WORK ECOLOGY, TECHNICAL RELATIONS AND SOCIAL INTERACTION IN AN AUTOMOBILE PLANT

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ABSTRACT

WORK ECOLOGY, TECHNICAL RELATIONS AND SOCIAL INTERACTION IN AN AUTOMOBILE PLANT

By Frank Holland

This study attempts to ascertain the relationships between technology and ecology as they pertain to spatial dimensions of work, size of the work group and the amount of social interaction required or allowed at work. Further, it attempts to ascertain the relationship between socio-technical interaction and job satisfaction, union participation, and community involvement.

The sample consists of 306 automobile workers of various skill levels. The research stems from the assumption that the technology of automobile production serves to set ecological boundaries for the worker which in turn affects his social interaction possibilities.

The findings point to a general satisfaction with the work environment, job, union, and community of residence. The data related to work environment satisfaction and interaction, while not statistically significant, indicate there is a tendency toward a positive relationship with technical interaction, and a tendency toward a negative association with total interaction. No discernable pattern

occurs between social interaction and work environment satisfaction.

Job satisfaction is somewhat associated with all dimensions of interaction, social, technical, and total, although the tendency in the data points to a negative relationship between these variables.

No distinguishable pattern is present between technical interaction and union participation. There is a tendency for a positive association to exist between social interaction and union participation. The association between total interaction and union participation is statistically confirmed.

Finally, the index of social interaction tends to be positively associated with community involvement. A pattern is apparent between total interaction and the community involvement of the worker.

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By

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CHAPTER I

WORK ECOLOGY AND SOCIAL INTERACTION

> Men alone do not give mass production. Mass production is achieved by both men and machines. And while we have gone a long way toward perfecting our mechanical operations we have not successfully written into our equation whatever complex factors represent man, the human element.
>
> Henry Ford II

Mass production technology has given birth to a new environment for modern man. Although people feel the influence of technology in the modern world in many ways, we shall examine only its impact upon men at work. The industrial worker spends much of his work day controlling or being controlled by machines. He lives in an environment which is conditioned directly by technology. We shall consider how work ecology, as determined by technology, affects the nature of social interaction at work. In addition we shall examine how technology and work ecology affect attitudes toward the job, work environment, union, and community.

For many years mass production technology was almost disregarded by social scientists. It seemed to be the preserve of philosophers, propagandists, and businessmen. Many who had never been inside the walls of a factory denounced all elements of it as evil. The ideologist especially deplored the process of dehumanization allegedly accompanying it.

> Those who people factories, do not feel them, (the noises and feelings of production rhythm) except in rare and fleeting moments, for they are not free. They can experience them only when they forget that they are not free; but they can rarely forget, for the thousand and one little details which, in the work day, makes their servitude apparent.[1]

On the other hand, many big businessmen and industrial managers supported the point of view of Henry Ford, who idealized the human results of mass production. He stated:

> As to the contention that machines thus become the masters of men, it may be said that machines have increased men's mastery of their environment, and that a generation which is ceaselessly scrapping its machines exhibits few indications of mechanical subjection.[2]

In the early 1920's Elton Mayo began to study systematically the human effects of mass production. Inspired by the work of the British Medical Council, Mayo focused his attention upon fatigue associated with repetitive work in a modern factory. He later was concerned with the problem of boredom and other clinical symptoms associated with repetitive work.[3] Other studies shortly thereafter pointed to "pacing" as a factor equally important in causing fatigue. Later many studies related repetition and pacing of work to other factors associated with mass production technology, such as job satisfaction, executive functions, communication, formal and informal groupings, alienation, motivations, and

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[1]Simone Weil, "Factory Work," translated by F. Giovanelli, Politics, December, 1946, pp. 369-370.

[2]Henry Ford, "Mass Production," Encyclopedia Britannica, pp. 38-40.

[3]Elton Mayo, The Human Problems of an Industrial Civilization, New York, The Macmillian Co., 1933, pp. 1-95.

productivity. Yet they avoided the specific question of the effects of different technologies on social interaction of workers in and outside the work situation.

Focus: Technology, Ecology, and Verbal Interaction

The effects of technologically shaped work ecologies in automobile assembly plants on the verbal interaction rates of workers is the subject of this paper. We intend to study how different technological requirements affect the distribution of workers in space, (ecology) and how this distribution might affect the amount of verbal interaction among workers. It is hypothesized that these relationships will have a direct bearing upon worker satisfactions both within and outside the plant.

Clearly, the ecology and technology of any given industry conditions the kind of work groups which can emerge, as well as the patterns of interaction among the workers. We may illustrate two extremes. The giant furnaces within steel mills require the close cooperation of between five to twenty-five men as a team or as a series of teams to insure proper operations. On the other hand, the modern automated chemical plant may isolate workers who monitor various instruments in control areas which are spatially separated. Between these extremes there is a wide range of variation both between and within different industries. Some workers may work in an ideal physical layout; one with a low noise level, and a favorable managerial orientation which permits them to interact

freely. Others are limited in the nature and type of social interaction in which they may take part, because of the technical demands of their assigned tasks. People on various kinds of assembly lines typically form weakly based work groups.[4] Here the technology frequently does not demand team action, nor does it provide much opportunity for social interaction.

Technology and Work Satisfaction

The basic assumption upon which this study rests is that certain historical changes in the structure and technology of industry have given rise to a differing form of production, factory social structures, and work relationships. Yet the recent literature in this area implies a uniform technology which causes the worker to be dissatisfied with his work role. It suggests that he rejects the impersonal, technologically dominated work world and seeks his identity outside the work environment.

A number of scholars have asked whether work is in fact of central life importance to an individual. For example, Daniel Bell asks, if auto workers are no longer receiving their satisfactions and central life values from their world of work, where do they receive them? He answers his own question;

> Few auto workers today have a future beyond their job. Few have a chance for social advancement. But they are not radical: What has happened is that old values have been displaced, and the American Dream has been given a

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[4]Leonard Sayles, Behavior of Industrial Work Groups, New York, John Wiley & Son, Inc., 1958.

> new gloss. Success at one's job becomes less important than success in one's life style.[5]

While a number of writers tend to accept the notion of the separation of the worlds of work and non-work, Nosow and Form emphasize that work is still a major link between men and their society. They state:

> The separation of work from the other realms of life has been erroneously interpreted by some as indication that work is no longer a central life interest of modern man. The available evidence does not confirm this, for work continues to be the driving force giving direction and meaning to contemporary living. While it is true that work satisfaction tends to decrease with the level of occupational skill, work still occupies a central role in the lives of most people. The primary reason for this is that there is no other activity which provides as much social continuity to life as does work. Certainly, leisure has not yet replaced work as a central organizing principle of life. It is work, not leisure, that gives status to the individual and his family.[6]

The conflict in viewpoints is obvious. How does one settle the differences? First, it is obvious that work means different things to people in different occupational groups. Studies of different occupations by Dubin, Orzack, Morse and Weiss, and Arensberg[7] among others, document this observation.

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[5]Daniel Bell, The End of Ideology, New Revised Edition, New York, Collier Books, 1961, p. 225.

[6]Sigmund Nosow and William H. Form, Man, Work and Society, New York, Basic Books, Inc., 1952, p. 11

[7]Robert Dubin, "Industrial Worker's Worlds: A Study of the General Life Interests of Industrial Workers," Social Problems, Jan. 1956; Louis H. Orzack, "Work as a Central Life Interest of Professionals; Social Problems, fall, 1959; Conrad M. Arensberg, "Work and the Changing American Scene," Research in Industrial and Human Relations, New York, Harper and Bros., Inc., p. 58; Nancy C. Morse and R. S. Weiss, "The Function and Meaning of Work and the Job," American Sociological Review, April 1955, p. 191.

Secondly, certain problems arise in the study of the meanings of work and work satisfaction, either in historical or contemporary analysis. Specifically, with respect to current studies, the data generally available are the results of directing questions to people asking what they like or dislike about their work. But workers may not be able to verbalize what work means to them. For example, Friedman and Havighurst found that semi-skilled workers said they worked for economic reasons and that they looked forward to their retirement. However, upon retirement, it became apparent that for most of them work was an integrative force in their lives.[8]

Third, a fundamental weakness of many studies on worker satisfactions is their lack of concern with non-work environment. Only recently has the meaning of work been approached by evaluating the meanings of other related activities such as leisure, retirement, and unemployment. We take the position that, regardless of other social activities, work continues to provide social continuity to an individual's life. We hypothesize that factors which affect work satisfaction affect other areas of life and vice versa, for example, community involvement.

Technology and Ecology

We have chosen to investigate some technological aspects of modern assembly production which affect the location

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[8] E. A. Friedman and R. J. Havighurst, et al., The Meaning of Work and Retirement, Chicago, University of Chicago Press, 1954, p. 41.

of workers within an automobile factory. The technologically conditioned ecology sets limits and conditions social behavior such as the interaction potential, the size of the work group, friendship patterns, union activity, and the like. That is, the ecology affects a number of factors related to worker satisfaction.

Contrary to popular belief, the work ecology of an automobile factory varies considerably. Some workers are, in effect, ecologically isolated. The technological requirements of their particular task allows them no physical mobility and very limited verbal interaction possibilities. Others are in ecological situations which permit them reasonable degrees of physical mobility and opportunities for verbal exchange with fellow workers. Still others have a great deal of physical mobility within the department, the section or the entire plant. These have the greatest potential for social interaction with workers of varying social characteristics.

Summary

The technological requirements of production in some degree affect the ecological situation where work is done. Both the physical and social ecology of work are so affected. Varied amounts and types of interaction may be required by the very types of machine used and by their physical spacing. The interaction which is technologically provoked may of course also affect non-work behavior and attitudes. That is, the structural characteristics of work ecology may affect the

worker's orientations toward his job, work environment, union and community.

We shall examine how ecology and technology of an automobile factory affect the spatial dimensions of work, the size of the work group, and the amount of interaction at work. We shall then ascertain whether socio-technical interaction affects job satisfaction, union participation, and community involvement.[9]

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[9]The usage of the terms social and technical interaction serve as a shorthand method to express the particular orientation of the social interaction within which the actor is engaged. While patently true that all interaction at a verbal level is social, we shall distinguish as technical interaction that interaction which must occur in order for the worker to complete his task. Social interaction, on the other hand, is that interaction within which the worker participates freely and it is not required of him to perform his duties.

CHAPTER II

HYPOTHESES AND RESEARCH DESIGN

Eleven specific hypotheses are proposed in this study. They are formulated on the assumption that more work space, greater freedom of movement, and the greater interaction possibilities result in a larger network of choice of fellow workers with whom one may interact. Increased choice possibilities probably result in greater satisfaction with the total environment of work.[1] While we cannot demonstrate a direct relationship between more opportunity for interaction at work and increased union, neighborhood, and community integration we assume that some carry-over may be operating. That is, we expect that the greater amounts of verbal exchange allowed within the work situation, the greater will be the amount of satisfaction a worker experiences with his job, work environment, union and community. Further, we expect that varying degrees of technological freedom or control will condition the nature and type of the worker's verbal exchange. Finally we expect that skill levels will correlate positively with the degree of technological freedom or control.

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[1]This proposition underlies much of human relations theory. See for example, Rensis Likert, New Patterns of Management; New York, McGraw-Hill Book Company, Inc., 1961; Chris Argyris, Personality and Organization, New York, Harper Row, 1957; Elton Mayo, The Human Problems of an Industrial Civilization, New York, The Viking Press, 1933.

The eleven hypotheses are:

1. There is a positive relationship between the amount of technical interaction and the amount of satisfaction with the work environment.

2. There is a positive relationship between the amount of social interaction and the amount of satisfaction with the work environment.

3. There is a positive relationship between the total amount of interaction (technical and social) and the amount of satisfaction with the work environment.

4. There is a positive relationship between the amount of technical interaction and the amount of satisfaction with the job.

5. There is a positive relationship between the amount of social interaction and the amount of satisfaction with the job.

6. There is a positive relationship between the total amount of interaction (technical and social) and the amount of satisfaction with the job.

7. There is a positive relationship between the amount of social interaction and the degree of participation in the union.

8. There is a positive relationship between the amount of technical interaction and the degree of participation within the union.

9. There is a positive relationship between the total amount of interaction (technical and social) and the degree of participation in the union.

10. There is a positive relationship between the amount of social interaction and the amount of involvement within the community.

11. There is a positive relationship between the total amount of interaction (technical and social) and the amount of involvement within the community.

Research Design

This research paper is based upon a secondary analysis of data collected for a larger project.[2] The portion of data selected for analysis deals primarily with measures of social and technical interaction as they are related to the worker's attitudes and selected behavior patterns. The data are obtained from a stratified random sample of workers in selected department of an automobile factory in Lansing, Michigan. Lansing, capitol of Michigan, has a population of 120,000. A moderate percentage of this work force are employed by the automobile industry. Approximately half of the working force of this city live outside the city limits. The proportion of workers in this study living outside the city limits is slightly greater than one-half.

While Lansing is not a major metropolitan area, it is sufficiently representative to enable some application of these research findings to other industrial communities. The sample was not selected specifically to study "blue collar

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[2]William H. Form, Patterns of Social Integration Among Industrial Workers: A Comparative Analysis, in progress.

workers" or automobile workers in general. It was designed to investigate relationships between technology of a highly industrialized occupation and selected behavioral and attitudinal dimensions.

The sample is overly represented in skilled workers. The breakdown is as follows:

Number of Workers Interviewed as Classified by Skill Level	
Unskilled	142
Semi-skilled	82
Skilled	82
Total	306

Skill levels were defined as follows:

> Skilled: Skilled machine work, tool and die, experimental design, etc. A skilled worker required apprenticeship and journeyman status.
>
> Semi-Skilled: Operators or on semi-automatic machines, stamping machines, and fashioning machines.
>
> Unskilled: Assembly line work, and other unskilled work which requires very little training.

The workers' wages corresponded with skill level as defined by the organization. Wages for skilled workers are arrived at through collective bargaining by a separate bargaining unit.

Membership in the United Auto Workers Local 652 numbered 9,100 workers in 1962. There were 1,700 in the skilled trades, and 7,400 classified as unskilled production workers. The production worker category was divided into categories of assembly and non-assembly line workers. This latter distinction was a factor in the determination of wage rates. The

sample included a number from each category of skill level. Those with less than one year of seniority were eliminated from the study. The remainder of the sample were contacted by letter and a time was arranged for an interview in the worker's home. The refusal rate was approximately 7 per cent of the sample. A comparison of those refusing to be interviewed with those who cooperated reveals little or no differences.

The interviews were conducted in the homes of the workers, and lasted for a mean time of 1-1/2 hours. The interviewing was done within a two-month period in the summer of 1962. This was a period of changeover, retooling, and temporary lay-off for the factory.[3]

Dependent Variables

1. Job Satisfaction
2. Work Environment Satisfaction
3. Union Participation
4. Community Involvement

Independent Variables

5. Index of Total Potential Interaction
6. Density of Total Potential Interaction

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[3]The interview schedules were coded and put onto IBM cards. The data were tabulated by the CD 3600 computer. The data representing interaction information had been coded in a manner which was unacceptable to the computers' standard contingency table program ACT TWO Additional difficulties stemming from the same source were encountered in re-coding the data into a suitable form. These problems were finally solved through the extensive efforts of Mr. Frank Mulvihill, a graduate student in the Sociology department. The re-coding allowed us to construct indices with raw scores ranging from 000-999. The range was collapsed into three or four major categories for tabular presentation. The breaking points were established by an examination of the marginal frequencies.

7. Density of Work Place Mates
8. Degree of Friendly Interaction at Work
9. Degree of Friendly Interaction Outside the Plant
10. Degree of Actual Total Interaction
11. Density of Actual Total Interaction
12. Degree of Technical Interaction
13. Density of Technical Interaction
14. Index of Potential Social Interaction
15. Index of Actual Social Interaction
16. Measure of Potential Social Interaction
17. Density of Actual Social Interaction

The explication of these variables and the listings of the questions used are found below.

Dependent Variables

Variable I: Job Satisfaction. This measure is constructed from responses to these items:

> How about the operation you actually perform on your job?
> On the whole how do you feel about the work you are actually doing?
>
> Would you like, without a change in pay, to change the type of work activity once in a while?

Variable II: Work Environment Satisfaction. This index was formulated from responses to these questions:

> On the whole, do you like the actual place or location where you work or not?
>
> How do you feel about daily contacts with fellow workers?

Variable III: Union Participation. This measure is constructed from responses to these questions:

> Do you attend local meetings?
>
> Do you hold an office in the union?
>
> Do you participate in union activities?
>
> Do you know the names of the current union officers?

Did you vote in the last local election?

Variable IV: Community Involvement. This index is designed from responses to these questions:

Do you like living in_____?

Are you a member of a voluntary association?

Problems of the community, mentioned, not see, other?

Independent Variables

The independent variables refer to the various dimensions of interaction. The indices which follow may be expressed in formula form. W = the number of workers located within the work space as indicated by the respondent. The size of the space is indicated by the respondent as the distance within which he may freely move during the course of work. The range will vary according to the degree of physical mobility the respondent has. This will vary from the absolute restrictions on his movement to free mobility throughout the plant. W_I = the number of workers located within the respondent's workspace with whom the respondent may actually talk (interact) during the work day. The measure does not include scheduled breaks within the work day such as coffee or lunch. Furthermore, it does not distinguish between social as opposed to technical interaction.

W_T = the technical dimension of the respondent's interaction. It refers to the number of workers the respondent must talk with in order to do his job.

W_A = the actual number of workers the respondent interacts with during the work day.

S = the spatial distance within which the worker may freely move during the day. The distance ranges from no mobility or a few feet or yards to mobility in the shop, section, department or plant.

F_I = the number of confidants and intimate friends a worker has within the plant.

F_P = the number of friends the respondent has with the plant.

F_O = the number of plant friends the respondent has who continue this relationship outside the plant. In other words, it distinguishes plant based friendships from other associates the respondent may have. The interaction indices are as follows.

Index of Total Potential Interaction. The index is constructed from responses of this question:

> How many of these (workers located about the respondent) can you talk with, for one reason or another during actual working hours?
> While working? $= W_I$

Density of Total Interaction. This measure is derived from responses to these questions:

> How many of these (workers located about the respondent) can you talk with, for one reasons or another during actual working hours?
> While working?
>
> How far from your work place can you freely move about during work? (Yards in each direction--not at lunch, etc.)
> $= \frac{W_I}{S}$

Density of Work Place Mates. The number of workers located within the respondent's work space (W) divided by

the space in yards within which the respondent may freely move (S) yields this formula. Density of Work Place Mates $= \frac{W}{S}$

Degree of Friendly Interaction at Work. This index is constructed utilizing responses to these questions:

> If you had a very important and delicate personal problem and you wanted to confide in someone, are there among your fellow workers, people in whom you could confide and be certain that they merited your trust and would keep your secret? (If yes, how many)
>
> In general, how many good friends would you say you had in the entire plant?

The number of intimate friends or confidants within the plant (F_I) divided by the total number of plant friends (F_P) yields the following formula. Friendly Interaction at Work = $\frac{F_I}{F_P}$.

Degree of Friendly Interaction Outside the Plant. This index is derived from responses to this question:

> Do you have the occasion to meet with some of these (Plant friends) outside of work? With how many in all? $= F_O$

Degree of Actual Total Interaction. This index is constructed from responses to the question:

> With how many do you actually talk? (number of workers with whom interaction is possible) $= W_I$

Density of Total Actual Interaction. This index is composed of responses to these questions:

> With how many do you actually talk? (number of workers with whom interaction is possible)
>
> How far from your work place can you freely move during work? (yards in each direction--not at lunch, etc.)

The number of workers with whom the respondent actually talks (W_A) divided by the distance the respondent may freely move while working (S) gives this formula. Density of Total Actual Interaction = $\frac{W_A}{S}$.

Degree of Technical Interaction. This index is composed from responses to the question:

> With how many fellow workers must you talk during the work day? = W_T

Density of Technical Interaction. This measure is composed from responses to these questions:

> With how many fellow workers must you talk during the work day?
>
> How far from your work place can you freely move about during work? yards in each direction--not at lunch)

Dividing the number of workers with whom the respondent must talk to accomplish his work (W_T) by the space in yards within which the respondent may freely move while working (S) yields the formula. Density of Technical Interaction = $\frac{W_T}{S}$

Index of Potential Social Interaction. To obtain an index of purely social interaction we simply subtracted the degree of technical interaction required of a respondent (W_T) from the index of potential total interaction W_I. The formula is, Index of Social Interaction = $W_I - W_T$.

Index of Actual Social Interaction. This index refers to actual social interaction. It is derived by subtracting the number of workers with whom the respondent has to talk to accomplish his work (W_T) from the number of workers the

respondent actually talks to during the work day. The formula is, Index of Actual Social Interaction = $W_A - W_T$.

Density of Potential Social Interaction. This density index is constructed by dividing the index of potential social interaction ($W_I - W_T$) by the space in yards within which the respondent may freely move while working (S). The formula is, Density of Potential Interaction = $\frac{W_I - W_T}{S}$.

Density of Actual Social Interaction. This density index is constructed by dividing the index of actual social interaction ($W_A - W_T$) by the space in yards within which the worker may freely move while working (S). The formula is, Density of Actual Social Interaction $\frac{W_A - W_T}{S}$.

Figure 1 shows that a majority of the interaction indices are interrelated at statistically significant levels. We should not be very surprised that there is such a high degree of relationship among the indices. Basically, there are two indices, social and technical interaction. Each index can be analysed for the amount of potential interaction, amount of actual interaction, and density of interaction. Figure 1 suggests that social and technical interaction are related to each other and that the potential and actual amounts of interaction also strongly correspond.

Two dimensions which appear to be unrelated are; 1. friendly interaction at work, and 2. social interaction in transit to work. We may speculate as to why these indexes appear to be unrelated to the others. The index of social

FIGURE 1.--Interrelationships of the interaction indices*

	Density Total Interaction	Density Work Place Mates	Friendly Interaction at Work	Density Actual Total Interaction	Number You have to Talk To	Degree of Technical Interaction	Potential Social Interaction	Actual Social Interaction	Density Potential Social Interaction	Density Actual Social Interaction	Social Interaction in Transit
Density Total Interaction		0	-	0	-	0	0	-	0	0	+
Density Work Place Mates	0		*	0	-	0	*	-	0	0	-
Friendly Interaction at Work	-	*		-	-	-	-	-	-	-	+
Density Actual Total Interaction	0	0	-		-	0	0	0	0	0	*
Number have to Talk To	-	-	-	-		0	*	*	*	-	-
Degree of Technical Interaction	0	0	-	0	0		0	0	0	+	-
Potential Social Interaction	0	+	-	0	*	0		0	0	0	-
Actual Social Interaction	-	-	-	0	*	0	0		0	0	-
Density Potential Social Interaction	0	0	-	0	*	0	0	0		0	-
Density Actual Interaction	0	0	-	0	-	+	0	0	0		-
Social Interaction in Transit	+	-	+	*	-	-	-	-		-	

KEY

0 = .01
* = .05
+ = .10
- = not significant

*Many highly positive relationships occur because of the commonality of several elements which are utilized in the formulation of these several indexes.

interaction in transit to work is not related to the others probably because more than 80 per cent of the workers drive to work alone in their own cars. The journey to work may not be a social phenomenon. Absence of correlations between the indexes dealing with friendly interaction within and outside the plant and the other indexes is more difficult to explain. It suggests a lack of carry over of friendship in the interaction complex.

In sum, notwithstanding the presence of common elements, these interaction measures developed through the utilization of many dimensions of interaction at work and outside the plant are positively associated with each other and suggest a strong relationship exists among the various dimensions of interactions be they technically or social oriented.

CHAPTER III

WORK ENVIRONMENT SATISFACTION

The physical environment of this research site is a modern automobile plant. Its efficiency, hygenic and safety standards, medical facilities for on-the-job accidents, modern lighting, and good ventilation markedly contrast with the factory environment of previous eras. However, some conditions remain which have traditionally been sources of dissatisfaction to workers. Large noisy workshops and dirty production processes have not been completely eliminated, and modern ventilation systems do not yet adequately control the environment to everyone's satisfaction.

These physical conditions may become sociologically important for their effect on the overall pattern of worker satisfaction, however, their effect is limited. Once a certain standard has been achieved in the physical setting of work, it is unlikely that further improvements would generate increased worker satisfaction. If the standard falls below certain levels, dissatisfactions are likely to appear.

The human environment of work is also important to the worker. Undoubtedly there is an interaction effect between the physical and social environments, and we should not neglect one in favor of the other. As suggested in the previous

chapter, the physical environment to some extent shapes the social ecology of the factory. Walker states, "The technical nature of the work on the assembly line neither suggests nor compels interaction.[1] Nonetheless, production jobs often require workers to interact frequently because articulation of functions is needed to accomplish the assembly process. As Blauner's work indicates, variations in rates of interaction exist across industries, within the same department.[2] This variation may range from a job which neither requires nor permits verbal exchange, to jobs which require frequent exchange, communications and team work. We have called the type of verbal exchange required by the job, technical interaction.

We shall now examine some data on the physical aspects of the automobile factory as reported by workers in our sample. The distribution of their attitudes toward the physical environment is reported in Table 1. Approximately eight-tenths of the workers reported they liked their actual place of work. The reasons most often mentioned in Table 2 are good physical conditions, (light, airy, clean, etc.) the convenience of the work site, and work associates.

The question arises whether the amount of control the worker has over technology affects his evaluation of the work environment. First the distinction should be noted between

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[1]Charles R. Walker, The Foreman on the Assembly Line, Cambridge, Mass., Harvard University Press, 1956, p. 129.

[2]Robert Blauner, Alienation and Freedom, Chicago, The University of Chicago Press, 1964.

TABLE 1.--Satisfactions with physical setting of work

Category	N	Percent
Likes Work Place	244	79.7
Does Not Like Work Place	50	16.3
Always Changes	10	3.3
No Answer	2	0.7
Totals	306	100.0

TABLE 2.--Reasons for positive evaluation of work location

Category	N	Percent
Good Physical Conditions	159	52.0
Convenient Location	44	14.4
Good Work Associates	31	10.1
Other	52	17.0
No Answer	20	6.5
Totals	306	100.0

TABLE 3.--Distance in yards one is able to move while working

Category	N	Percent
Cannot Move	27	8.8
1-2 yards	17	5.6
3-5 yards	29	9.5
6-10 yards	19	6.2
More Than 10 yards	66	21.2
Move Freely in Section	31	10.1
Move Freely in Department	52	17.0
Move Freely in the Plant	59	19.3
No Answer	6	2.0
Totals	306	100.0

control over the technological process and skill level. As noted above, the sampling procedure selected departments with varying degrees of control over technological factors associated with production. In these departments there was some variation in the distribution of skills. The skill level of the individual is associated with a wage-rate which is fixed according to the type of operations performed, the time required for training, and necessity for or lack of an apprenticeship. Skill level is strongly associated with the degree of control a worker has over the technological process. The relationship is particularly strong for skilled and unskilled workers. It is slightly weaker for the semi-skilled because this category is not as internally homogeneous as the other two skill levels.

A separate classification is used to evaluate the degree of control the individual has over the technological process. The four categories of this functional classification are: (1) Assembly; (2) Machine Operator; (3) Testing, Repair; (4) Trades. Each level indicates a higher degree of control over the production technology.

Spatial mobility is importantly related to the level of control over production technology. A worker confined to a particular machine has less potential for social interaction than one who does not have to attend his machine closely and constantly. The question to ascertain the workers degree of physical mobility was, "How far from your work space can you freely move about during work, in yards?"

Data in Table 3 reveal that only about one-tenth of the workers are fixed at their work station. About four-tenths are able to move from their work position from one to ten yards in either direction, and half can move an even greater distance. This amount of mobility in the automobile plant runs contrary to popular notions that the worker is frozen to one spot. True, the technology of the assembly line workers permits only a limited degree of physical mobility. Yet only a slight minority of workers are so circumscribed as to have no mobility. These workers may be situated at machines which are isolated or they may monitor control equipment at a stationary locale.

We felt that the greater distance a worker was able to move from his work station the greater would be his satisfaction with his work environment. Skill level and type of function were thought to be positively related to amount of mobility. Table 4 presents the relationship between the skill level of the worker and the distance in yards he may move from his workspace; Table 5 presents the relation between the functional classification of his job and the distance he can move.

Table 4 clearly indicates a strong relationship between the skill level of the worker and the amount of physical mobility he has while working. The unskilled worker (mostly on the assembly line) generally cannot move from his work station or is allowed a distance of one to ten yards. The fact that some unskilled workers are able to move freely about their

section or department results from the fact that not all of the unskilled work on the assembly line. Those who have more physical mobility may be relief men, utility men, line supply men or other types of unskilled labor.

The data show that the semi-skilled indicated they have a greater degree of freedom from production technology than the unskilled. The majority of the semi-skilled are able to move about their work station. The skilled worker indicates a relative independence from the technological restrictions of his work station. Virtually no skilled worker is absolutely confined to his work station.

Table 5 presents the relationship between the functional classification of the workers' job and the distance within which he may move while working. The table offers an independent measure of control over production, as well as a verification of the utility of skill level as an index of control over the production technology. The data clearly indicate that those who have the least amount of control over production technology also have the least amount of freedom to move from their work station. On the other hand, those in the trades have most control over technology and exhibit the highest amount of physical mobility. The curvilinearity of the data for the assembly workers, machine workers, and testers indicate that the distance within which they may move is generally limited to their particular work section of the plant.[3]

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[3]The association between the distance one can move and work environment satisfaction is $x^2 = 11.2$, df = 6, $P < .10$.

TABLE 4.--Distance worker can move from his work station while working by skill level

Skill Level	Distance in Yards: Cannot Move	1-10 Yards	Throughout Section-up to 300 Yards	Throughout Dept. or Factory 300-800 or more Yards	Totals
	Percentages				N
Unskilled	16.4	35.7	28.6	19.3	100.0 (140)
Semi-skilled	3.8	8.8	57.5	30.0	100.0 (80)
Skilled	1.3	10.0	13.8	75.0	100.1 (80)
Totals	(27)	(65)	(97)	(111)	(300)

$\chi^2 = 109.28$, DF = 6, $P < .001$

TABLE 5.--Functional classification by distance worker can move from his work station while working

Functional Classification	Distance in Yards: Cannot Move	1-10 Yards	Throughout Section-up to 300 Yards	Throughout Dept. or Factory 300-800 or more Yards	Totals
	Percentages				N
Assembly	21.4	35.7	27.1	15.7	99.9 (70)
Machine Operator	12.2	24.3	37.8	25.7	100.0 (74)
Repair, Tester	3.1	18.8	48.4	29.7	100.0 (64)
Trades	1.1	10.9	20.7	67.4	100.0 (92)
Totals	(27)	(65)	(97)	(111)	(300)

$\chi^2 = 78.80$, DF = 9, $P < .001$

The utility of skill levels as a measure of control over production technology is supported by Table 5.

Social Dimensions of the Work Environment

The amount of satisfaction with the social setting of work was determined by responses to questions related to daily contacts with fellow workers. A degree of satisfaction with daily contacts is expected because we assume that few people can tolerate complete social isolation or continued dissatisfaction with the people with whom they are working. When asked how they felt about their daily contacts they had with fellow workers, over nine-tenths indicated that they were satisfied; furthermore, seven-tenths said that they always felt that way. These figures refer to satisfaction with the total amount of daily contacts with fellow workers.

The amount of technical interaction, i.e., required interaction, is the number of fellow workers with whom the respondent must talk in order to perform his job. The frequencies for technical interaction are found in Table 6. One quarter of the workers did not have to interact with anyone to accomplish their jobs. Approximately three-quarters did. Although the large majority of workers are involved in required interaction, significant differences should occur for various functional classes of jobs. Data in Table 7 indicate this relationship. A large percentage of workers (over 80 percent) at both the assembly and machine operator levels report either no required technical interaction, or a minimal amount of interaction with one to five fellow workers. The jobs performed

TABLE 6.--Number of workers with whom one must interact for technical reasons

Number	N	Percent
None	53	17.3
1-5 workers	99	32.4
6-10 workers	27	8.8
11 or more	29	9.5
Not Ascertained	98	32.0
Totals	306	100.0

TABLE 7.--Functional classification associated with the number of fellow workers with whom one must interact at a technical level

	Number of Workers					
Functional Classification	None %	1-5 %	6-10 %	11 or more %	Totals %	N
Assembly	33.3	50.0	4.8	11.9	100.0	(42)
Machine Operator	38.0	48.0	10.0	4.0	100.0	(50)
Repair, Tester	29.3	41.5	12.2	17.1	100.1	(41)
Trades	10.7	49.3	20.0	20.0	100.0	(75)
Totals	(53)	(99)	(27)	(27)		(208)

$\chi^2 = 22.5$, DF = 9, $P < .01$

TABLE 8.--Number of fellow workers with whom one must interact at the technical level according to skill level

	Number of Workers					
Skill Level	None	1-5	6-10	11 plus	Totals	
Unskilled	40.9	40.9	10.2	8.0	100.0	(88)
Semi-skilled	22.2	51.9	11.1	14.8	100.0	(54)
Skilled	7.6	53.0	18.2	21.2	100.0	(66)
Total N	(53)	(99)	(27)	(29)		(208)

$\chi^2 = 25.0$, DF = 6, $P < .01$

TABLE 9.--Number of fellow workers with whom a worker may talk at work according to skill level

	Number of Workers					
Skill Level	None	1-5	6-10	11 plus	Totals	
Unskilled	18.3	41.6	16.2	23.9	100.0	(142)
Semi-skilled	9.9	34.6	18.5	37.0	100.0	(81)
Skilled	1.2	25.9	18.5	54.3	99.9	(81)
Total N	(35)	(108)	(53)	(108)		(304)

$\chi^2 = 29.8$, DF = 6, $P < .01$

by repairmen, testers, and trades men require more technical interaction with fellow workers as these functions are more technological complex.

We turn from the required interaction for various functional groups to an examination of the potential interaction available for the several functional classifications. The nature of the production technology sets certain limits to the physical dimensions of the work space. Aside from the physical elements of noise, lighting, heat, etc., production machinery because of its immobility, serves to set limits on possible social groupings and interaction patterns. The assembly line spaces men along a narrow band or ribbon. This in effect limits their possible interaction to workers on either side or directly across from them.

The machine operator, however, may be even more limited in his potential social interaction. He must work at a stationary machine; the number of people with whom he may talk is determined by the positioning of the machines and the noise level in the section. The repair man or person in the trades has a greater potential for social interaction because he controls his machine and can potentially contact a greater number of fellow workers. Table 10 presents the relationship between the functional classification of jobs and the number of workers with whom the worker can talk while working. This measure differs from the technological interaction measure because it is the total number of people the worker can talk to for any reason. The data clearly show that those who have a greater

TABLE 10.--Functional classification for number of fellow workers with whom worker may talk while at work

Functional Classification	Number of Workers: None	1-5	6-10	11 or more	Totals
	Percentages				N
Assembly	10.1	44.9	20.3	24.6	99.9 (69)
Machine Operator	34.2	35.1	14.9	17.6	100.0 (74)
Repair, Testing	3.0	37.9	19.7	39.4	100.0 (66)
Trades	2.1	27.4	15.8	54.7	100.0 (95)
Totals N	(35)	(108)	(53)	(108)	(304)

$\chi^2 = 63.39$, DF = 9, $P < .001$

TABLE 11.--Skill level and work environment satisfaction

Skill Level	Work Environment Satisfaction: Low	Medium	High	Totals
	Percentages			N
Unskilled	4.4	18.3	77.4	100.0 (137)
Semi-skilled	3.7	19.8	76.5	100.0 (81)
Skilled	0.0	20.7	79.3	100.0 (82)
Total N	(9)	(58)	(233)	(300)

$\chi^2 = 3.67$, DF = 4, $.50 < P < .30$

*(Collapsing unskilled and semi-skilled yields $\chi^2 = 3.54$, DF = 2, $.10 < P < .20$)

degree of control over their jobs are able to interact with potentially more fellow workers. An interesting finding in this table is that machine operators or tenders are more restricted than assembly line workers with respect to possible interaction.

We have examined the physical and social dimensions of the work site separately and have seen that assembly workers and machine operators are limited in their physical mobility, by technological factors. This condition in turn affects the number of workers they can and do talk to while working. The worker who has a limited degree of control over production technology requires a limited amount of communication to do his job. Further, the physical mobility is more limited and this also restricts the number of fellow workers with whom he may talk.

The combination of the evaluation of the physical work site and the evaluations of contact with fellow workers comprise an index of satisfaction with the work environment. We expect that the higher skilled worker will exhibit a greater level of satisfaction with both, than his less skilled work mates. However, Table 11 indicates that the major portion of all workers, regardless of skill, are moderately or highly satisfied with their work environment. The expected relationship is only slightly supported. It is more clearly seen when functional classifications are used.[3]

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[3]The association between work environment satisfaction and functional classification is statistically significant at the .05 level of confidence; $\chi^2 = 13.82$, DF = 6, $P < .05$.

It has been noted that varied technologies require differential amounts of interaction among workers. Data on the relationship between technical interaction and work environment satisfaction are found in Table 12. Although the data do not satisfy the requirements of statistical significance ($P = < .05$), a trend is apparent. Excepting at the level of no interaction, an increase in the degree of technical interaction is generally accompanied by an increase in work environment satisfaction. Those most satisfied with the work environment are at opposite ends of the technical interaction continuum. A check on this relationship using skill levels as a control factor offers little additional information.[4]

The association between the density of technical interaction and work environment satisfaction fails to yield any recognizable pattern or trend.[5] When we introduce skill as a control variable, as in Table 13, a slight inverse relationship occurs. Although the table is not statistically significant, there may be a slight trend. Higher densities of technical interaction tend to be associated with more work environment dissatisfaction as one moves from the unskilled to the skilled worker categories. These findings suggest that high densities of technical interaction may be more important to the unskilled worker than to the skilled worker.

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[4]However, a strong association is in evidence when the functional classification of the job is associated with required technical interaction. $\chi^2 = 33.7$; $DF = 9$; $P < .001$.

[5]$\chi^2 = 0.05$; $DF = 1$; $P < .80$.

TABLE 12.--Amount of technical interaction associated with the amount of work environment satisfaction

Density of Technical Interaction	Degree of Work Environment Satisfaction: Low	High	Totals	
	Percentages			N
None	21.2	78.9	100.1	(52)
Low	28.4	71.6	100.0	(95)
Medium	14.8	85.2	100.0	(27)
High	17.2	82.8	100.0	(29)
Totals	(47)	(156)		(203)

$\chi^2 = 3.22$, DF - 3, .30 < P < 50

TABLE 13.--Density of technical interaction associated with the amount of work environment satisfaction controlling for skill level

Density of Technical Interaction	Low	High	Totals	
	Percentages			N
Low	21.4	78.6	100.0	(42)
Unskilled Workers				
High	19.2	80.8	100.0	(26)
$\chi^2 = 0.04$, DF = 1, .80 < P < .90				
Low	31.3	68.7	100.0	(16)
Semi-skilled Workers				
High	22.2	77.8	100.0	(18)
$\chi^2 = 0.35$, DF = 1, .50 < P < .70				
Low	31.6	68.4	100.0	(19)
Skilled Workers				
High	44.4	55.6	100.0	(9)
$\chi^2 = 0.44$, DF = 1, .50 < P < .70				
Total N	(33)	(97)		(130)

Less meaningful unskilled tasks may be compensated by a greater degree of social interaction whether it be technically required or voluntary in nature.

Closely associated with factors of work environment satisfaction and density of technical interaction is the density of work place mates. We expect that greater densities of workers are associated with more satisfaction with the work environment. Greater densities should give rise to greater potentials for social interaction. However, the data do not support this assumption. Even when density is controlled by skill level, no relationship appears.[6]

Social Interaction and Work Environment Satisfaction

This section will examine the degree of social interaction the worker has with his work mates considered apart from contact required for technical reasons. We hypothesized that the greater the amount of voluntary social interaction permitted to a worker the more likely he would be satisfied with his work environment.

The measure of social interaction is derived by simply subtracting the number of verbal exchanges required for technical interaction from the total amount of verbal exchange while working. Table 14 shows that there is no association between the amount of satisfaction with the work environment and the amount of social interaction. The possibilities for

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[6] $\chi^2 = 5.16$; DF = 6; $.50 < P < .70$.

TABLE 14.--Association of social interaction on the job with work environment satisfaction

Degree of Voluntary Social Interaction	Work Environment Satisfaction: Low	High	Totals	
	Percentages			N
No voluntary Social Interaction	17.7	82.3	100.0	(62)
1-5 fellow workers	25.5	74.5	100.0	(55)
6-10 fellow workers	25.0	75.0	100.0	(20)
11 or more fellow workers	26.8	73.2	100.0	(41)
Totals N	(41)	(137)		(178)

$\chi^2 = 1.54$, DF = 3, $P < .70$

*Collapsing the table in terms of no verbal social interaction and some verbal social yields $\chi^2 = 1.50$, DF = 1, $P < .70$.

TABLE 15.--Density of social interaction associated with work environment satisfaction

Density of Social Interaction	Work Environment Satisfaction: Low	High	Totals	
	Percentages			N
Low	21.0	79.0	100.0	(81)
High	38.5	61.5	100.0	(26)
Totals N	(27)	(80)		(107)

$\chi^2 = 3.19$, DF = 1, $.05 < P < .10$

explaining this finding seem limited. There may be, in fact, no relationship between the variables, or there may be a relationship, but it is not evident because of the low numbers in several of the cells. More likely the workers' attitudes toward their work environment may be evaluated on other bases of combinations of factors, social and technical, or social alone. Yet a striking fact is that eight-tenths of the workers who have no social interaction have a high degree of satisfaction with their work environment.

The lack of relationship between the size of the work group and work environment runs contrary to the findings of Ammassari.[7] He showed that in an Italian automobile factory the workers in groups of one to five workers displayed the most satisfaction with their work environment. This size group may permit a sustained pattern of interaction. Larger groups may disrupt social interaction. Ammassari also found that there was an increase in social interaction and work satisfaction when the number of workers with whom one is able to interact expands beyond ten.[8] He attributes this to an increase of choice possibilities. However, he quickly adds that this opportunity to interact with others is circumscribed by work technology.

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[7]Paolo Ammassari, "Worker Satisfaction and Occupational Life: A Study of the Automobile Worker in Italy," Unpublished Ph.D. dissertation, Michigan State University, 1964.

[8]Ibid., pp. 179-80.

One further explanation exists. Research conducted by Robert Dubin in three Midwestern plants was designed to determine, among other things whether work was a central life interest.[9] He found that the work place does not provide the worker with social experiences which are more highly valued than those obtained elsewhere. He also found that a large proportion of industrial workers were non-job oriented with respect to informal group experiences, and that only nine percent preferred the informal group life that is centered in the job.[10]

The second dimension of social interaction we wish to examine includes a spatial factor. We hypothesize a positive association between the density of actual voluntary social interaction and the amount of work environment satisfaction. Data in Table 15 present this relationship. The direction of the relationship suggests that lower densities of social interaction are somewhat related to higher amounts of satisfaction with the environment. This finding harmonizes with Ammassari's.

Total Interaction at Work

When we combine both dimensions of verbal interaction, the required and the voluntary, (social and technical) we arrive

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[9]Robert Dubin, "Industrial Workers' Worlds: A Study of the Central Life Interests of Industrial Workers," Social Problems, January 1956.

[10]Robert Dubin, "Industrial Workers' Worlds" op. cit, p. 61.

at a measure for the total amount of verbal exchange within which the worker takes part while working. We hypothesized that the amount of total interaction is positively associated with the amount of work environment satisfaction. However, the data do not support this.[11] Yet there is a slight negative tendency, the workers having low total interaction rates seem to have higher work environment satisfaction. Skill level is introduced as a control variable in Table 16. There is a slight tendency for an increase in total interaction to be accompanied by higher work environment satisfaction as we move from the unskilled to the skilled workers.

The relationship between the density of total interaction and work environment satisfaction is statistically significant. The direction of the relationship is contrary to that expected. The data indicate that work environment satisfaction tends to decrease as the density of total interaction increases. This finding is consistent with the findings dealing with the densities of social and technical interaction. The combined factors indicate that work environments characterized by high densities of interaction are negatively related to the amount of work environment satisfaction. This suggests that the smaller sized groups of workers wherein densities of interaction are limited are more conducive to an expression of work environment satisfaction. These findings and their implications are consistent with those of Ammassari.

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[11] $\chi^2 = 0.22$; DF = 1; $P < .90$.

TABLE 16.--Degree of total interaction associated with the amount of work environment satisfaction controlling for skill level

Degree of Total Interaction	Low	High	Totals
	Percentages		
Unskilled: Low	19.2	80.3	100.0 (52)
Unskilled: High	24.7	75.3	100.0 (85)
$\chi^2 = 0.56$, DF = 1, .30 < P < .50			
Semi-Skilled: Low	7.1	92.9	100.0 (14)
Semi-Skilled: High	22.6	77.4	100.0 (62)
$\chi^2 = 1.71$, DF = 1, .10 < P < .20			
Skilled: Low	25.7	75.3	100.0 (35)
Skilled: High	15.6	84.4	100.0 (32)
$\chi^2 = 1.03$, DF = 1, .30 < P < .50			
Totals N	(60)	(220)	(280)

TABLE 17.--Density of total interaction associated with work environment satisfaction

	Work Environment Satisfaction		
Density of Total Interaction	Low	High	Totals
	Percentage		
None	19.4	80.6	100.0 (36)
Low	23.2	76.8	100.0 (99)
Medium	24.1	75.9	100.0 (29)
High	33.3	66.7	100.0 (36)
Totals N	(49)	(151)	(200)

$\chi^2 = 18.8$, DF = 3, P < .01.

Conclusions

We have seen that auto workers express a general satisfaction with their work environment in both its physical and social dimensions. Surprisingly few workers are totally constrained by the physical location of their work and similarly few are not permitted by reason of the work ecology to participate in some form of social interaction. Other findings of this chapter point to a positive relationship between the degree of physical mobility allowed a worker and his skill level. The skilled worker has considerably more physical mobility than the unskilled or semi-skilled worker. The amount of physical mobility allowed is related to the potential amount of social interaction in which he may engage. This finding is further substantiated by the positive relationship between the amount of physical mobility and the functional classification of the job. The more highly skilled workers have a greater degree of control over production technology, are able to move about physically over a greater distance, and require more interaction of a technical nature to complete their job than the less skilled worker.

While all workers, regardless of skill level or functional classification, indicate a positive work environment satisfaction; Dubin's doubts about the social meaning of work for the industrial worker suggest that further research is in order.

In sum, we note that the hypotheses related to work environment satisfaction and the nature and type of social

interaction are only weakly supported by the data. It is however evident that work environments characterized by a high density of technical and social interaction tend to foster dissatisfaction with that environment. While neither the measure of density of technical interaction, nor that of density of social interaction yielded statistically significant results; their combination pointed to a statistically significant relationship with work environment satisfaction. The direction of the relationship is opposite that hypothesized.

Finally, the findings indicate that there is a need for more rigorous methods of determining the relative importance of social and technical interaction with respect to work environment satisfaction.

CHAPTER IV

INTERACTION AT WORK AND JOB SATISFACTION

This section deals with the factor of job satisfaction and its relationship to verbal interaction on the job. Job satisfaction as used here differs from the related concept of occupational satisfaction. Occupation refers to a task which is performed in several industries such as agriculture, business, and manufacturing, whereas job refers to a specific routine found only in a particular process in specific industries. Increased specialization in some industries has virtually eliminated some occupational trades. Other trades are now being eliminated by more specialized equipment and advanced technologies.[1]

At one time, a worker in a given occupation could move from one industry to another and find that his skill could be readily utilized. Today this becomes increasingly difficult. In the auto industry many jobs are limited to it alone. They require a limited training period and little knowledge of the general production process. Increased industrial specialization also gives rise to a condition where one would find highly skilled jobs which are unique to the auto industry.

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[1]See Everett C. Hughes, "Personality Types and the Division of Labor," The American Journal of Sociology, March 1928, pp. 754-768.

The concept of job satisfaction refers to the amount of satisfaction the worker experiences with the actual operations he performs. He may be required to perform only a single operation throughout the day, or he may be required to perform a series of different operations to complete his task. The level of satisfaction he experiences is called "intrinsic" job satisfaction.

The particular job of a worker links him to various systems associated with the production process. It links him not only to the technological systems of the production process, but also to larger social systems. His job may so situate him within a physical environment where the potential for interaction is extremely limited by virtue of the technology. On the other hand, his job may be less circumscribed permitting him a considerable degree of physical mobility. This freedom to move about exposes him to a potentially larger social environment.

The technical factors associated with the job are but one part of the work situation which affects behavior. The worker must also relate to his fellow workers, the organizational hierarchy of supervisors and foremen, and various union officials. In essence, physical, social, and technical factors associated with the job all bear some relationship to the amount of satisfaction derived from it.

The factor of technological control over a given job has been well documented by Blauner.[2] The lack of control

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[2]Robert Blauner's, "Worker satisfactions and Industrial Trends in Modern Society," in W. Galeson and S. M. Lipset (editors) Labor and Trade Unionism, New York, John Wiley and Sons, 1960, p. 346.

over the pace of one's work, and the lack of autonomy in the selection of tools leads to a general feeling of dissatisfaction with assembly operations. The physical dimensions of the job, the range of operations required by the job, the variety of operations required, the relationship of the particular job to the entire production process, the degree of supervision, age and seniority, are also factors which have some relationship to the amount of job satisfaction.

Intrinsic Job Satisfaction

In order to ascertain the amount of intrinsic job satisfaction, we asked workers the following questions:

> On the whole, how do you feel about the operations you actually perform on the job, the work that you are actually doing; very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, very dissatisfied?

Data in Table 18 indicate that about eight-tenths of the workers felt that they were satisfied with their job tasks. Less than one-tenth said they were dissatisfied.

The second major question used to obtain a measure of intrinsic job satisfaction asked, "Would you like, without a change in pay, to change your type of work activity once in a while?" Slightly more than half of the workers reported that they were satisfied with their task and would like to continue the same type of work activity. The reason most frequently mentioned for desiring a change in the type of work activity was relief from monotony. The remainder selected other reasons including a desire to learn another skill, and not liking the present activity.

TABLE 18.--Satisfaction with actual job tasks in percent

	N	Percent
Very Satisfied	69	22.5
Satisfied	188	61.4
Neither Satisfied or Dissatisfied	29	9.5
Dissatisfied	14	4.6
Very Dissatisfied	5	1.6
No Answer	1	0.3
Totals	306	99.9

TABLE 19.--Distribution of job satisfaction according to skill level

	Job Satisfaction				
Skill Level	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Totals	
	Percentages				N
Unskilled	16.7	39.1	44.2	100.0	(138)
Semi-skilled	13.6	45.7	40.7	100.0	(81)
Skilled	3.7	38.3	58.0	100.0	(81)
Totals N	(37)	(122)	(141)		(300)

$\chi^2 = 10.8$, DF = 4, P <.05.

TABLE 20.--Functional classification and job satisfaction

Functional Classification	Job Satisfaction: Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Totals
	Percentage			
Assembly	22.9	44.3	32.9	100.0 (70)
Machine Operator	11.1	41.7	47.2	100.0 (72)
Repair, Tester	12.5	35.9	51.6	100.0 (64)
Trades	5.3	40.4	54.3	100.0 (94)
Totals N	(37)	(122)	(141)	(300)

$\chi^2 = 13.0$, DF = 6, $P < .05$

The combined responses to these questions comprised the index of intrinsic job satisfaction. Generally speaking, slightly less than half of the workers interviewed said that they were satisfied with their job.[3] The data in Table 19 clearly indicate that the skilled worker has a higher amount of intrinsic job satisfaction than either the semi-skilled or the unskilled worker. Similarly the functional classification of work and its association with job satisfaction is statistically significant. Table 20 presents this data.

Social Interaction and Job Satisfaction

We hypothesized that there would be a positive relationship between the amounts of social interaction on the job and job satisfaction. We shall first examine the degree of association between actual social interaction of a voluntary nature and the amount of job satisfaction.[4] Although the data in Table 21 show no significant relations, a trend is apparent. The largest proportion of the satisfied workers work alone and the largest percentage of the dissatisfied workers work with one to five people. The largest percent of those neither satisfied nor dissatisfied are found among those interacting with the most people. This is somewhat of

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[3] For additional information concerning the relationship between skill level and job satisfaction see, Steven E. Deutsch, "Skill Level, Social Involvments, and Ideology: A Study of Automobile Workers," unpublished Ph.D. dissertation, Michigan State University, 1964.

[4] The association between potential interaction and job satisfaction is as follows: $\chi^2 = 9.12$, DF = 6, $20 < P < .10$.

TABLE 21.--Distribution of job satisfaction according to the amount of social interaction at work

Voluntary Social Interaction	Job Satisfaction: Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Totals	
	Percentages				N
None	7.9	39.7	52.4	100.0	(63)
1-5 fellow workers	19.3	38.6	42.1	100.0	(57)
6 or more fellow workers	14.5	43.5	41.9	99.9	(62)
Totals	(25)	(74)	(83)		(182)

$\chi^2 = 4.02$, DF = 4, $.30 < P < .50$

TABLE 22.--Social interaction associated with job satisfaction and skill level

Voluntary Social Interaction	Job Satisfaction: Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Totals	
	Percentages				N
Unskilled					
No Social Interaction	7.7	38.5	53.8	100.0	(26)
1-5 fellow workers	24.2	36.4	39.4	100.0	(33)
6 or more fellow workers	20.0	36.0	44.0	100.0	(25)
χ^2 = 3.05, DF = 4, *violated 20% expected assumption					
Semi-skilled					
No Social Interaction	5.9	47.1	47.1	100.2	(17)
1-5 fellow workers	25.0	33.3	41.7	100.0	(12)
6 or more fellow workers	23.5	41.2	35.3	100.0	(17)
χ^2 = 2.68, DF - 4, *violated 20% expected assumption					
Skilled					
No Social Interaction	10.0	30.0	60.0	100.0	(20)
1-5 fellow workers	0.0	50.0	50.0	100.0	(12)
6 or more fellow workers	0.0	55.0	45.0	100.0	(20)
χ^2 = 5.16, DF = 4, *violated 20% expected assumption					
Totals N	(25)	(72)	(84)		(182)

a reversal of expectation, for we expected the largest group to be in the satisfied sector.

The relationship between the amount of social interaction and job satisfaction is controlled by skill level in Table 22. The data are not conclusive, but some trends appear. Of the unsatisfied workers, slightly less than one tenth of the unskilled and semi-skilled are isolated, while all of the unsatisfied skilled workers worked in isolation. In essence, greater percentages of skilled workers who are either satisfied or dissatisfied have no social interaction on the job, while the greater percentage of unskilled and semi-skilled workers are found among those having some voluntary social interaction. The differences are small, the trend is not clear, but the assumption that skilled workers have more freedom and therefore have more social contacts and are more satisfied with their job is not confirmed.[5]

Next we examine the relationship of density of social interaction with job satisfaction. Data in Table 23 show that isolated workers tend to be somewhat more satisfied than those in higher density interaction situations, but the relationship is not strong or statistically significant.

We now turn to examine the relationship between the required technical interaction of the job and job satisfaction. We hypothesized that there would be a positive relationship between the two variables. The data in Table 24 show no statistically significant results, for the pattern of satisfaction

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[5]The relationship between job satisfaction and the distances one can move while working is statistically significant. $\chi^2 = 15.45$, DF = 6, $P < .01$.

for those whose jobs require no technical interaction and for those who require a great deal is the same.

An examination of the relationship between the density of technical interaction and the amount of satisfaction with the job yields no significant findings. A slight trend may be discerned, that higher densities of technical interaction appear to be a source of dissatisfaction. This is a reversal of the hypothesized relationship.

The introduction of a control variable, skill level, to the above relationship does little to clarify the nature of the association. The trends indicate that skilled workers have higher amounts of satisfaction with lower densities of technical interaction: among the semi-skilled workers no pattern is apparent; however a higher percentage of satisfied workers is found in high density situations. Finally for unskilled workers, the highest percentage of satisfied workers is found in high density situations.

The tentative conclusions one can draw for the data which are not statistically significant is that, while there are highly irregular patterns, a greater proportion of the satisfied workers are found among the isolated. That is, an increase in the density of required technical interaction generally is accompanied by an increase in job dissatisfaction. This same reversal has been noted by Ammassari among the Fiat workers.[6]

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[6]See Ammassari, op. cit., Chapter 5 and 6 are particularly relevant to this point, but the entire dissertation notes this pattern.

TABLE 23.--Density of social interaction at work associated with job satisfaction

Density of Voluntary Social Interaction	Job Satisfaction: Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Totals	
	Percentages				N
None	2.8	52.8	44.4	100.0	(36)
Low	22.4	42.9	34.7	100.0	(49)
High	19.2	38.5	42.3	100.0	(26)
Totals N	(17)	(50)	(44)		(111)

$\chi^2 = 7.01$, DF = 4, $.10 < P < .20$.

TABLE 24.--Degree of technical interaction according to the amount of job satisfaction in percentages

	Job Satisfaction				
Amount of Technical Interaction	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Totals	
None	17.0	34.0	49.1	100.0	(53)
Low	11.3	42.3	46.4	100.0	(97)
Medium	11.5	46.2	42.3	100.0	(26)
High	10.3	37.9	51.7	99.9	(29)
Totals	(26)	(82)	(97)		(205)

$\chi^2 = 2.45$, DF = 6, $.90 < P < .80$

TABLE 25.--Amount of total interaction associated with job satisfaction in percentages

	Job Satisfaction				
Total Interaction	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Totals	
None	12.5	50.0	37.5	100.0	(16)
Low	11.4	43.9	44.7	100.0	(114)
Medium	19.6	45.1	35.3	100.0	(51)
High	7.8	37.7	54.5	100.0	(77)
Total N	(31)	(110)	(117)		(258)

$\chi^2 = 5.12$, DF = 6, $.50 < P < .30$

The final index of interaction examined is the amount of total interaction. The data in Table 25 offer no statistically significant relationship between actual total interaction and the amount of job satisfaction.

These slight differences in the table must be interpreted with caution, however, for the major portion of the workers sampled have either a neutral or generally satisfied attitude toward the job. It is suggested that situations which are characterized by low to moderate amounts of social and technical interaction are generally more conducive to meaningful interaction which can be controlled by the worker.

Conclusions

An examination of the amount of intrinsic job satisfaction of the auto workers sampled indicated that the vast majority (83%) was satisfied with their jobs. Skilled workers had a higher degree of satisfaction with their job than the unskilled or semi-skilled. Those who worked alone or in a small group tended to be more satisfied with their jobs. Apparently the size of the work group had a greater effect upon the social interaction and job satisfaction of the skilled workers than unskilled or semi-skilled workers. As the size of the work group increased, the percentage of satisfied skilled workers decreased.

With respect to density of social interaction the data showed that those in high density social interaction situations tended to be more dissatisfied with their jobs than those in

isolated work situations. Moreover, situations characterized either by no required interaction or by a high degree of interaction are viewed as more satisfactory than others. In general, the data suggest that extremes of technical interaction, high or none, tend to promote feelings of job satisfaction.

All these generalizations must be viewed as tentative for several reasons. First, since most workers seem to be satisfied with their jobs, the trends reported are for a minority of the workers. Second, the complexity of the concept of job satisfaction presents some difficulties in properly assessing the role which interaction plays in contributing significance of the data at acceptable standards. Lastly, insufficient data made generalizations hazardous.

CHAPTER V

PATTERNS OF WORK INTERACTION AND UNION PARTICIPATION

Worker participation in the labor union may be stimulated by dissatisfactions experienced in the plant, by aspirations to improve the work situation, and other reasons. Dissatisfactions generated by isolated work situations, by over crowding, or other socio-technical factors may stimulate union participation. Deutsch's investigation showed that three-quarters of the unskilled workers had average or little interest in union problems, and one-sixth had a strong interest.[1] He also showed that no significant difference occurred between semi-skilled and skilled workers in awareness of union problems. Moreover, there was no association between the age of the worker and his interest in unions, although there was a tendency for younger workers to be slightly more interested than older workers.

While the majority of union members were relatively uninterested in union problems, the vast majority did recognize the need for a union and had favorable attitudes toward it.

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[1]Steven Deutsch, "Skill Level, Social Involvements and Ideology: A Study of Automobile Workers," unpublished Ph.D. dissertation, Michigan State University, 1964, p. 55.

Even though the skilled workers were not interested in union problems, they evaluated the union more favorably than lower skilled workers. Since skilled workers tended to be the older, they had worked in non-union shops and they compared the present very favorably to earlier periods.

Sayles and Strauss suggest that skill is associated positively with amount of union participation and participation in informal groups in the shops.[2] Our measures of socio-technical and verbal interaction tap "informal" participation. These measures, along with the union participation index, are useful in evaluating worker behavior.[3]

Deutsch summarizes Dean's research:

> Participation in the union may be predicted by the extent of his social integration with fellow workers away from the factory. Kyllonen, Seidman, et al.; Sayles and Strauss; Rose; Tannenbaum; and Kahn all saw union activity as special activity and related to worker social cohesion or social activity.[4]

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[2]Leonard Sayles and George Strauss, The Local Union, Its Place in the Industrial Plant, New York, Harper Brothers, 1953. Also see, Joseph Kouner and Herbert Lahne, "Shop Society and The Union," Industrial and Labor Relations Review, October, 1953, p. 314.

[3]For a summary of related literature see, William Spinrad "Correlates of Trade Union Participation: A Summary of the Literature," American Sociological Review, April, 1960, pp. 237-244. See also, Jack Stieber, Governing the U.A.W., New York, John Wiley & Sons, 1962.

[4]Deutsch, op. cit., p. 62. He cites: "Social Intergration, Attitudes, and Union Activity," Industrial and Labor Relations Review, Oct. 1954, pp. 48-58; Toimi E. Kyllonen, "Social Characteristics of Active Unions," American Journal of Sociology, May, 1951, pp. 528-533; Joel Seidman, et al., The Worker Views His Union, Chicago, The University of Chicago Press, 1958; Leonard R. Sayles and George Strauss, The

Therefore it seems reasonable to expect skilled workers to exhibit a higher rate of participation within the union and higher rates of interaction in the plant than the less skilled worker.

The index of union participation was constructed from the responses to these questions.

"How frequently do you attend union meetings?"

"Do you now hold office in the union?"

"Do you participate in union activities?"

"Do you know the names of current local union officials?"

The index was cross tabulated with the various measures of interaction. Table 26 displays the data on the association between skill level and union participation.[5] The findings clearly indicate that skilled workers participate more in the union than do the unskilled and semi-skilled workers. Additional data on union voting support this finding. About 49 percent of the unskilled workers, 65 percent of the semi-skilled workers, and 78 percent of the skilled workers reported they voted in the last election of union officials. These findings conform to expectation.[6]

Local Union: Its Place in the Industrial Plant, New York, Harper Brothers, 1963; Arnold Rose, Union Solidarity, Minneapolis, University of Minnesota Press, 1952; Arnold S. Tannenbaum and R. L. Kahn, Participation in Union Locals, Evanston, Illinois, Row Peterson and Son, 1958.

[5]The association between union participation and functional classification is as follows: $\chi^2 = 18.09$, DF = 6, $P < .05$.

[6]Actually one fifth of the local membership voted and an even smaller percentage regularly attend local union meetings, therefore data on union participation must be regarded with some caution.

We turn now to data on the relation between union participation and sociotechnical interaction. We hypothesized that higher levels of technical interaction are positively associated with union participation. The data in Table 27 do show a strong tendency in the direction of the hypothesis.[7] There is a tendency for those with a low degree of technical interaction to participate less in the union than those having higher amounts of technical interaction.

We turn to the hypothesized relationship that higher densities of technical interaction are positively associated with the degree of union participation. Data in Table 28 support the hypothesis. However, whether there is a causal relationship between dissatisfaction with highly dense work situations and active union participation cannot be demonstrated.

Data on density of work place mates and its association with union participation are found in Table 29. Although the relationship is not statistically significant it appears in the expected direction; higher densities are associated with higher participation.[8]

A considerable amount of research dealing with union participation suggest that a major factor influencing participation in the union is informal interaction within the plant. We hypothesized that there would be a positive association

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[7] $\chi^2 = 12.4$, DF = 6, $.10 < P < .05$.

[8] $\chi^2 = 3.81$, DF = 2, $.10 < P < .20$.

TABLE 26.--Union participation according to skill level

	Union Participation				
Skill Level	Low	Medium	High	Totals	
	Percentages				N
Unskilled	22.7	45.5	31.8	100.0	(132)
Semi-skilled	21.1	47.4	31.5	100.0	(76)
Skilled	8.8	37.5	53.8	100.1	(80)
Totals	(53)	(126)	(109)		(288)

$\chi^2 = 14.1$, DF = 4, $P < .01$.

TABLE 27.--Technical interaction according to union participation

	Union Participation				
Technical Interaction	Low	Medium	High	Totals	
	Percentages				
None	25.0	40.4	34.6	100.0	(52)
Low	15.2	44.4	40.4	100.0	(99)
Medium	11.1	29.6	59.3	100.0	(27)
High	3.4	34.5	62.1	100.0	(29)
Totals	(32)	(83)	(92)		(207)

$\chi^2 = 12.4$, DF = 6, $.10 < P < .05$.

TABLE 28.--Density of technical interaction associated with union participation

Density of Technical Interaction	Low	Medium	High	Totals	
		Percentages			N
Low	28.0	36.0	36.0	100.0	(50)
Medium	13.8	46.2	40.0	100.0	(65)
High	10.5	26.3	63.2	100.0	(19)
Totals N	(25)	(53)	(56)		(134)

$\chi^2 = 8.20$, DF = 4, $.05 < P < .10$.

between these variables. Although the data in Table 30 do not offer firm statistical support they are in the predicted direction; workers who associate with larger numbers of fellow workers tend to participate more in the union.

An aspect of social interaction closely related to the index used above is the measure of the density of social interaction. We hypothesized that the greater the density of social interaction in the plant, the greater the amount of participation in the union. However, no association was found.[9]

The final two dimensions we shall examine are total interaction within the work situation and the amount of friendly interaction workers engage in outside the plant. Table 31 shows that workers with low total interaction also have the lowest amount of union participation; those with a moderate level of total interaction tend to have a moderately high amount of union participation; and the highest interactors have the highest percentage of union participation.

The basic trend seems to be moderate interaction, high union participation, moderate union attendance, favorable attitudes toward the union, agreement on the necessity of the union, and moderate interest in union problems.[10]

The last measure of social interaction with which we shall deal is the amount of social interaction a worker has

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[9] $\chi^2 = 4.2$, DF = 6, $.70 < P < .50$.

[10] The association between the density of total interaction and union participation is $\chi^2 = 9.2$, DF = 6, $.20 < P < .10$.

TABLE 29.--Density of work place mates according to degree of union participation

Density of Work Place Mates	Union Participation: Low	High	Totals	
	Percentages			N
Low	31.4	68.4	100.0	(35)
Medium	16.9	83.1	100.0	(118)
High	17.5	82.5	100.0	(57)
Totals N	(41)	(169)		(210)

$\chi^2 = 3.81$, DF = 2, .10 < P < .20

TABLE 20.--Degree of social interaction according to degree of union participation

Degree of Voluntary Social Interaction	Union Participation: Low	Medium	High	Totals	
	Percentages				N
None	17.2	43.8	39.1	100.0	(64)
1-5 fellow workers	21.1	45.6	33.3	100.0	(57)
6 or more fellow workers	12.9	32.3	54.8	100.0	(62)
Totals	(31)	(74)	(78)		(183)

$\chi^2 = 6.28$, DF = 4, .10 < P < .20

TABLE 31.--Degree of total interaction according to amount of union participation

Degree of Total Interaction	Union Participation				
	Low	Medium	High	Total	
None	31.3	56.3	12.5	100.1	(16)
Low	20.4	49.5	30.1	100.0	(103)
Medium	25.5	41.2	33.3	100.0	(51)
High	10.4	40.3	49.4	100.1	(77)
Totals	(47)	(112)	(88)		(247)

$\chi^2 = 14.41$, DF = 6, $P < .05$

TABLE 32.--Friendly interaction outside the plant associated with union participation

Friendly Interaction Outside The Plant	Union Participation				
	Low	Medium	High	Totals	
No	25.9	49.4	24.7	100.0	(77)
Yes	15.6	41.7	42.7	100.0	(288)
Totals	(53)	(126)	(109)		(288)

TABLE 33.--Friendly interaction outside the plant associated with union participation

Friendly Interaction Outside The Plant	Union Participation			
	Low	Medium	High	Totals
1-5	15.6	46.7	37.8	100.1 (90)
6-10	27.9	39.5	32.6	100.0 (43)
11-plus	8.9	37.2	53.8	99.9 (78)
Total N	(33)	(88)	(90)	(211)

$\chi^2 = 11.1$, DF = 4, $P < .02$

with his fellow workers outside the plant. The data are found in Tables 32 and 33. The data in Table 32 clearly indicate that the majority of workers get together with fellow workers at least occasionally. They indicate further that there is a tendency for workers who do become involved in friendly interaction outside the plant to participate in their union in moderate or high degrees.

The data in Table 33 attempts to examine the relationship and relative extensity of off-the-job interaction for workers who have indicated that they do get together with fellow workers outside the plant occasionally. The association is statistically significant. The data suggest that those who interact with fellow workers outside the plant tend to participate more in the union.

Conclusions

We have attempted to ascertain the degree of association existing between the various dimensions of social interaction and union participation. We have seen that while the majority of workers expressed an average or slight interest in their union problems, they nonetheless exhibited a favorable attitude toward their union and felt that it was necessary. Skilled workers tended to have higher rates of union participation than unskilled or semi-skilled workers. This finding was consistent with other research.

The dimensions of interaction as developed by our indexes offered no statistically acceptable measures of association

with union participation. Yet they pointed to certain tendencies. Workers with low degrees of technical interaction tended to participate less in the union than fellows with higher levels of interaction. Increased density of technical interaction also tended to raise union participation. Crowding may have aggravated feelings of dissatisfaction toward management and increased union participation.

With respect to the social interaction variables and union participation, the data indicated that those in work groups containing one to five workers had higher percentages of moderate union participators. This is consistent with other data which showed that the majority of workers had a moderate degree of union participation as measured on several dimensions.

Our data also showed that as the size of the group with which workers were able to interact increased, so did union participation. For the index of <u>total</u> interaction, those with moderate and high degrees of it have the highest amounts of union participation. The amount of friendly interaction outside the plant is related to union participation.

In sum, there was a weak but general relationship between technical, social, and total interaction rates and degree of union participation.

CHAPTER VI

WORK INTEGRATION PATTERNS AND COMMUNITY INVOLVEMENT

In chapter I we stressed that the larger social systems in which the automobile worker lived (community, state and nation) should be related to their world of work. While the worlds of work and non-work may appear to be distant, there is, we hypothesized, a theoretical if not empirical relationship between them. In this chapter we shall focus upon the degree of association between a worker's interaction at the plant and the degree of his community involvement. Studies by Kornhauser,[1] Stokes,[2] and others indicate that the participation of auto workers in such associations tends to be low.

Deutsch's findings show a high positive relationship between the occupational skill level of the auto worker and participation in voluntary associations.[3] A study by Form and

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[1]Ruth Kornhauser, "Some Social Determinants and Consequences of Union Membership," Labor History, Winter, 1961.

[2]Donald Stokes, "Political Communications to Union Workers," unpublished study, University of Michigan, undated.

[3]Deutsch, op cit., p. 107.

Dansereau attempted to ascertain the links between plant life and community integration.[4] They found a relationship between these variables and patterns of union orientation.

Deutsch's extensive analysis on participation emphasizes the importance of ecological factors. He states, "Less than ten percent of those interviewed stated that friends that they got together with live in their neighborhood, and just over half get together with friends in their towns. About one-third meet socially with friends who live in other towns."[5]

This finding, contrary to expectations may be accounted for in ecological terms. The auto workers commute to the plant from areas within a radial distance of 60 miles of the plant. A number of small towns are located within this area. Thus, extra plant social life is affected by the community of residence of friends.

The index of community involvement was developed from responses to a series of questions which may be found in appendix A. The first area we shall examine is the association between the skill level and the amount of community involvement. Data in Table 34 indicate a clear relationship between the two variables. This finding is consistent with other studies which stress that skilled workers are more frequently members of voluntary associations than unskilled or semi-skilled workers.

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[4]William H. Form, and H. K. Dansereau, "Union Member Orientations and Patterns of Social Integration," Industrial and Labor Relations Review, October, 1957, p. 3-12.

[5]Deutsch, Ibid., p. 112.

Participation in voluntary associations accounts for most of the variance in our index of community participation.

Recalling that functional classifications of the workers tend to be associated with skill levels, degree of physical mobility within the plant and voluntary social interaction, we shall examine the relationship between functional categories and the degree of community involvement. Table 35 presents the association which reaches a level of statistical acceptability. The data for the first three categories, assembly, machine operator, and repair, exhibit a pattern in the shape of an inverted J. That is, there is a steady increase from low to moderate community involvement and then a falling off at the highest level. A plurality of assembly, machine operators, and repair men tend to have moderate levels of community involvement. This situation for those in the trades probably reflects their greater degree of physical mobility in the plant and their ability therefore to interact with a larger number of fellow workers on the job and off the job.

The association between the size of group the worker interacts with and the amount of community involvement was explored but no statistically significant relationship was found. We noted, however, that workers who are able to interact with six to ten fellow workers have the largest representation among those highly involved in the community. Those in smaller groups and isolated workers exhibit the lowest degree of community involvement.

TABLE 34.--Skill level associated with community involvement

	Community Involvement				
Skill Level	Low	Medium	High	Total	
Unskilled	20.1	56.1	23.1	99.9	(139)
Semi-skilled	13.4	43.9	42.7	100.0	(82)
Skilled	7.4	37.0	55.6	100.0	(81)
Totals N	(45)	(144)	(113)		(302)

$\chi^2 = 24.98$, DF = 4, $P < .001$

TABLE 35.--Functional classification associated with community involvement

	Community Involvement				
Functional Classification	Low	Medium	High	Total	
Assembly	24.6	50.7	24.6	99.9	(69)
Machine Operator	12.2	51.4	36.5	100.1	(74)
Repair Tester	15.6	53.1	31.3	100.0	(64)
Trades	9.5	38.9	51.6	100.0	(95)
Totals N	(95)	(144)	(113)		(302)

$\chi^2 = 17.7$, DF = 6, $P < .01$

We then examined the association between the density of social interaction and the amount of community involvement. We hypothesized that the greater the degree of density of social (non-technical) interaction, the greater the degree of community involvement. The data, however, did not support the hypothesis. However, those who work in moderately dense situations tend to have greater community involvement.

An examination of the degree of association between community involvement and other dimensions of verbal interaction was undertaken. The relationship between the amount of technical interaction[6] as well as the density of technical interaction[7] and community involvement offer no statistically significant results.

The last two tables contain data on the relationship between the degree and density of the total interaction at work and community involvement. We hypothesized that the greater the degree of and the density of total interaction a worker experienced, the greater the degree of community involvement. Table 38 shows a statistically acceptable relationship between the degree of community involvement, and total interaction. While the majority of workers indicate a low or moderate range of total interaction and a moderate degree of community involvement, we nevertheless are able to

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[6]Degree of Technical Interaction Associated with Community Involvement: $\chi^2 = 6.66$, DF = 6, $P < .50$.

[7]Density of Technical Interaction Associated with Community Involvement: $\chi^2 = 8.00$, DF = 6, $P < .30$.

discern a trend wherein community involvement tends to increase with amount of total interaction at work.

Table 39 indicates a curvilinear relationship between the density of total interaction and the level of community involvement. Workers in sectors which are either sparsely populated on the one hand or somewhat crowded on the other, are less involved in the community than those who work in moderately dense environments. It appears as though the density extremes negatively affect the degree of community involvement. Perhaps workers in situations of moderate density are more able to control interaction on both the technical and social levels. This satisfying situation may carry over into community situations, although we have no direct evidence for this.

Conclusions

We have found that skilled workers are most likely to have a higher amount of community involvement than their less skilled associates. This involvement is mostly in voluntary associations. Another factor which may affect the amount of community involvement is the pattern of ecological residence of workmates. The auto workers live in many small towns which are located within a radius of sixty miles from the plant. Initially we felt that those living in the small towns might know one another, ride to work together and participate more in local community life. However, we found that sixty percent of the workers rode to work alone and no differences were found among the categories for these variables.

TABLE 38.--Degree of total interaction according to the degree community involvement

Degree of Total Interaction	Community Involvement: Low	Medium	High	Totals	
	Percentages				N
None	20.0	40.0	40.0	100.0	(15)
Low	18.6	48.7	32.7	100.0	(113)
Medium	3.7	59.3	37.0	100.0	(54)
High	15.2	39.2	45.6	100.0	(79)
Total N	(38)	(124)	(99)		(261)

$\chi^2 = 11.2$, DF = 6, $P < .05$

TABLE 39.--Density of total interaction associated with the degree of community involvement

Density of Total Interaction	Community Involvement: Low	Medium	High	Totals	
	Percentages				N
None	29.7	43.2	27.0	99.9	(37)
Low	9.0	45.0	46.0	100.0	(100)
Medium	13.8	44.8	41.4	100.0	(29)
High	29.7	51.4	18.9	100.0	(37)
Total N	(35)	(93)	(75)		(203)

$\chi^2 = 17.7$, DF = 6, $P < .01$

Our data suggested that those with low degrees of community involvement were found in situations characterized by isolation or high degrees of social interaction. Situations which are either crowded or sparsely populated tend to have a negative effect upon social interaction and there may be a carry over of this into the community.

A statistically significant association was obtained between degree of total interaction and the degree of community involvement, as well as the density of total interaction and community involvement. The clearly indicated curvilinear relationship of the density of total interaction adds support to the earlier findings regarding low and high density work situations. In sum, the workers tended to exhibit differential amounts of involvement in the community as they varied in skill level, functional classification and the amount and density of social interaction at work.

CHAPTER VII

CONCLUSIONS

We have attempted to evaluate the relationship between technical and social (verbal) interaction patterns of automobile workers of varying skill levels on such dimensions of work as work environment satisfaction, job satisfaction, union participation, and community involvement. While the data offer little conclusive evidence, they offer some credance to the hypothesized relationships.

Generally, the workers are satisfied with their workplaces, their jobs, their daily contacts with fellow workers, their union, and their community of residence. An examination of the several dimensions of verbal interaction and work environment satisfaction, job satisfaction, union participation, and community involvement yielded little empirical evidence as to the nature of these relationships. Table 38 shows that three of the original eleven hypotheses were rejected for the lack of supporting data. Only one hypothesis met our statistical tests but six others were in the expected direction.

Hypothesis one posited a relationship between technical interaction and work environment satisfaction. The trend in the data indicates that an increase in the degree of technical

interaction is accompanied by an increase in work environment satisfaction with the one exception at the level of no technical interaction.

Hypothesis two expected a positive relationship between degree of social interaction and work environment satisfaction. This hypothesis is rejected.

Hypothesis three suggested a positive relationship between the total interaction (social and technical) and the degree of satisfaction with the work environment. There is no statistical relationship between these variables although there seems to be a slight negative tendency present in the data. The worker who has a low degree of total interaction seems to have higher work environment satisfaction.

The next three hypotheses were formulated about the variable of job satisfaction. Hypothesis four states there is a positive relationship between technical interaction and job satisfaction. Although the relationship is not statistically significant, a trend is apparent; higher densities of technical interaction tend to be associated with job dissatisfaction.

Hypothesis five posits a positive relationship between social interaction and job satisfaction. The trend suggests the largest proportion of satisfied workers work alone, while the largest proportion of dissatisfied are found in groups of one to five workers. Further, the largest proportion of those neither satisfied nor dissatisfied are among those interacting with the most people. This is a slight reversal of expectations.

Hypothesis six stated that there would be a positive relationship between the total amount of interaction and job satisfaction. A trend is apparent although the direction is reversed; the greater the amount of total interaction, the greater the degree of dissatisfaction.

Hypotheses seven through nine dealt with union participation. We predicted a positive relationship between social interaction and union participation in hypothesis seven. The trend is for workers who associate with larger numbers of fellow workers tend to participate more in their union.

Hypothesis eight which suggested a positive relationship between technical interaction and union participation was rejected. Hypothesis nine asserts that there is a positive relationship between the total amount of interaction and the degree of union participation. A tendency is apparent in which those with low amounts of total interaction tend to have moderate participation levels, and the highest interactors have the highest percentage of union participators.

Hypothesis ten stated that there is a positive relationship between social interaction and community involvement. A trend is apparent wherein workers able to participate in a work group of six to ten fellow workers have the highest proportion of those highly involved in the community.

Hypothesis eleven suggested a positive relationship between the total amount of interaction and community involvement. This is statistically significant.

Although the data fails to lend empirically significant support for the hypothesize relationships, an abandonment of the general theory seems premature. The evidence available tends to support the general hypothesized relationships. A more adequate test of the theory needs to be formulated. The hypothesis, presently in a very general form, need to be more clearly and narrowly delimited; intervening variables need to be specified and controlled in cross tabulations, and the possitilities of curvilinearity of the data also need to be specified. The influence of such variables as skill level, functional classification of the job, situs location within various departments of the plant, and technological requirements of particular jobs needs to be accounted for in a more rigorous manner.

Criticisms of this research are many. One of the major shortcomings was the low total number of cases available in various cross runs. Incomplete schedules, missing data, and general "vague" answers resulted in many cases being dropped from some tables. Such problems can only be rectified at the initial stages of research.

Clearly a modification of the study design would lead to a clearer understanding of the relationship between technology and interaction. The major limit to the present design is that it focused on reported interaction patterns only.

The incorporation of several dimensions of Meissner's thesis would aid our understanding.[1] Meissner's thesis is

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[1]Martin Meissner, "Worker's Communications and the Means of Production," mimeographed, to be published in the Canadian Review of Sociology and Anthropology, forthcoming.

TABLE 38.--Summary of outcomes of hypotheses

Hypothesis		Confirmed	Trend Apparent	No Relationship
Work Environment Satisfaction	1.		*	
	2.			*
	3.			*
Job Satisfaction	4.		*	
	5.		*	
	6.		*	
Union Participation	7.		*	
	8.			*
	9.		*	
Community Involvement	10.		*	
	11.	*		

that at different levels of technology the opportunities for communication among workers is modified by the technical demands through which a worker's action is linked into the design of the production process. Meissner devised some scales to describe, (a) the differences in operations by which one work piece is converted from one state to another, and (b) the different methods of moving such work pieces. The elements in the scale are energy supply, tool and work piece manipulations during operations, feeding, loading, assembling, control over the work cycles, planning, and feedback.[2]

The mediating variable between the things a worker has to do in order to get his job done, and the technical character of the work station is the attention requirements for coordinate

[2] Ibid., p. 5.

activity. Meissner distinguishes five major kinds of attention: (1) low, (2) surface, (3) detailed, (4) external focus, and (5) watching.[3]

The benefits of categorizing the technical dimensions of the work space as well as the attention requirements of the worker are obvious. An additional value of Meissner's work is the attention he gives to the various rates and kinds of communications existing among the workers. By observing a particular work station he is able to determine the frequency of communication units sent and received per hour. The types of communication classes he coded were speech, (where direct talking or shouting occurred without the aid of technical devices), signs, (clues emitted by an individual other than speech) signals, (produced by a technical transmitter and received by sight or sound such as light indicators, telephones, or chalk marks on a piece of work) and objects, (cues produced by control over the positioning of a material object and received by sight, sound or touch.[4]

The incorporation of the major dimensions of Meissner's paper into the present design would greatly aid the understanding of the relationship between technology and interaction patterns in this industrial setting of the automobile factory.

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[3] Ibid., p. 7,8.

[4] Ibid., p. 12.

APPENDIX A

Do you like living in your community?

Response	Percent
Yes	90.8
No	8.0
N.A.	1.2
Total	100.0

Do you belong to any voluntary associations?

Response	Percent
Yes	43.0
No	57.0
Total	100.0

What are the problems of your community?*

Response	Percent
Problem mentioned	83.5
None seen, don't know	16.5
Total	100.0

*Rather than list the complete set of coded responses, we shall select a few which appeared more frequently; 9.2% said there were no problems; 23% mentioned health services; 9.2% said auto traffic control, parking and public transportation; 7% mentioned taxes and finances; 7% mentioned sanitary services.

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