areas of concern, as opposed to a large number of issues of lesser importance to the organization. For instance, exploration and production departments typically are considered the most powerful departments in oil and gas companies. Possibly these departments are so involved with issues related to exploration and production that they do not become involved in issues of marketing, pricing, data processing, or other product related issues.

The present findings must be tempered by the organizatons on which they are based: six universities, four oil and gas companies, and five breweries. In addition, the measures need to be refined and the research design improved. Yet, several new questions have emerged from this analysis that highlight the need to explore certain issues: Why does the importance of the determinants of power vary by industry? How does the power system work in different organizations? Under what circumstances are one or more of the determinants negatively related to power?

It is possible that differences in the correlations in the three samples may be attributed to differences in work flow. However, differences in the relationships may also be attributed to differences in the backgrounds and attitudes of the respondents, organization structure, organization size, or a variety of other reasons. For example, university administrators might have longer time orientations than brewery administrators and, therefore, attribute power to departments involved in activities with long range impacts. Or more time might be required to realize the impact of decisions of powerful departments in decentralized organizations (as possibly exemplified by universities in this research) than that required for powerful departments in centralized organizations (as possibly exemplified by the breweries and oil and gas companies for whom the correlations have been reported).

A key to understanding the differences in the relationships may be found in analyzing the relative importance of the determinants across a

range of industries and by focusing on relevant characteristics that distinguish these industries. Ascertaining whether differences occur across a range of industries is especially important to managers because departments in dissimilar industries may need to employ different strategies to enhance their power. In some industries, strategies to increase one of the determinants may actually result in a reduction of departmental power. Thus, research should be designed to study the effectiveness of power strategies in different industries. At the same time, total organizational effectiveness should be assessed in order to determine the prevalence of suboptimization resulting from departmental power strategies.

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