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THE SYMBOLEC POTENTKAL OF COMPUTER TECHNOLOGY: DI[FFERENCES AMONG WHITE-COLLAR WORKERS

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THE SYMBOLIC POTENTIAL OF COMPUTER TECHNOLOGY: DIFFERENCES AMONG WHITE-COLLAR WORKERS

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ABSTRACT

Evidence that computers can act as status symbols is presented. Organizational symbols and factors empirically associated with income (one measure of status) are discussed. This paper presents quantitative evidence that computer terminals are allocated according to both use and status and, thus, may act as symbols of status. A field study of computer-using white collar work groups found that the distributions of terminals and income were similar and they shared many of the same predictors when other relevant factors were controlled (computer skills, experience and use). Exploratory analyses indicated that the pattern of results differed by occupation with strongest evidence of symbolic value found among professional workers. Managerial implications are described.

The predominant metaphor used to describe the relationship between information systems (IS) and their users is that of a "neutral tool" to aid users in working more efficiently (Hirschheim 1986; Hirschheim and Newman 1991). One mission of IS professionals is to describe problems and develop computerized "tools" to solve them (Keen 1980). Computers have diffused into organizations; however, expected productivity gains among white collar workers have not been realized (Bowen 1986). The possibility that computers are not just neutral tools is explored. The question to be addressed by this research is: For what types of workers is computer equipment distributed differentially based on status? This paper presents quantitative evidence that computer resources are allocated according to both use and status and may act as status symbols.

If computers are status symbols, they could be integrated into compensation packages and be considered in strategic plans for managing employee performance. Managers' awareness of computers' symbolic nature would improve their understanding of employees' reactions to them.

Research on organizational culture suggests a framework for illuminating the value attached to computers. If an object is distributed differentially based on status, researchers can infer that the object is not neutral (Schein 1985; Sundstrom 1986). A common measure of status in industrialized societies is income (Trieman and Terrell 1975), which, for most workers, is composed primarily of a salary or wages. Thus, similarities between the distributions of computer resources and income indicate that they could act as status symbols. The next section reviews the literature on organizational symbols, focusing primarily on those indicating status. The value of computers is posited to differ depending on the workers' occupation. Evidence of the value attached to computers is presented and factors empirically associated with income are enumerated. Hypotheses regarding the distribution of income and computers are developed and the research methods are described. Results of the analysis are presented and their implications for managers and researchers are discussed.

1. BACKGROUND

Interest in organizational symbols (objects that convey meanings and values) and their role in corporate climate (James and Jones 1974) and culture (Schein 1984, 1985) persists because of their use in forming impressions and in rapid communication of information (Dandridge, Mitroff and Joyce 1980; Morgan, Frost and Pondy 1983; Sundstrom 1986). Schein (1985) suggests that culture is composed of three levels: the visible built environment, a sense of what "ought" to be, and basic assumptions that are preconscious. Symbols are visible artifacts that embody underlying values.

Organizational symbols' connotations depend upon the way in which they are interpreted within the context of specific situations (Ornstein 1986). Norms, values, beliefs, and

cognitions established by previous interaction with the object all play a role in the interpretation of symbols. Organizational symbols convey information about an employee; status symbols indicate the relative standing of an individual in the organization's hierarchy of influence and represent concrete evidence of power. There has been little systematic empirical research on status markers, but several features of workspaces have become traditional signs of status (Konar and Sundstrom 1985; Konar et al. 1982; Steele 1973a, 1973b). For example, windows, a private office, and floorspace are often symbols of status.

Within an organization, status symbols are allocated differentially to workers and any aspect of the work place that is tied to rank can operate as a status symbol, even if it is also necessary for job performance (Steele 1973a); characteristics of workspaces signifying status can serve multiple simultaneous functions (Konar and Sundstrom 1985; Sundstrom 1986). Income is also allocated to workers based on their rank in the organization and can be used as an indicator of status. The allocation of income and of status symbols simultaneously reflects the perceived value of the individual to the organization, the props required to perform the job, as well as indicants of success. Top executives may receive the largest incomes, large private offices, and nice furnishings because they are highly valued, or because they need these props, but this does not diminish the role of these symbols in transmitting status information.

The symbolic value of computers may depend partly on the nature of the individual's occupation. An organizational symbol is context specific, but some symbols convey similar meanings for workers performing similar types of jobs in different organizations. Computer systems differ markedly from one another in their physical characteristics, implementation, purpose, and history (Kling and Scachi 1982). Those designed for executives share common characteristics and differ markedly from those for clerical workers (Rockart and DeLong 1988). Since executive support systems differ from clerical systems, executives' should hold similar cognitions regarding computers (formed by interaction with them), which differ from those formed by clerical workers (Sundstrom 1986). Although no research has yet focused on differences in social meaning, as described below, the effects of computer use have differed based on participants' occupations.

1.1 Evidence of Value

Literature on the impact of computer use provides evidence that the effects depend partly on the nature of the work performed with generally positive effects reported for managerial and professional workers and generally negative effects reported for clerical workers (Alcalay and Pasick 1983; Grandjean 1987). On the positive side, computer users learn marketable skills (Clement and Parsons 1990; Clement, Parsons and Zelechow 1990) and computers can ease time constraints by providing rapid asynchronous communication (Turner 1980), facilitate output, increase speed, decrease tedium, improve working conditions, and be fun to use (Alcalay and Pasick 1983; Starbuck et al. 1990; Starbuck and Webster 1991).

On the negative side, computer-based systems can make the task environment more demanding (Clement and Parsons 1990; Clement, Parsons and Zelechow 1990; Johannson and Aronsson 1984). Research on clerical workers using computers indicates that they experience more uncertainty, stress, delays and health problems than those who do not use computers (Grandjean 1987; Smith et al. 1981; Turner 1980; Wineman 1982). In addition, computers may be used as a mechanism of managerial control affecting the pacing of work and surveillance of workers (Alcalay and Pasick 1983; Braverman 1974; Clement 1988; Edwards 1979).

Organizational researchers have shown that control over computer resources is related to power (Kling and Iacono 1984; Kraemer and Dutton 1979; Markus 1981). Computers also appeal as entertaining or status-improving (Beatty and Gordon 1988; Katz 1987; King 1983) and have been mentioned as desired items indicating workers' new status upon promotion (Sundstrom 1986). Managers and professionals have also reported positive interpretations of those whose offices contained a computer terminal (Safayeni, Purdy and Higgins 1989). Finally, the institutionalization of computers has been described (Dickson 1981), and some employees demand computers (Kling and Iacono 1989).

The symbolic value of computers could depend on the context within which they are used. They may be negative status symbols when associated with clerical work, but positive status symbols when associated with highly skilled, technical work (Safayeni, Purdy and Higgins 1989; Sundstrom 1986). Executive support system designers have recognized that acceptance depends partly on overcoming users' associations of typing with secretarial work (Dreyfuss 1988). In contrast, vendors of engineering systems emphasize the status inherent in owning the latest equipment.

In sum, effects of computer use have been generally positive for managerial and professional workers and generally negative for clerical workers. Symbolic effects may be related to direct effects and may differ according to occupation because they are based on interaction with objects that differ and the resulting cognitions.

Exposing the social meaning of any artifact (such as computers) is difficult since the insiders of a culture are often not aware of their own artifacts and their meaning (Schein 1985). When questioned directly, respondents may deny their symbolic value and attribute differences in their distribution to their utility (Lipman et al. 1978). Even meanings that are articulated indicate only what people will say (Argyris and Schon 1978). However, an outsider can observe the distribution of an artifact, in light of its instrumental nature, and infer its underlying value (Schein 1985; Sundstrom 1986).

Although little empirical work has focused on the distribution of computers, the distribution of income (one measure of status) has been studied extensively. Relevant concepts from the sociology literature on status attainment are described below with particular reference to factors associated with income inequality.

Issues of distributive justice (who gets the largest share of a good) have been researched at the societal, organizational and group levels (Becker 1962; Blau 1977). Studies of income dispersion among U.S. workers have identified individual, job, and organizational factors consistently associated with income (Pfeffer and Davis-Blake 1990; Strober 1990; Thurow 1972). Worker characteristics empirically associated with salary include education, age, gender, marital and minority status, job and organizational tenure. Work characteristics associated with salary include occupation, routineness, hours worked per week, and supervisory responsibility. Organizational characteristics associated with salary include unionization, size, geographic region, and industry. Researchers have shown that findings regarding societal income inequality are relevant to organizational inequality (Baron and Bielby 1980; Pfeffer and Davis-Blake 1990).

This paper investigates the possibility that correlates of income inequality are also relevant to understanding the distribution of computers in organizations. In order to infer the social meaning of computers, the distribution of income (generally positively valued) is compared to that of computers (value unknown, but expected to differ by occupation). The next section develops specific hypotheses designed to test two questions: For what types of workers are income and computers distributed similarly? For what types of workers do they share the same predictors? Methods and measures used to test these hypotheses are described.

2. HYPOTHESES

Hypotheses focus on three sets of predictors (organizational, employee and work characteristics) commonly associated with income and their relation to both income and computers. Additional predictors control for workers' computer skills, experience and use. There is insufficient information to allow development of specific hypotheses regarding a respondent's occupation; however, it is included in the analyses, and all hypothesized results are predicted to differ by occupation.

One model of similarity in the allocation of two commodities is their joint distribution, the extent to which they occur together. This hypothesis asks the question: For what types of workers are level of income and distribution of computer terminals related? Formally stated: **Hypothesis 1**: There will be a significant relation between the distribution of income and that of computer resources.

A more complex model of similarity in the allocation of two commodities includes an expectation that they share the same predictors. The following hypotheses asks the question: For what types of workers do income and computers share the same predictors?

Characteristics of the job are related to income. **Hypothesis 2**: Work characteristics associated with income will predict income and computers. Both will be positively related to being a manager or professional, performing less routine work, working more hours per week, supervising, and to the function of one's work group.

Individual employee characteristics are also related to income. **Hypothesis 3**: Individual characteristics associated with income will predict income and computers. Both will be positively associated with education, being older, married, or a man, and having longer job or organizational tenure.

Organizational characteristics are also related to income. **Hypothesis 4**: Organizational characteristics associated with income will predict income and computers. Both will be positively associated with organization size.

3. METHODS

Data come from a field study of computer-using white collar work groups. Consistent with previous research (Bikson, Gutek and Mankin 1987; Gutek, Bikson and Mankin 1984), we defined a work group as at least four persons engaged in some common information-related process or product including at least one level of supervision. Computers did not have to be used by all group members, but had to be necessary for the work of the group as a whole and to have been used for at least one year (Gutek and Winter 1990). Diversity in organization level, size, and computer configuration, implementation and use were sought. Constituting a convenience sample, 623

employees in 89 workgroups in 49 organizations in Southern California, recruited through personal contact, agreed to participate. It was not possible to draw a stratified random sample of computer-using white collar work groups because the characteristics of the parent population were unknown. Although the sample was selected to achieve variation in many areas, there is no reason to assume that it was representative (although replication of previous statistical results indicates it was not too unusual). Questionnaires were given to attending workers (and collected after each interview) and semi-structured interviews (one and one-half to two hours) with the supervisors were conducted during site visits. Although a portion was used to investigate the symbolic potential of computer technology, the data were originally collected as part of a larger study on the impact of computerization and of structural contingency theory.

Table 1 provides basic information about the sample.

Work groups were classified into one of four categories according to their function: technically-oriented professional groups (performing scientific and engineering work), non-technically oriented professional groups (performing specialized non-technical work), management and administrative groups (e.g., personnel, finance), and clerical (e.g., order entry, reservations).

3.1 Measures

Respondents indicated their income (see Table 1) within broad categories (larger numbers indicate larger incomes) because this information is sensitive.

Our ability to measure computer equipment was severely limited by the nature of the study. Most workers did not know the names of their equipment or its configuration. One of the few questions they could accurately answer on a survey was whether they shared a computer with others (coded 1) or had their own (coded 2). About half (51.4%) had their own terminal (5.7% had more than one). Most who shared a terminal shared with more than one other person (44% of the total group), and terminals were usually in one location accessed by many workers.

This measure is particularly appropriate for assessing the value of computers. Computer use does seem to be limited by convenient access (Gogan 1991) and sharing terminals decreases feelings of ownership, experimentation, learning, and personalization (Katz 1987) and also inhibits ergonomic design of work stations (Grandjean 1987). Finally, this measure would likely capture status effects because control and privacy at work are associated with status (Sundstrom 1986) and should be strongly associated with having one's own terminal.

Four characteristics of employing organizations have been related to income. Region was controlled by the research design (sampling one area); unionization was not a significant factor since little of the sample was unionized. Since most of the organizations were involved in light manufacturing or services in electronics, defense contracting, or local government, variability in industrial sectors was not broad enough to be of concern. However, the organizations did vary in size as shown in Table 1.

Computer skills and experience could also affect the distribution of both income and computers and were measured in two ways (as shown in Table 1). First was a self-report of the number of years of computer experience. Respondents were also asked which of five computer skills they possessed. The modal number of skills was one and only 5% of the sample had four.

The distribution of computers is likely to be a function of the extent to which a computer is used in performing one's work. Two measures of use were included: time spent at the computer (shown in Table 1) and the percent of tasks performed that required the use of a computer. Respondents were asked to provide information about twenty-one common office tasks such as writing original material, filling in forms, and gathering information. The percentage of tasks performed frequently which were done mostly by computer was used as a measure of the extent to which job tasks demanded computer use. The distribution departed from normality with 9% of the sample reporting no tasks done by computer and another 9% reporting that all were computerized. The distribution between these extremes was reasonably normal (mean = 54.3%, median = 57.1%, SD = 29.6).

Table 2 shows characteristics of the respondents and their work. Workers were professionals if they had specialized scientific or intellectual training and did not generally supervise; technical work involved the applied sciences. Social workers or lawyers were classified as non-technical professionals; engineers and computer programmers were technical professional workers. Bookkeeping was both technical and clerical.

Routineness of work was measured by the Withey, Daft and Cooper (1983) 5-item measure. Items were combined into an internally consistent scale (alpha = .88) that was approximately normally distributed (Mean = 2.45, SD = .72).

Table 1. Distribution of Responses

WORK GROUPS (N=89)

Unionization	
None of the workers	80%
Some of the workers	9%
All of the workers	11%

Number of workers at site	
4-100	39%
100-500	30%
500-1000	8%
1000-9000	23%

Sector	
Service	74%
Manufacturing	26%

OUTCOME MEASURES (N=623)

Income	
Under $10,000	5%
10,000 to 25,000	40%
25,000 to 50,000	44%
Over 50,000	11%

Computer Terminals	
Share terminals	49%
Have one of my own	51%

PREDICTORS STATISTICALLY CONTROLLED

Number of workers in parent company	
7 to 200	25%
200 to 1,000	15%
1,000 to 10,000	25%
10,000 to 50,000	12%
50,000 to 200,000	23%

Hours/week at the Computer	
Less than 5	14%
5 to 10 hours	18%
10 to 20 hours	20%
20 to 30 hours	22%
30 to 40 hours	20%
More than 40	6%

Years of Computer Experience	
None	4%
Less than 1 year	10%
1 to 5 years	46%
5 to 10 years	29%
More than 10 years	11%

Computer Skills	
Data entry	74%
Application package	59%
Programming language	25%
Machine language	9%
Hardware/systems	1%

Table 2. Individual-Level Predictors of Income

Occupation	
Executive/managerial	12%
Technical professional	18%
Non-Tech. professional	21%
Sctry/Technical-clerical	19%
Clerical	28%
Other	2%
Supervise Others	
Yes	71%
No	29%
Education	
Less than college	19%
Some college	38%
Bachelor's degree	17%
Masters degree	22%
Doctoral degree	4%
Job Tenure	
Less than 6 months	15%
6 months to 1 year	14%
1 to 2 years	18%
2 to 5 years	27%
5 to 10 years	17%
More than 10 years	9%
Sex	
Male	36%
Female	64%
Group Function	
Managerial/Administrative	21%
Non-Tech. Professional	21%
Technical Professional	30%
Clerical	28%
Hours worked per week	
Less than 40	15%
40	47%
More than 40	38%
Organizational Tenure	
Less than 6 months	9%
6 months to 1 year	8%
1 to 2 years	12%
2 to 5 years	24%
5 to 10 years	24%
More than 10 years	23%
Age	
Under 25	12%
26 to 35	38%
36 to 45	28%
46 to 55	16%
Over 55	6%
Marital Status	
Married	56%
Unmarried	44%

The distribution of responses for measures of employee characteristics (sex, marital status, education, age, supervising others, job and organizational tenure, group function, and hours worked per week) are also shown in Table 2. When the data were collected, minority status was too sensitive to include.

Results were hypothesized to differ by occupation. Additional descriptive statistics are available from the author.

3.2 Analysis Performed

Hypothesis one was tested with simple correlations. Multiple regression was used to test hypotheses two, three and four by estimating the effects of the individual demographic, work and organization variables on the two outcome measures. Separate models were developed for each of the outcome variables (income and computers). The models also included, as control variables, computer skills, experience and use. All analyses outlined were performed for the total sample. The sample was then divided into five groups based on the worker's occupations and the two regression models were repeated for each of the groups.

The use of a dichotomous measure of computer resources as a dependent variable technically violated the assumption of regression that dependent variables be normally distributed. However, the practice is common and considered valid (Cohen and Cohen 1983, p. 241), especially for large samples when the ratio of the dichotomous values is not too skewed (Hays 1981, pp. 211-214; McGhee 1985, pp. 188-189). Using multiple regressions for both dependent measures facilitates the comparison of results and is consistent with previous work on status.

Table 3. Simple Correlations between Income and Computers

	SIMPLE r	SIMPLE r^2
TOTAL SAMPLE	.148 ***	.022 ***
WORKERS IN DIFFERENT OCCUPATIONS		
Managers/Executives	.100	.010
Technical Professionals	.290 **	.084 **
Non-Technical Professionals	.161 *	.026 *
Secretary/Tech.-Clerical	.161 *	.026 *
Clerical Workers	.200 **	.040 **

* p<.05; ** p<.01; *** p<.001; **** p<.0001

Each path to the model was tested by estimating the unique variance contributed to the outcome measures by each of the three sets of predictors and by the control variables through blocked multiple regression. This procedure is a form of stepwise regression in which the entry of a block of variables is based on theory and is controlled by the researcher. This provides estimates of the unique contribution to variance made by a block of variables, controlling for the effects of all other predictor or control variables. Multicollinearity shrinks the amount of unique variance accounted for by each of these paths. Therefore, a second set of blocked multiple regressions was used to estimate the size of the joint effects of organization, employee and work characteristics over and above the control variables. Whenever occupation or group function was included as a predictor in a model, it was dummy coded with "clerical" omitted.

4. RESULTS

The simple correlations between income and having one's own computer terminal are presented in Table 3. Hypothesis one was supported for the entire sample of respondents; the correlation was statistically significant (r=.148; p<.001), but small, accounting for only 2.2% of the variance. Exploratory analyses of the hypothesized moderator of this relationship (occupation) were also performed. Correlations for workers in different occupations did differ from one another and from the results for the sample as a whole. The correlation was strongest for technical professional workers (r=.290; p<.01), and still quite strong for clerical workers (r=.200; p<.01). The correlation was similar to that for the overall sample for non-technical professional workers (r=.161; p<.05) and for secretaries and technical-clerical workers (r=.161; p<.05). No statistically significant correlation was found between income and computers for managers and executives (r=.100; n.s.). Thus, hypothesis one was supported for the entire sample and for professionals, secretaries, and clerical workers, but not for managers or executives.

Table 4 shows the results of blocked multiple regressions. Supporting hypotheses two, three and four, job, individual, and organizational characteristics were predictive of income and computers when computer skills and experience were controlled. Job characteristics were the most strongly related to the outcomes (income R^2=.166; p<.0001, computers R^2=.034; p<.01) but individual characteristics (income R^2=.087; p<.0001, computers R^2=.020; p<.05) and organization size (income R^2=.004; p<.05, computers R^2=.004; p<.05) were also related. The predictors accounted for a larger percentage of the variance in income than in computers. Table 4 also shows the results of blocked multiple regressions estimating the size of the joint effect of organization, job and individual characteristics on income and computers. They were more strongly related to income (R^2=.465; p<.0001) than to computers (R^2=.071; p<.0001). However, these predictors (associated with status) accounted for a unique 7.1% of the variance in computer resources while computer use accounted for a unique 9.7%. Thus the distribution of computer resources was affected roughly equally by status and need. Due to space constraints, final standardized regression coefficients are available from the author.

Table 4. Multiple Regressions Predicting Income and Computers from Each of Five Sets of Predictors Holding Constant All Others for Total Sample, Managers, and Technical Professionals

TOTAL SAMPLE	INCOME MULT. R^2	COMPUTER MULT. R^2
TESTS OF PATHS		
Org. Characteristics	.004 *	.008 *
Job Characteristics	.166 ****	.034 **
Indiv. Characteristics	.087 ****	.020 *
Computer Skills & Exp.	.007	.014
Computer Use	.001	.100 ****
TOTAL MODEL	.539 ****	.219 ****
EFFECT SIZE	.465 ****	.071 ****
WORKERS IN MANAGERIAL OR EXEC. JOBS		
TESTS OF PATHS		
Org. Characteristics	.000	.017
Job Characteristics	.077	.072
Indiv. Characteristics	.163 *	.077
Computer Skills & Exp.	.026	.044
Computer Use	.038	.010
TOTAL MODEL	.520 ***	.234
EFFECT SIZE	.346 ***	.186
WORKERS IN TECHNICAL PROFESSIONS		
TESTS OF PATHS		
Org. Characteristics	.011	.002
Job Characteristics	.071	.127 ***
Indiv. Characteristics	.196 ***	.033
Computer Skills & Exp.	.037	.153 ***
Computer Use	.001	.054 **
TOTAL MODEL	.409 ***	.557 ****
EFFECT SIZE	.356 ****	.191 **

* $p<.05$; ** $p<.01$; *** $p<.001$; **** $p<.0001$

4.1 Moderators

Although there was insufficient information to allow development of specific hypotheses for occupation, it was included as a moderator. The results of these exploratory analyses are shown in Tables 4 and 5 and discussed below.

Table 4 shows the results of blocked multiple regression for managers and executives. Contrary to hypotheses two and four, neither organizational (R^2=.000; n.s.) nor job (R^2=.077; n.s.) characteristics were predictive of income or of computers (organization R^2=.017; n.s.; job R^2=.072; n.s.). Hypothesis three received mixed support. Individual

characteristics were predictive of income (R^2=.163; p<.05,), but not of computers (R^2=.077; n.s.). The joint effect of organization, job and individual characteristics on income was significant (R^2=.346; p<.01), but was not significant for computers (R^2=.186; n.s.). Thus, for managers, the distribution of computer resources was not affected by status or need. Perhaps this is because managers are quite diverse.

For technical professionals, hypothesis two received mixed support. Job characteristics were not predictive of income (R^2=.071; n.s.) but were predictive of computers (R^2=.127; p<.001). Hypothesis three received mixed support; individual characteristics were predictive of income (R^2=.196; p<.001,), but not of computers (R^2=.033; n.s.). Hypothesis four was not supported; organization size was unrelated to income (R^2=.011; n.s.) or computers (R^2=.002; n.s.). The joint effect of organization, job and individual characteristics was statistically significant for income (R^2=.356; p<.0001) and for computers (R^2=.191; p<.01). Thus, for technical professionals, the distribution of computer resources was affected almost equally by status and need. This result was consistent with anecdotal evidence regarding technical professionals' interest in technical equipment. An examination of the beta weights indicates that having one's own terminal was uniquely associated with doing less routine work.

Table 5 shows the results for non-technical professionals. Supporting hypotheses two and three, both job and individual characteristics were predictive of income and computers. Job characteristics were more strongly predictive of both income (R^2=.189; p<.0001) and computers (R^2=.122; p<.001) than were individual characteristics (income R^2=.083; p<.05, computers R^2=.086; p<.01). Hypothesis four received mixed support with organizational characteristics predicting computers (R^2=.076; p<.0001) but not income (R^2=.004; n.s.). The joint effect of organizational, job and individual characteristics was statistically significant for income (R^2=.286; p<.0001), and for computers (R^2=.338; p<.0001). Thus, for non-technical professionals, the distribution of computer resources was affected more strongly by status than by need. An examination of the beta weights indicates that having one's own terminal was uniquely associated with less education, doing more routine work, and not supervising others.

For secretaries and jobs that are both technical and clerical, both hypotheses two and three received partial support. Job characteristics predicted computers (R^2=.100; p<.05), but not income (R^2=.059; n.s.). Individual characteristics predicted income (R^2=.100; p<.05), but not computers (R^2=.022; n.s.). Hypothesis four was not supported. Organizational characteristics were unrelated to income (R^2=.020; n.s.) or computers (R^2=.008; n.s.). The joint effect of organization, job and individual characteristics was statistically significant for income (R^2=.186; p<.05), but not for computers (R^2=.130; n.s.). Thus, the distribution of computer resources was not affected by status (although it was affected by need).

For clerical workers, both job and individual characteristics predicted income (job characteristics R^2=.133; p<.0001, individual R^2=.102; p<.001), but not computers (job characteristics R^2=.062; n.s., individual R^2=.022; n.s.). Hypothesis four received partial support with organizational characteristics predicting computers (R^2=.020; p<.05), but not income (R^2=.009; n.s.). The joint effect of organizational, job and individual characteristics was statistically significant for income (R^2=.270; p<.0001), but not for computers (R^2=.111; n.s.). Thus, the distribution of computer resources was not affected by status but was affected by need. It is possible that secretaries and clerical workers do not generally have sufficient power to obtain computers for symbolic purposes.

5. DISCUSSION

In sum, the distribution of computer resources does resemble weakly that of income for the sample as a whole, but occupation affects their degree of similarity. Providing evidence of possible symbolic value, computers were, in part, allocated according to use for all types of workers except managers and executives, but for none of the subsamples was use the only factor predicting whether or not workers had their own terminals. For professionals, secretaries and technical-clerical workers, income and computers were correlated and characteristics of the organization, individual or job were associated with income or computers. For professionals, status and need were almost equally important in determining the distribution of computer resources.

For clerical workers, computer resources and income were related when tested with a simple correlation, but not when tested with the more complete model. Perhaps the use of computers as status symbols depends upon both their symbolic value and on sufficient influence to obtain equipment for symbolic purposes. Clerical workers may not hold enough power to use computers as status symbols. For managers or executives, income and computers were not correlated and organizational, individual and job characteristics were not associated with computers. Thus, the distribution of computer resources did not resemble that of income for these workers. This group of respondents represented many levels of management from diverse functional areas (such as engineering, sales, and clerical pools) and this diversity may have attenuated any clear status effects.

Table 5. Multiple Regressions Predicting Income and Computers from Each of Five Sets of Predictors Holding Constant All Others for Non-Technical Professionals, Secretary/Technical-Clerical Workers, and Clerical Workers

PREDICTORS	INCOME MULT. R^2	COMPUTERS MULT. R^2
WORKERS IN NON-TECHNICAL PROFESSIONS		
TESTS OF PATHS		
Org. Characteristics	.004	.076 ****
Job Characteristics	.189 ****	.122 ***
Indiv. Characteristics	.083 *	.086 **
Computer Skills & Exp.	.057	.034
Computer Use	.036 *	.079 ***
TOTAL MODEL	.448 ****	.525 ****
EFFECT SIZE	.286 ****	.338 ****
WORKERS IN SECRETARIAL OR TECHNICAL-CLERICAL JOBS		
TESTS OF PATHS		
Org. Characteristics	.020	.008
Job Characteristics	.059	.100 *
Indiv. Characteristics	.100 *	.022
Computer Skills & Exp.	.013	.007
Computer Use	.048 *	.208 ****
TOTAL MODEL	.280 *	.312 ***
EFFECT SIZE	.186 *	.130
WORKERS IN CLERICAL JOBS		
TESTS OF PATHS		
Org. Characteristics	.009	.020 *
Job Characteristics	.133 ****	.062
Indiv. Characteristics	.102 ***	.022
Computer Skills & Exp.	.058 *	.009
Computer Use	.001	.083 ***
TOTAL MODEL	.380 ****	.239 **
EFFECT SIZE	.270 ****	.111

* p<.05; ** p<.01; *** p<.001; **** p<.0001

Previous findings regarding predictors of income were replicated for the sample as a whole, which indicates that the sample was probably representative and the measures were valid. Analyses indicated preliminary evidence of similarity between the distribution of income and that of computers. The moderated analyses were primarily exploratory because previous work on income allocation has not focused on moderators such as occupation and no relevant theories were adequate for deriving predictions. For some types of workers, having one's own computer and

higher income were slightly positively correlated and some predictors of income were also related to having one's own computer terminal. There is evidence that the basis of allocation may depend upon the nature of the work performed.

Previous research indicates that any object that conveys meanings and values to those who encounter it (Dandridge, Mitroff and Joyce, 1980; Morgan, Frost and Pondy 1983) and is allocated differentially to workers based on their rank can act as a status symbol (Steele 1973a). This paper presented quantitative evidence that computer resources were not allocated solely according to use but were distributed according to rank (as indicated by income). Thus, they may be able to act as status symbols particularly among professionals.

In many situations the allocation of computers may engender the same degree of conflict as the allocation of office space, although organizations may negate the symbolic value of computers by allocating identical equipment to each worker. Managers who recognize the power-related implications of computer resources should be better able to understand "irrational" responses (such as requests for little used equipment) and be able to manage more effectively. Management may even want to purchase equipment that is not objectively required (investing a relatively small amount of money) in order to retain and motivate a valued employee. Either decision (purchasing or not) may provide a signal to the employee regarding status. Computer resources may also provide a signal about the organization to prospective employees, clients and regulators: if the symbolic value of computers is recognized, managers can display them to enhance the firm's image.

As computer equipment becomes less expensive, it represents a relatively small fraction of compensation packages and may play a pivotal role in signalling both the modernity of the organization and the value of an employee to the company. Organizations recognizing the symbolic value of computer resources can choose to integrate them into their compensation system. Some organizations have already moved in this direction; more may be able to do so.

These findings also have implications for researchers interested in organizational symbols. Because respondents are generally unable to describe many of their symbols (Argyris and Schon 1978), the study of organizational symbols has remained primarily an idiographic, qualitative endeavor drawing heavily on anthropological research methods. Few studies have attempted to identify consistent patterns, classify common symbols, or test models with quantitative data from respondents in multiple organizations (see Ornstein 1986 and Safayeni, Purdy and Higgins 1989 for exceptions). In contrast to previous work, this study used a normative approach and quantitative data in an attempt to classify one object (the computer terminal) as a possible status symbol by identifying distribution patterns and comparing them to a more commonly accepted status symbol (income).

However, because the information collected about the symbolic nature of computers (their distribution) and about status (income) is indirect, there may be alternate explanations for the reported results. Although some may argue that direct questions about the symbolic value of computers would be preferable, it may also be extremely difficult to collect accurate information more directly from workers responding to questionnaires. Symbols embody the values of the group (what "ought" to be), but members may be unable to examine the invisible assumptions that explain why things "ought" to be this way (Schein 1985).

This study has several limitations; many worked to attenuate the results. First, the sample was one of convenience on which secondary analyses were performed. A small number of categories were used to code some measures and organizational policies regarding the allocation of computers and income were not elicited. Second, as with most survey-based field studies, there were many sources of uncontrolled variance, thus, the percent of variance accounted for was generally quite small. Third, although a sample of 623 is larger than usual for behavioral research, it is much smaller than that used in similar work on income inequality (using census data). The small sample size severely curtailed statistical power and moderated regressions further shrank sample sizes. Dividing the sample according to the hypothesized moderators may have restricted the range of some variables, again attenuating the results. Multiple statistical tests were performed, inflating the Type I error rate. Fifth, no information is provided about the mechanism by which computers are allocated or the direction of causality. This distribution may reflect allocators' preferences or workers' demands for equipment. Finally, the data were collected in one region of the U.S.

6. CONCLUSION

The "tool" metaphor does not adequately describe the relationship between computer terminals and their users. This paper reports empirical field research suggesting that having one's own computer could be a status symbol. As cultural artifacts, computer resources were distributed in a manner that indicates they could transmit status information and may have significant symbolic value. Computer equipment and income were correlated and shared some of the same predictors; these relationships were moderated by

the nature of the work performed. It is not clear that having one's own computer was acting as a status marker, but it probably could do so.

This evidence of extra-rational computer resource distribution in diverse settings provides a first step in assessing the symbolic value of computer artifacts and suggests that subsequent steps may prove fruitful. Future work should focus on bracketing more closely the true effect sizes for various organizations and occupations; a larger, representative sample drawn from census data could be used. Additional work should also include workers' perceptions of the status conferred by computer resources and more detailed measures of both status and computer equipment should be developed. Finally, the mechanism by which symbolic value may affect allocation decisions and the distribution of computer resources should be investigated. Specifically, the nature of the heuristics used by allocators and the mechanisms used by workers to influence allocation should be examined. It may also prove fruitful to consider the possibility of a self-fulfilling prophecy (e.g., I get a computer because I am valued by the organization and having a computer makes me look more valuable).

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